Intermediate Mathematics

Lessons 1–20

Succeed in School

1

Teacher

Creating Christ-Centered, Learner-Focused Experiences

Thank you for accepting the call to be a Succeed in School teacher. You will bless the lives of those you teach. The Lord will bless you because of your service to the youth.

The goal of Succeed in School is to help students learn and progress in their education and develop a stronger testimony of Jesus Christ. The lessons and activities will help youth at the intermediate level learn mathematics, reading, writing, speaking, and listening skills.

The following ideas can help you create Christ-centered, learner-focused experiences as you gather together:

1. Focus on conversion: Succeed in School gatherings should help the students become more converted to Jesus Christ and His gospel. Find opportunities to bear your testimony about the gospel principles that are included in the lessons and activities. Encourage the students to pray to Heavenly Father for help and guidance in their schoolwork and in other areas of their lives. Invite the students to share their testimonies in class and with friends and family members.

2. Make learning relevant: The lessons and activities will help the students develop the skills they need for school and future opportunities. Encourage them to apply the things they learn to their lives and to discuss them with their friends and family members. There may be words or ideas in the activities that they do not recognize. Use familiar examples, phrases, or stories to help them make connections and understand what they are learning.

3. Create a sense of belonging: Each time you gather, encourage the students to be kind to each other as they work together to solve problems, ask questions, make mistakes, and think through challenges. This will help the students feel comfortable, safe, and welcomed. They will grow closer together and learn to rely on and help each other. As the students work in groups, ensure that every student participates and feels included.

4. Help all students learn: The students may be at different levels of learning. Ask them to help each other as they work together in groups or pairs. If most of the students do not understand what is being taught, it is OK to review the lesson or go more slowly. If the students continue to struggle, consider finding others in your ward or branch who can also help your students learn. Each student should have their own workbook to use each day. Once they have finished their workbooks, they can take them home to share with their families and teach what they have learned.

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Contents

Class Rules

The class rules below are in each of the student workbooks. Review them with the students regularly. Remind the students that following the rules will help make the class a positive experience for everyone.

Be Responsible	Be Respectful	Be Ready
▪ Arrive on time. ▪ Stay on task. ▪ Follow instructions. ▪ Help clean up.	▪ Listen to others. ▪ Use kind words; do not tease. ▪ Do not distract others.	▪ Bring enough work to do. ▪ Bring and share resources. ▪ Ask for help. ▪ Help others.

How to Use This Guide

The Succeed in School mathematics lessons are written to help the students with basic mathematics skills. You do not have to be a mathematics expert to teach this class. The lessons will tell you how to teach the skills, what questions to ask, and how to help the students do the activities. The students will learn through class discussions, group activities, and partner work. They will also share ideas and help each other. The class should be full of active learning and fun.

Teach the students that it is OK to make mistakes. Do not allow the students to laugh at or tease other students who make mistakes. Help them understand that mistakes are part of learning. When students believe in their ability to learn, they will grow in confidence.

Start class on time so that the students learn it is important to be on time. Each lesson should last about 40–50 minutes, but you may need more time if your students do not understand the lesson.

Each mathematics skill is taught in two lessons: part A and part B.

Lesson Part A

Part A explains the mathematics skill. This skill may be a review for students or the first time they are learning it. You may have some students who have a hard time learning the skill. It may help to ask these students to work with older or more skilled students. This can give the more skilled students the opportunity to teach, and it may help the struggling students learn the skill.

Each lesson includes step-by-step instructions on how to teach the skill, practice problems for the students, and opportunities to see how well the students are learning. Include the students as much as possible. Try not to spend a lot of time at the board by yourself. Instead, ask the students to discuss and work together to learn the skill.

Lesson Part B

Part B helps the students learn to use the new skill in several problem-solving activities. These activities will help students learn how to use critical-thinking skills to think deeply about a problem and to analyze what they are learning. Students will also learn how to read the problems, decide what to do, and use what they've learned to solve the problems.

These activities are often done in pairs or small groups so that students can work together to think about and discuss each problem. Some students may need help from you and other students. As you help them, encourage them to solve the problems on their own as much as possible. Doing so will help the students learn problem-solving skills that will help them in other areas of their lives.

How to Use This Guide

Teaching the Lessons

Each lesson follows six steps:

Step 1: Lesson Overview

Read through the lesson overview before class.

- **Learning outcomes:** Read this to know what students will learn in the lesson.
- **Vocabulary words:** Review new words with the class before the lesson begins.
- **Helpful videos:** Before teaching the lesson, you can watch these short tutorials (usually by Khan Academy) to learn the mathematics skill. You can also show the videos during class.

Step 2: Discussion

This section tells you how to teach the mathematics skill or introduce the activity. Remember to involve the students by asking questions and giving them time to think and answer.

Step 3: Activity

In this section of the lesson, the students practice the skill in pairs or small groups. Here are some key things to remember:

- **Participation:** Make sure each student is helping to solve the problems.
- **Monitor:** Walk around the room and help the students as needed. Praise students for working hard and helping each other.
- **Discussion:** Ask groups or partners to share how they solved the problems.
- **Problem-Solving:** Help students learn to try new things and solve problems together and on their own. (See "Tips When Teaching Problem-Solving Lessons.")

Step 4: Practice

This section allows students to practice what they have learned. It will include a set of problems or a game.

Step 5: Closing (before class ends)

Before the students leave for the day, gather the class together to review what they have learned. You may also wish to testify of a gospel principle or something the students read that day. Invite the students to think about what they have learned and share it with a friend or family member.

Step 6: Reflection (after class)

Complete this part of the lesson after class is over. Reflect on how the lesson went, which students may need more help, and ways to make the next class better. Think about these questions:

- Was the outcome of the lesson met? How do I know if the students learned the skill?
- Were the students focused and involved? How do I know?
- Did I change the lesson plan as I taught the lesson? Why?
- What worked well? What did not work well?
- What additional help do the students need?

The main section of each lesson is written as a script that you may read and follow. Everything you will say is written in regular text and is preceded by the word "Teacher." Instructions or notes specifically for you are written in italicized text. A symbol will show you what is included in the student workbook.

These are the words you will say. "Teacher" is written in bold.

Teacher:

This class will be a wonderful experience as we learn and study together. Every day we will start class with a prayer to invite the Holy Ghost to help us learn.

These are instructions for you. They are italicized.

Ask a student to give the opening prayer.

This picture shows you sections of the student workbook that are included in your teacher guide.

At times, what you teach may be new to you, and you will want to follow the scripted lesson very closely. Other times, you will be more familiar with what you are teaching, and you will be able to teach using your own words instead of the scripted words. You can also change part of a lesson so that it helps your students learn more effectively. Pray every day and follow the promptings of the Holy Ghost as you teach. You will be blessed to know and meet your students' needs.

How to Use This Guide

Problem-Solving

In these lessons, the students will learn skills and solve problems. This section has some ideas to help your students solve difficult problems. You can come back and read this section throughout the year.

Problem-solving often involves four steps:

1. Understand the problem.
2. Determine how to find the correct answer.
3. Solve the problem.
4. Review the problem and think about how you solved it.

As students complete these steps, they will more effectively master the concepts and skills they are learning.

Problem-Solving Strategies

As you teach, consider using the following problem-solving strategies and activities:

- **Guess:** Teach your students that it is OK to guess and then check to see if the guess was correct. Teach them not to be afraid to try new things and make mistakes.
- **Act it out:** Use movement or objects to help the students understand the mathematics concepts and how they apply to their lives.
- **Draw:** Encourage the students to draw pictures and diagrams as they solve problems.

There are many other strategies and skills that you or your students may know. Help the students use skills they have already learned, look for patterns, and be creative.

Tips When Teaching Problem-Solving Lessons

- If a problem is confusing for your students, you may think about changing the topic so it will make more sense in your country or culture. You can also change the names of characters or the numbers in the problem to match your class and where you live.
- If the students have learned other ways to solve problems, encourage them to share those ideas.
- Think of a fun way to introduce a problem or a new skill.
- Ask students to tell in their own words what the problem is asking them to find out.
- If the students are struggling, complete the student practice worksheet together or in small groups.
- Use real-world examples to help the students understand how the skill applies to their lives and the world around them. For example, you may explain to the students how you can use fractions when you are measuring food for cooking.

How to Use This Guide

Questions to Ask Students

While the students are working on problems (by themselves, in pairs, or in groups), you may want to ask questions to guide them. The table below has some questions you might ask the students before, during, and after the problem-solving process.

Before Working on the Problem

- Have you ever seen a problem like this before?
- What is this problem asking you to do?
- What information has the problem given you?
- How do you think we should get started on this problem?

While Working on the Problem

- Can you tell me what you are doing?
- How did you think of that?
- If you have been trying one idea for a few minutes and it is not working, what else can you do?
- Can you find a different way to solve the problem?

After Answering the Problem

- Have you answered the question?
- Have you checked your answer?
- Does the answer look right to you?
- Do you think there is another answer?
- Do you think there is another way to solve the problem?

Class Attendance

Attendance should be taken near the beginning of every lesson. Count how many students are in class, and write that number next to the lesson number you are teaching that day. *An example is shown in the first row: 17 students attended the day the "Example" lesson was taught.*

After the last lesson you teach in the guide, share your attendance report with your stake education support supervisor.

Lesson #	# of Students
Example	*17*
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Lesson #	# of Students
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	

Approximately how many nonmember students attended each class?	

1

Add or Subtract Decimals

Part A

Step 1: Lesson Overview

Learning Outcomes

- Students will identify the place value of decimal numbers.
- Students will add decimals to the hundredths place value.

Helpful Videos

- **decimal place value:** https://youtu.be/BItpeFXC4vA
- **adding decimals:** https://youtu.be/6NBkb98nFOM

Vocabulary Words

- **sum:** the answer after adding (for example, 7 is the sum of 3 + 4)
- **difference:** the answer after subtracting (for example, 3 is the difference of 7 – 4)
- **decimal number:** a number written with a decimal point (.). The digits after the decimal point represent tenths, hundredths, thousandths, and so on. (For example, 4.5 and 0.345 are decimal numbers.)
- **addend:** a number that is added to another number
- **place value:** the value assigned to each digit in a number (for example, in the number 327, the 2 is in the tens place value, so it has a value of 2 tens, or 20)

Note

The discussion in this lesson includes two sections, part A and part B. Each part covers a different mathematics skill. Students need to understand both sections to be able to complete the practice and activity. This lesson may take more than one class to complete.

Step 2: Discussion

A. Reading Decimals

Teacher

Open your workbook to lesson 3. We are going to multiply and divide decimals today. But first I would like you to add 2.63 + 2.63 + 2.63 + 2.63 in your workbook. You can work with a partner if you would like.

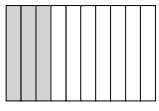
Problem 1

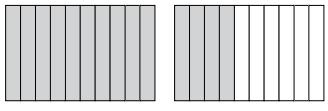
What are decimals?

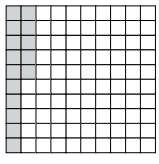
*Ask the students what decimals are and to share an example. Encourage them to write what they learn in their workbook. (**Possible answer:** A decimal is another way to write a fraction. All decimals are based on multiples or fractions of 10s [tens]. For example, the decimal 0.3 [three tenths] is another way of writing $\frac{3}{10}$. The decimal 0.15 [fifteen-hundredths] is another way of writing $\frac{15}{100}$. The decimal 1.4 [one and four-tenths] means 1 whole and 4 tenths, or $1\frac{4}{10}$.)*

Extra Example

To help students who are unfamiliar with decimals, consider drawing a diagram of 0.3, 0.15, and 1.4 on the board (see the diagrams included on the next pages).

$\frac{3}{10}$ 

$1.4 = 1\frac{4}{10} = \frac{10}{10} + \frac{4}{10}$ 

$\frac{15}{100}$ 

Problem 2

Where have you used or seen decimals in your life?

*Ask the students to write in their workbook places they have used or seen decimals in their lives. (**Possible answers:** Money, temperature, weight, height.)*

Write the decimals on the board: 5.4 3.23

1 Add or Subtract Decimals, Part A

Teacher:

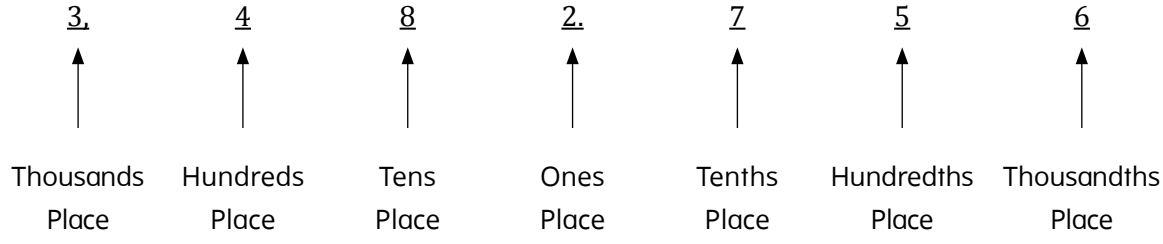
Here are some examples of decimals. The way we will read these numbers in this mathematics class will be different from how we read or say them in everyday life. How do we say these two decimal numbers? (***Answer:*** *Five and four-tenths; three and twenty-three hundredths.)*

Sometimes people say these decimals using simple language such as "five point four" or "three point two three." The correct way to read these decimals aloud is to say "five and four-tenths" and "three and twenty-three hundredths." For 5.4, the four is in the tenths place value, and for 3.23, 23 is in the hundredths place value. The last number after the decimal tells us what place value it is in.

The word *decimal* comes from the Latin word *decimus*, which means "tenth." To read decimals correctly, we need to understand that each digit has a place value.

Let's look at a number to help us understand the place value of each digit.

Write on the board: 3,482.756



As you read the following explanation, point to the numbers on the board.

Teacher:

3 is in the thousands place, 4 is in the hundreds place, 8 is in the tens place, 2 is in the ones place, 7 is in the tenths place, 5 is in the hundredths place, and 6 is in the thousandths place.

We are going to read this number out loud. As we do, think about how the words relate to the place value of each digit, especially the last digit.

Say together: "Three thousand four hundred eighty-two and seven hundred fifty-six thousandths."

Ask the students to take turns reading the three decimal numbers in their workbook out loud to someone next to them.

While the students are reading these numbers out loud, listen to their answers. Once each pair is finished, select three students to share their reading with the class. Ask each member of the class to write in words how to say each decimal number.

3) 5.9	**"five and nine-tenths"**
4) 108.53	**"one hundred eight and fifty-three hundredths"**
5) 22.07	**"Twenty-two and seven hundredths"**

B. Adding Decimals

Teacher:

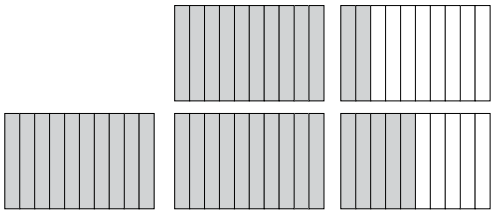
Next we are going to review how to add decimals. When adding (or subtracting) decimals, it is important to line up matching decimal values. This is because we want to add tenths to tenths, hundredths to hundredths, tens to tens, and so forth. Let's look at an example together.

Problem 1

If we wanted to add 1.2 and 2.5, you can see how to do that by looking at the shapes in your workbook.

Answer:

$$\begin{array}{r} 1.2 \\ +\ 2.5 \\ \hline 3.7 \end{array}$$



Teacher:

From this picture, we can see that we have a total of 3 whole rectangles and 7 tenths. To get this result, we need to add 2 tenths to 5 tenths to get 7 tenths. Then we add 1 whole to 2 wholes to get 3 wholes.

Move to the next addition problem in the workbook.

Teacher:

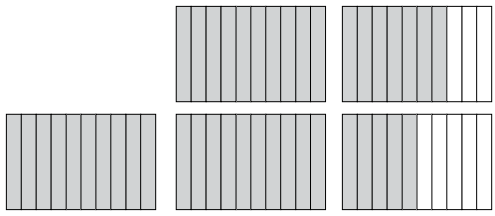
What happens when we add digits in a column and end up with more than ten of that place value?

Problem 2

$$\begin{array}{r} 1.7 \\ +\ 2.5 \\ \hline \end{array}$$

Answer:

$$\begin{array}{r} 1.7 \\ +\ 2.5 \\ \hline 4.2 \end{array}$$



Teacher:

To show this, we line up the decimal numbers. We add the 7 tenths to the 5 tenths to get 12 tenths, which is more than one whole; it is one whole and 2 tenths. We must now "carry," or bring over, a 1 into the ones column and leave 2 in the tenths place.

$$\begin{array}{r} \textcircled{1} \\ 1.7 \\ +\ 2.5 \\ \hline 2 \end{array} \qquad \begin{array}{r} 1 \\ 1.7 \\ +\ 2.5 \\ \hline 4.2 \end{array}$$

Step 3: Activity

Ask the students to look at the activity section of their workbooks and examine problems A, B, and C. The students should circle the problems that are correctly lined up. They should then rewrite the problems correctly in the spaces provided. Remind them that anywhere there is "empty space" (no digit), they can add a 0. Please see the correctly written problems.

Problems with Answers

1) $\begin{array}{r} 21.4 \\ +\ 6.82 \\ \hline \end{array}$	2) $\begin{array}{r} 12.5 \\ +\ 2.8 \\ \hline \end{array}$	3) $\begin{array}{r} 4.9 \\ +\ 2.61 \\ \hline \end{array}$
Answer: *Correct*	***Answer***: *Incorrect*	***Answer***: *Incorrect*

After they have correctly rewritten the problems, they should solve them with a partner. Remind them that it is OK if they do not know the answers; you will go over them together. While the students are working, select three different students to show their work on the board after everyone is done.

Go over each problem using the answers and explanations below:

Step-by-Step Answers

1) $\begin{array}{r} {\scriptstyle 1} \\ 21.40\ \textit{(Add a 0)} \\ +\ 6.82 \\ \hline 28.22 \end{array}$	2) $\begin{array}{r} {\scriptstyle 1} \\ 12.5 \\ +\ 2.8 \\ \hline 15.3 \end{array}$	3) $\begin{array}{r} {\scriptstyle 1} \\ 4.90\ \textit{(Add a 0)} \\ +\ 2.61 \\ \hline 7.51 \end{array}$

Step 4: Practice

If there is time, the students can complete more of the practice problems included in the workbook. If there is not time and you notice that some students need more practice, you can take aside a small group of students during the next class and work with them. If most of the class still needs more practice, take another day to practice this skill.

Teacher:

With a partner, practice adding and subtracting decimals. If you need help, ask another student first. If neither of you can figure it out, raise your hand, and I will come help. After each set of problems, we will review them as a class and go over the answers.

Problems with Answers

Place Value

Write the value of each underlined digit (ones, tens, hundreds, tenths, hundredths, or thousandths).

1)	$3.\underline{2}4$	**tenths**	2)	$1\underline{7}.5$	**ones**
3)	$51.0\underline{8}$	**hundredths**	4)	$5.0\underline{5}$	**hundredths**
5)	$8.60\underline{3}$	**thousandths**	6)	$19.\underline{2}6$	**tenths**

Find the Mistakes

7) There is a mistake in the way this mathematics problem was solved. $\begin{array}{r} {\scriptstyle 1}\\ 12.3\\ +\ \ 18\\ \hline 14.1 \end{array}$	Solve the mathematics problem correctly: $\begin{array}{r} {\scriptstyle 1}\\ 12.3\\ +\ 18.0\\ \hline 30.3 \end{array}$

Explain the error: This problem was not lined up correctly when it was written. The number 18 should be below the number 12. (The 8 goes below the 2.) You may also change the number 18 to 18.0 so you have the same number of digits in each addend.

8) There is a mistake in the way this mathematics problem was solved. $\begin{array}{r} {\scriptstyle 1}\\ 32.1\\ +\ \ 4.6\\ \hline 37.7 \end{array}$	Solve the mathematics problem correctly: $\begin{array}{r} 32.1\\ +\ \ 4.6\\ \hline 36.7 \end{array}$

Explain the error: It is not necessary to carry a 1 into the tens place of this problem.

Step 5: Closing

Explain to the students that decimals help us to be exact in mathematics. Just as we can be exact in mathematics, we can also be exact in our obedience to the commandments of God. In the book of Alma, we read about Helaman and the 2,000 stripling warriors who "did obey and observe to perform every word of command with exactness" (Alma 57:21). Share your testimony about exact obedience and how we can be obedient like the sons of Helaman.

Encourage the students to talk with a friend or family member about how they can follow the example of the stripling warriors and be exactly obedient.

Today we learned about adding and subtracting decimals. Sometimes when you weigh something or buy something, you use decimals to know the exact weight or price of that item. It is often important to be exact in mathematics.

In the scriptures we learn of people who were exactly obedient. One example of this is in the book of Alma when Helaman led a group of young men into war. These young men "did obey and observe to perform every word of command with exactness" (Alma 57:21).

How can we be like the sons of Helaman and "perform every word of command with exactness"? When you go home today, talk with a friend or family member about how you can follow the example of the stripling warriors and be exactly obedient.

Step 6: Reflection (after class)

This may be a hard skill for some students to learn. Write down the names of students who seemed to struggle with learning this mathematics skill. What are ways you can make sure they still learn it? What resources can they use to get more practice?

2

Add or Subtract Decimals

Part B

Step 1: Lesson Overview

Learning Outcomes

- Students will identify the place value of decimal numbers.
- Students will add decimals to the hundredths place value.

Helpful Videos

- **Decimal Place Value:** https://youtu.be/BItpeFXC4vA
- **Subtracting Decimals:** https://youtu.be/MufbvU4tGh8

Vocabulary Words

- **sum:** the answer after adding (for example, 7 is the sum of 3 + 4)
- **difference:** the answer after subtracting (for example, 3 is the difference of 7 – 4)
- **budget:** an estimate of income and expenses for a set period of time

Note

This lesson includes problems about currency or money. In the problems about currency, there are blank lines like this ____ next to the numbers in the problem. Before today's lesson, write the currency symbol of your country in each blank line (for example: $5 ; ¢5 ; £5). Then, in class, ask your students to write the currency symbols in the lines before they begin each problem.

Step 2: Discussion

Teacher:

In our last lesson, we discussed how to add decimal numbers. Today we will be reviewing how to subtract decimal numbers. Let's look at a couple of examples of how we subtract decimals.

Problem 1

$$\begin{array}{r} 4.5 \\ -\ 1.3 \\ \hline \end{array}$$

Teacher:

In your workbook, discuss with someone next to you how you would subtract 1.3 (one and three-tenths) from 4.5 (four and five-tenths).

As you walk around listening to the discussions, select a pair of students to solve the problem on the board after most of the students have completed the problem.

Answer:

$$\begin{array}{r} 4.5 \\ -\ 1.3 \\ \hline 3.2 \end{array}$$

Teacher:

Remember what we learned last time about the importance of lining up the decimal point and digits. As with adding decimals, tenths can only be combined with tenths, hundredths with hundredths, and so forth.

In this problem we had 4 wholes and then we lost 1 whole, so we have 3 wholes left. We had 5 tenths and lost 3 tenths, so we have 2 tenths left. Thus, the answer is 3.2 (three and two-tenths).

Problem 2

$$\begin{array}{r} 4.5 \\ -\ 1.8 \\ \hline \end{array}$$

Ask the students to try to solve the subtraction problem on their own. Select a different pair of students to solve the problem on the board. Encourage the other students to make any corrections.

Answer:

$$\begin{array}{r} 4.5 \\ -\ 1.8 \\ \hline \end{array} \rightarrow \begin{array}{r} {}^{3}\not{4}.{}^{15}5 \\ -\ 1.8 \\ \hline .7 \end{array} \rightarrow \begin{array}{r} {}^{3}\not{4}.{}^{15}5 \\ -\ 1.8 \\ \hline 2.7 \end{array}$$

Teacher:

Because we are trying to subtract 8 tenths from 5 tenths (which we cannot do), we "borrow" 10 tenths from the digit just ahead of the 5. This means we now have 15 tenths and can now subtract 8 tenths. This leaves us with 7 tenths. Because we borrowed 10 tenths (1 whole) from 4, it became 3, so we now have 3 minus 1, which equals 2. Our final answer is 2.7 (two and seven-tenths).

Step 3: Activity

Ask the students to turn to lesson 2, "Add or Subtract Decimals, Part B," in their workbooks. Choose someone to read the problem out loud. Ask the others to follow along and circle words that are unfamiliar.

Problem

A football club manager budgeted ___2280 for supplies for the upcoming season. The items that the club needs, along with estimated costs, are listed to the right.

a. What is the total cost of these supplies?
b. What is the difference between the total cost of the items and her budget?
c. Based on your work, has she stayed within her budget? If not, what recommendations would you make to her to bring her list within budget?

Item	Cost
Balls	490
Shorts	430.40
Shirts	133.75
Water bottles	275.10
Drinks and snacks	679.90
Towels	210.35
Socks	231.80

Teacher:

Turn to a partner and explain to each other what the problem is asking you to do.

- Look up words that you do not know in the dictionary together.
- Discuss what strategy you might use to solve this problem, but do not solve it yet.

Gather the students to discuss their responses before solving the problem.

Divide the class into groups of 2–3 students. Ask the students to work together to solve the problems. If a group gets stuck, encourage them to raise their hands for help or to ask another group. It is OK if they find different ways to solve the problem. They can teach each other.

Encourage the students who understand how to solve this problem to help those students who are less experienced or do not understand how to solve it. Walk around the room to monitor and to make sure that no student gets left out. Give groups hints if needed. Look for students who use different strategies when solving the problem.

After most groups have finished, select a group to show how to solve the problem. You might even choose different groups to show each step.

Answer:

```
  3231
 490.00
 430.40
 133.75
 275.10
 679.90
 210.35
+ 231.80
--------
 2451.30
```

```
  315
 2451.30
-2280.00
--------
  171.30
```

She is **_171.30** over her budget.

Teacher:

Now that we solved the problem, how can we check if our answer is correct? *(**Possible answers:** Check with a calculator; check with another person.)*

Remember that when you ask students to solve a problem on the board, they may not always get the correct answers. Please be gentle and kind as you correct them. You may wish to help them work through the problem step by step to find the errors. Praise them for their efforts and successes. If you do this with kindness, other students will not be afraid to come up to the board, and all of the students will learn together.

Step 4: Practice

Ask the students to solve the following problems individually. Encourage them to ask a partner for help if they get stuck. Once most of the students are finished, ask them to take turns showing the class how they solved the problems.

Problems with Answers

1) The maximum weight that an elevator can hold is 1125 kilograms. Four people weighing 54 kilograms, 61.5 kilograms, 80.25 kilograms, and 75 kilograms get on the elevator. How many more kilograms can the elevator hold?

$$\begin{array}{r} {\scriptstyle 9} \\ {\scriptstyle 10\ 12\ 4\ 10\ 10} \\ 1125.00 \\ -\ 270.75 \\ \hline 854.25 \end{array}$$

***Answer*:** Since the total weight of the people is 54 + 61.5 + 80.25 + 75 = 270.75, the elevator can hold **854.25 more kilograms.**

2) Two friends, Brock and Ana, compare their heights. Brock is 2.03 meters tall, while Ana is only 1.71 meters tall. How much taller is Brock than Ana?

$$\begin{array}{r} {\scriptstyle 1\ \ 10} \\ 2.03 \\ -\ 1.71 \\ \hline 0.32 \end{array}$$

***Answer:* 0.32 meters**

3) Rachel purchased 1.41 kilograms of beef and 2.3 kilograms of chicken. How many more kilograms of chicken than beef did Rachel buy?

$$\begin{array}{r} {\scriptstyle 1\ \ 12\ 10} \\ 2.30 \\ -\ 1.41 \\ \hline 0.89 \end{array}$$

***Answer:* 0.89 kilograms**

4) The *Tyrannosaurus rex* could grow up to 6.096 meters in height. The *Allosaurus* could grow up to 4.9 meters in height. How much taller was a *Tyrannosaurus rex* than an *Allosaurus*?

$$\begin{array}{r} {\scriptstyle 5\ 10} \\ 6.096 \\ -\ 4.900 \\ \hline 1.196 \end{array}$$

***Answer:* 1.196 meters**

Step 5: Closing

Discuss the importance of working in groups and helping each other. Remind the students that they can learn and grow from helping others. Ask the students to talk with a friend or family member about how working in groups has helped them learn.

Today in our activity, we worked in groups to help each other find the correct answer. When you work in a group, not only can you receive the help you need, but you can also help others learn. This is true in your family too: as you help each other at home, each member of the family will grow.

Think about the following questions. When you get home, discuss these questions with a family member or friend:

- How do you feel after you help others?
- Is there someone you know who needs your help? How can you help them?

Step 6: Reflection (after class)

Think of students who worked together today, and make note of groups or partners who worked well together. Students need to support one another. It is important that you recognize both those students who can help more and the students who need more help than others. Make sure that those who need more help are paired with others who will motivate and support them.

3

Multiply or Divide Decimals

Part A

Step 1: Lesson Overview

Learning Outcome

Students will multiply and divide decimals to the thousandths place value.

Helpful Videos

- **Dividing Decimals:** https://youtu.be/7JPIX3odZrY
- **Multiplying and Dividing Larger Decimals:** https://youtu.be/iorZdz4dsBU
- **Dividing a Decimal by a Whole Number:** https://youtu.be/Z_NHrwK6ALE

Vocabulary Words

- **product:** the answer after multiplying (for example, in $3 \times 4 = 12$, 12 is the product)
- **quotient:** the answer after dividing (for example, in $12 \div 4 = 3$, 3 is the quotient)
- **factor:** a number that when multiplied by another number produces a given number (for example, in $3 \times 4 = 12$, 3 and 4 are factors)
- **dividend:** the amount that you want to divide (for example, in $12 \div 4 = 3$, 12 is the dividend)
- **divisor:** the number that you divide the dividend by (for example, in $12 \div 4 = 3$, 4 is the divisor)
- **numerator:** the top number of a fraction, indicating how many parts we have. It is also the dividend in a division problem.
- **denominator:** the bottom number of a fraction, indicating how many equal parts make a whole. It is also the divisor in a division problem.

Note

This lesson includes problems about currency or money. In the problems about currency, there are blank lines like this ____ next to the numbers in the problem. Before today's lesson, write the currency symbol of your country in each blank line (for example: $5 ; ¢5 ; £5). Then, in class, ask your students to write the currency symbols in the lines before they begin each problem.

The discussion in this lesson includes two sections, part A and part B. Each part covers a different mathematics skill. Students need to understand both sections to be able to complete the practice and activity. This lesson may take more than one class to complete.

Step 2: Discussion

A. Multiplying Decimals

Problem 1

$2.63 + 2.63 + 2.63 + 2.63$

$$\begin{array}{r} 2.63 \\ 2.63 \\ 2.63 \\ +\ 2.63 \\ \hline \end{array}$$

Teacher:

Open your workbook to lesson 3. We are going to multiply and divide decimals today. But first I would like you to add 2.63 + 2.63 + 2.63 + 2.63 in your workbook. You can work with a partner if you would like.

As students are working on this problem, walk around the room helping those who need help and observing those who understand the problem. After 1–2 minutes of work time, select a student who answered the problem correctly to go to the board and explain their process.

Answer: 10.52

$$\begin{array}{r} 2.63 \\ +\ 2.63 \\ +\ 2.63 \\ +\ 2.63 \\ \hline \end{array} \qquad \begin{array}{r} {\scriptstyle 1} \\ 2.63 \\ +\ 2.63 \\ +\ 2.63 \\ +\ 2.63 \\ \hline 2 \end{array} \qquad \begin{array}{r} {\scriptstyle 2\ 1} \\ 2.63 \\ +\ 2.63 \\ +\ 2.63 \\ +\ 2.63 \\ \hline 52 \end{array} \qquad \begin{array}{r} {\scriptstyle 2\ 1} \\ 2.63 \\ +\ 2.63 \\ +\ 2.63 \\ +\ 2.63 \\ \hline \mathbf{10.52} \end{array}$$

Teacher:

This student just showed us how to add these four numbers. Did you see that they lined up the digits so that the place values matched? Then they showed us how to carry over to the next column once we got a group of 10 or more.

Can you think of a quicker way to find the sum of these decimal numbers? *(**Possible answers:** Multiply them, since they are all the same amount.)*

Problem 2

$$\begin{array}{r} 2.63 \\ \times \quad 4 \\ \hline \end{array}$$

Teacher:

Please take a minute or two and work on the next problem in your workbook. I will walk around and help you if you need it. If you are confused, you can also ask a classmate for help. If a classmate asks you for help, work together on the problem. It is more important to help each other than to finish the problem. Just do the best you can.

While the students are working, make a note of who has clear, correct work. Quietly ask that student if they would be willing to share their work with the class when most of the students have completed the problem. Encourage them to explain their process as they go.

The students will probably use the standard method shown below. After having a student show the standard method, thank the student for his or her work. Then explain how estimation can be used to check the answer to see if it makes sense. Ask students for connections they see between the methods. Let them know either method can be used when multiplying numbers.

Answer:

Below are two different ways to solve the problem.

1. Using the standard method:

$$\begin{array}{r} 2.63 \\ \times \quad 4 \\ \hline \end{array} \qquad \begin{array}{r} {\scriptstyle 1} \\ 2.63 \\ \times \quad 4 \\ \hline 2 \end{array} \qquad \begin{array}{r} {\scriptstyle 2\ 1} \\ 2.63 \\ \times \quad 4 \\ \hline 52 \end{array} \qquad \begin{array}{r} {\scriptstyle 2\ 1} \\ 2.63 \\ \times \quad 4 \\ \hline \mathbf{10.52} \end{array}$$

2. Using the estimation explanation:

Teacher:

When multiplying numbers with decimals, it is a good idea to do a quick estimate to get an idea of what value the final answer should be. If we round down, we will have 2 multiplied by 4. That makes 8, so our answer should be greater than 8. If we round up, we will have 3 multiplied by 4. This is 12, so our answer should be smaller than 12. Now multiply using the standard algorithm in your workbook. What is 2 multiplied by 3? The answer is 6, right? So 2.35 multiplied by 3.4 should be a number that is a little greater than 6.

If we ignored the decimal point and just did the multiplication, we would have the answer of 1052. But we know the answer should be between 8 and 12 from our estimation. Let's see where we can put the decimal place and which answer makes the most sense. We could have all of the following choices.

0.1052
1.052
10.52
105.2
1052

The only answer between 8 and 12 is 10.52. That must be the answer.

In this problem, we found the solution by using partial products. We first multiplied 4 by three hundredths. This is twelve hundredths, or 0.12. Then we multiply 4 by six tenths. This is twenty-four tenths, or 24 tenths, which is 2 wholes and 4 tenths. Then we multiply 4 by 2 and get 8. Lastly, we add together all those partial products to get the final sum of 10.52.

B. Dividing Decimals

Problem 1

$6.5 \div 2 =$

Teacher:

To divide decimals, we write it out as a long division problem. Make sure to line up the numbers in the correct place value when dividing. Take a minute to divide the expression in your workbook. If you do not know where to start, that is OK; we will review it together.

If this is a new skill, you may need to show the students how to solve it. Walk around the room and check that students are trying. Allow the students to teach each other.

Answer:

$$
\begin{array}{r}
3.25 \\
2\overline{)\,6.50} \\
-\ 6 \\
\hline
05 \\
-\ 4 \\
\hline
10 \\
-\ 10 \\
\hline
0
\end{array}
$$

Teacher:

Would someone like to show us how to solve this on the board? *(**Answer:** 3.25, or three and twenty-five hundredths)*

Does this answer make sense? We know 6 divided by 2 is 3, so 6.5 divided by 2 should be close to 3. An answer of 3.25 does seem reasonable. Notice how the placement of the decimal in the final answer is exactly above the decimal of the dividend (the number we are dividing).

In this first example, we were dividing a decimal number by a whole number. In this next example, we will divide a decimal number by another decimal number.

Problem 2

$6.50 \div 0.25 =$

Teacher:

Solve the next problem in your workbook. I will walk around to help if you have a question.

Answer:

$$
\begin{array}{r}
26 \\
.25\overline{)\,6.50} \\
-\ 50 \\
\hline
150 \\
-\ 150 \\
\hline
0
\end{array}
$$

Teacher:

Would someone like to show us how to solve this on the board? *(**Answer:** 26)*

This can also be written as $\frac{6.50}{0.25}$ or $0.25\overline{)6.50}$.

Trying to divide this expression as it is written could be hard, but we have a way to rewrite it so that we are dividing by a whole number.

What would I multiply the denominator by so that 0.25 became 25, a whole number? *(**Answer:** 100)*

As long as we multiply the denominator and numerator by the same number, it is the same as if we had just multiplied by 1. Multiplying by 1 doesn't change the value of the number, only its appearance.

Write on the board:

$$6.50 \div 0.25 = \frac{6.50}{0.25} = \frac{6.50 \text{ x } 100}{0.25 \text{ x } 100} = \frac{650}{25}$$

Teacher:

This shows that dividing 650 by 25 will give us the same result as dividing 6.50 by 0.25. When we divide 650 by 25, we get 26. Thus, 6.50 divided by 0.25 is also 26.

Another way to rewrite the fraction is to move the decimal over the same number of places in both the numerator and the denominator by multiplying by the appropriate power of ten. We can move the denominator's decimal point over however many digits there are after the decimal. Then we move the numerator's decimal point over the same number of spaces. By doing so, we get an equivalent fraction, which is much easier to divide.

Write on the board:

$$\frac{4.565}{0.35} = \frac{4.565 \times 100}{0.35 \times 100} = \frac{456.5}{35}$$

Teacher:

For example, $\frac{4.565}{0.35}$ equals $\frac{456.5}{35}$, which we get by moving the decimal point over two spaces by multiplying both the numerator and the denominator by 100 until the denominator (or divisor) becomes a whole number.

Problem 3

$$\frac{90.08}{0.123}$$

Teacher:

How would we rewrite this so that the denominator is a whole number?

Answer: We would move the decimal point over 3 spaces, which gives us $\frac{90080}{123}$.

Step 3: Activity

Teacher:

In your workbook, turn to the activity. There are a few problems that you will do with a small group. Work together and do not leave anyone out.

Divide the students into groups of 2–3. Try to pair struggling students with students who can help them.

Problems with Answers

1) $2.6 \times 3 =$
two and six-tenths multiplied by three

$$\begin{array}{r} {\scriptstyle 1} \\ 2.6 \\ \times\ \ 3 \\ \hline 7.8 \end{array}$$

2) $12.45 \times 2 =$
twelve and forty-five hundredths multiplied by two

$$\begin{array}{r} {\scriptstyle 1} \\ 12.45 \\ \times\ \ \ 2 \\ \hline 24.90 \end{array}$$

3) $4.62 \div 2 =$
four and sixty-two hundredths divided by two

$$\begin{array}{r} 2.31 \\ 2\overline{)\,4.62} \\ -\,4 \\ \hline 06 \\ -\ \ 6 \\ \hline 02 \\ -\ \ 2 \\ \hline 0 \end{array}$$

Teacher:

We will have a different group come to the board and show us how to solve each problem. Make sure to explain each step. Everyone else follow along. Make corrections to your work if needed, and feel free to ask questions. Who would like to come to the board to show us how to solve problem 1?

Step 4: Practice

Teacher:

Do your best to solve the following problems individually. There are some examples to help you. After each problem, compare your work with a partner. If you have different answers, try to find the mistakes. If you still need help, raise your hand, and I will come help you.

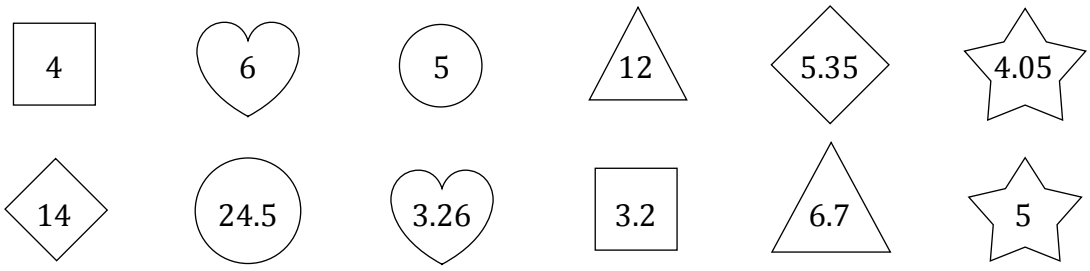
Examples

Multiplying	Dividing by a whole number
$3.64 \times 4 =$ $\begin{array}{r} {\scriptstyle 2\ 1} \\ 3.64 \\ \times\ \ 4 \\ \hline 14.56 \end{array}$	$15.5 \div 5 =$ $\begin{array}{r} 3.1 \\ 5\overline{)15.5} \\ -\ 15 \\ \hline 05 \\ -\ \ 5 \\ \hline 0 \end{array}$

Dividing by a non-whole number	
$1.86 \div 6.2 =$ $\begin{array}{r} 0.3 \\ 62\overline{)18.6} \\ -\ \ 0 \\ \hline 186 \\ -\ 186 \\ \hline 0 \end{array}$	Multiply both the dividend and the divisor by 10 in order to move the decimal points one place value to the right so that the divisor is a whole number. This allows us to do normal long division.

Problems with Answers

Find the product of the numbers for the matching shapes.



1) Find the product of the numbers in the circles:

Answer: 5 × 24.5 = **122.5**

$$\begin{array}{r} {\scriptstyle 2\ 2} \\ 24.5 \\ \times\quad 5 \\ \hline 122.5 \end{array}$$

2) Find the product of the numbers in the stars:

Answer: 4.05 × 5 = **20.25**

$$\begin{array}{r} {\scriptstyle 2} \\ 4.05 \\ \times\quad 5 \\ \hline 20.25 \end{array}$$

3) Find the product of the numbers in the triangles:

Answer: 6.7 × 12 = **80.4**

$$\begin{array}{r} {\scriptstyle 1} \\ 6.7 \\ \times\ 12 \\ \hline 13.4 \\ +\ 67.0 \\ \hline 80.4 \end{array}$$

4) Find the product of the numbers in the squares:

Answer: 4 × 3.2 = **12.8**

$$\begin{array}{r} 3.2 \\ \times\quad 4 \\ \hline 12.8 \end{array}$$

5) Find the product of the numbers in the hearts:

Answer: 3.26 × 6 = **19.56**

$$\begin{array}{r} {\scriptstyle 1\ 3} \\ 3.26 \\ \times\quad 6 \\ \hline 19.56 \end{array}$$

6) Find the product of the numbers in the diamonds:

Answer: 5.35 × 14 = **74.9**

$$\begin{array}{r} {\scriptstyle 1\ 2} \\ 5.35 \\ \times\ 14 \\ \hline 21.40 \\ +\ 53.50 \\ \hline 74.90 \end{array}$$

Find each quotient.

7) $4.08 \div 2 =$	8) $133.2 \div 6 =$	9) $3.96 \div 0.9 =$	10) $0.54 \div 0.03 =$
Answer:	***Answer:***	***Answer:***	***Answer:***
$2\overline{)4.08}$ → 2.04 − 4 00 − 0 08 − 8 0	$6\overline{)133.2}$ → 22.2 − 12 13 − 12 12 − 12 0	$9\overline{)39.6}$ → 4.4 − 36 36 − 36 0 Move the decimal one place to the right.	$3\overline{)54}$ → 18 − 3 24 − 24 0 Move the decimal two places to the right.

Word Problem

Juan is saving ___4.50 each day. How much money will he have by the end of the second week? (Remember there are seven days in a week.)

Answer:

$$\begin{array}{r} {\scriptstyle 2}\\ 4.5\\ \times\ 14\\ \hline 18\\ +\ 45\\ \hline 63 \end{array}$$

By the end of two weeks, Juan will have ___**63**.

Step 5: Closing

Discuss some of the different ways you multiply decimals in real life. For example, you multiply decimals when you exchange money or take measurements.

Ask a student to read aloud Doctrine and Covenants 50:22, which is included in the student workbook. Explain that we learn best through teaching, and so when we teach what we learn to others, both the teacher and the learner are blessed. Ask them to teach what they have learned about decimals to a younger sibling or a friend. Bear your testimony of how we can be blessed when we share our knowledge and our testimonies with others.

Today we learned about multiplying and dividing decimals. We often multiply and divide decimals when we are working with money or measurements. In our class, we often teach each other and help each other learn. Doctrine and Covenants 50:22 tells us about teaching one another: "Wherefore, he that preacheth and he that receiveth, understand one another, and both are edified and rejoice together."

This scripture tells us that when we teach and share our knowledge with others, both the teachers and the learners are blessed. When you go home today, teach what you have learned about decimals to a younger sibling or a friend so that you may both be blessed and "rejoice together."

Step 6: Reflection (after class)

This may be a hard skill for some students to learn. Write down the names of students who seemed to struggle with learning this mathematics skill. What are ways you can make sure they still learn it? What resources can they use to get more practice?

4

Multiply or Divide Decimals

Part B

Step 1: Lesson Overview

Learning Outcome

Students will multiply and divide decimals to the thousandths place value.

Helpful Videos

- **Dividing Decimals:** https://youtu.be/7JPIX3odZrY
- **Multiplying and Dividing Larger Decimals:** https://youtu.be/iorZdz4dsBU
- **Dividing a Decimal by a Whole Number:** https://youtu.be/Z_NHrwK6ALE

Vocabulary Words

- **product:** the answer after multiplying (for example, in $3 \times 4 = 12$, 12 is the product)
- **quotient:** the answer after dividing (for example, in $12 \div 4 = 3$, 3 is the quotient)
- **factor:** a number that when multiplied by another number produces a given number (for example, in $3 \times 4 = 12$, 3 and 4 are factors)
- **dividend:** the amount that you want to divide (for example, in $12 \div 4 = 3$, 12 is the dividend)
- **divisor:** the number that you divide the dividend by (for example, in $12 \div 4 = 3$, 4 is the divisor)

Note

This lesson includes problems about currency or money. In the problems about currency, there are blank lines like this ____ next to the numbers in the problem. Before today's lesson, write the currency symbol of your country in each blank line (for example: $5 ; ¢5 ; £5). Then, in class, ask your students to write the currency symbols in the lines before they begin each problem.

Step 2: Discussion

Ask the students to turn to lesson 4, "Multiply or Divide Decimals, Part B," in their workbooks. Ask someone to read the problem aloud for the class. The other students should follow along in their workbooks and circle words they do not know.

Problem

Three young women worked hard to earn money to start a business. Their goal was to raise a total of __2100. Each day, Girl A earned about ___ 6.50, Girl B raised three times as much as Girl A, and Girl C raised half as much as Girl B.

About how many weeks did it take the girls to reach their goal of __2100? Assume they worked five days a week.

Teacher:

Turn to a partner and explain to each other what the problem is asking you to do. Discuss how you might solve this problem. Do not solve it yet.

Ask a few of the students to share their responses before solving the problem.

Teacher:

What are some key words and numbers in the problem? *(**Possible answers:** The amounts the girls earn. Three times. Half as much. Total 2100. The girls only work five days each week.)*

What are some ways to start solving the problem? *(**Possible answer:** Start by figuring out the amount that each girl earns each day.)*

Step 3: Activity

Divide the class into groups of 2–3 students. Ask the students to work together to solve the problem. This problem has many steps to find the answer. Remind the students to work through each step carefully. They can ask you or another group for help if they get stuck.

Encourage the students who understand how to solve this problem to help those students who are less experienced or do not understand how to solve it. Walk around the room to monitor and to make sure no student gets left out. Give groups hints if needed. Look for students who use different strategies when solving the problem.

Possible hints:

- "Three times as much as" means multiply by 3.
- "Half" means divide by 2.
- Add up all the girls' amounts earned each day.
- Divide the total by the amount earned each day.
- Use a calculator, if available, for larger numbers.

Select a group to show how to solve the problem. (There may be a few ways to solve it.)

Step-by-Step Answer:

Step 1: Girl B earns three times as much as Girl A:

Girl A earns __6.50 a day. So ***__6.50 × 3*** = ***__19.50. Girl B earns __19.50 each day.***

Step 2: Girl C raises half as much as Girl B:

__19.50 ÷ 2 = __9.75. Girl C earns __9.75 each day.

Solution 1: Standard method

$$
\begin{array}{r}
9.75 \\
2\overline{)\,19.50} \\
-\,18 \\
\hline
15 \\
-\,14 \\
\hline
10 \\
-\,10 \\
\hline
0
\end{array}
$$

Solution 2: Partial quotients method

$$\frac{19.50}{2} = \frac{10}{2} + \frac{9}{2} + \frac{0.50}{2} = 5 + 4.5 + 0.25 = 9.75$$

Step 3: Total that the girls earned each day:

The three girls raised a total of __35.75 each day

since __6.50 + __19.50 + __9.75 = __35.75

Step 4: Total amount that the girls raised each week:
The girls raised ___178.75 each week, since 5 x ___35.75 = ___178.75

Step 5: Total number of weeks:
Divide the total needed, ___2100, by the amount earned each week, ___178.75.

___2100 ÷ ___178.75 is about 11.75.

Solution 1: Standard method:

```
      11.748
   ____________
17875 | 210000.000
      - 17875
      ---------
        31250
      - 17875
      ---------
        133750
      - 125125
      ---------
          86250
        - 71500
        -------
          147500
        - 143000
        --------
            4500
```

Answer: It took the three friends about 11.75 weeks to earn enough money.

Estimation approach (optional)

If long division is confusing, you might use an estimation approach. 178.75 is about 200. How many 200s would fit into 2100? About 10.5, so we know the answer is above 10.5 weeks. If we then multiply 178.75 by 11, we get 1966.25, so the answer must be above 11 weeks. If we multiply 178.75 by 12, we get 2145, so we know the time it took the girls was less than 12 weeks.

*After the groups have solved the problem, ask a group to share the steps they took to find the answer. Ask the groups if there are other strategies they used to solve the problem, and ask them to share these strategies with the class. If you noticed someone using a different strategy, tell them ahead of time that you would like to call on them. Discuss ways to check their answer. (**Possible answers**: Work backwards; check with a calculator.)*

Step 4: Practice

1	2	3	4	5
Do Not Understand		**Somewhat Understand**		**Fully Understand**

Teacher:

Because most of the activity today was done in groups, it is difficult for me to know how well you understand this skill. I would like you to think about how well you understand it. In your workbooks, circle the number that you think matches how well you understand how to multiply and divide decimals. Remember that 1 means that you do not understand, 3 means you somewhat understand, and 5 means you fully understand.

Walk around and look at the numbers the students have circled in their books. Note those students who may not understand the skill learned today. If there are many students who do not understand, carefully review the lesson in the next class.

Step 5: Closing

Ask a student to read aloud the closing from their workbook. Share an experience you have had when being accountable has helped you in your life. Share your testimony about moral agency and the importance of the choices we make every day. Encourage the students to discuss ways their families can make choices to grow closer to the Lord and follow the example of Jesus Christ.

Today you evaluated how confident you are about multiplying and dividing decimals. Evaluating your confidence with a topic helps you make choices about how you will practice, study, and learn in the future.

In Doctrine and Covenants 101:78, the Lord teaches us that He wants every individual to "act in doctrine and principle . . . according to the moral agency which I have given unto him." This means that the Lord wants us to make choices and act on the truths and principles we have been taught.

When you go home today, talk with a family member or friend about how the choices we make can help us draw closer to the Lord and become more like Him. Think about ways your family can make choices to grow closer to the Lord and follow the example of Jesus Christ.

Step 6: Reflection (after class)

Think of students who worked together today, and make note of groups or partners who worked well together. Students need to support one another. It is important that you recognize both those students who can help more and the students who need more help than others. Make sure that those who need more help are paired with others who will motivate and support them.

5

Teach One Another

Step 1: Lesson Overview

Learning Outcome

Students will understand the value of teaching one another.

Vocabulary Word

- **tangle:** to twist together into a confused mass

Step 2: Discussion

Ask the students to turn to lesson 5, "Teach One Another," in their workbooks. Ask a student to read the first paragraph from the lesson.

Learning is one of the most important things we do in life. It is an important reason we came to earth. Many of the experiences of life can teach us and help us become more like our Heavenly Father. Everyone has things that are easy for them to learn and understand.

Ask the students to answer the following question in their workbooks:

What are some things that are easy for you to learn?

Teacher:

I'm going to mention a few things that we can learn in life, and I want to see what things are easy for you to learn. Stand up if it is easy for you to learn English.

Comment on how many people stood up, and have the students look at who's standing up.

Teacher:

OK, you can sit down.

Now stand up if it is easy for you to learn mathematics and solve problems.

Comment on how many people stood up, and have the students look at who's standing up.

Teacher:

Thank you. You can sit down.

Now, stand up if it is easy for you to memorize scriptures and hymns.

Comment on how many people stood up, and have the students look at who's standing up.

Teacher:

Thank you. You can sit down.

Stand up if you learn things really well by working with your hands, building things, or creating things.

Comment on how many people stood up, and have the students look at who's standing up.

Teacher:

Thank you. You can sit down now.

Discuss the following questions after the activity: Did you notice that it is easier for some people to learn English than for others? Did you notice that some people learn by working with their hands? Did you notice that mathematics is easier for some people to learn than for others?

Teacher:

We are all different, and we have different strengths. That is why it is important to teach one another. You can share your strengths with your friends, and they can share their strengths with you. When you do that, you can all be lifted because you share your knowledge and skills with each other, and everyone learns better.

Step 3: Activity

Human Knot Team Activity

Explain to the students that you are going to do an activity to show how working together and learning from each other helps everyone. Ask them to open their workbook to the activity, and invite them to read the instructions together.

Instructions

This activity helps everyone understand how valuable it is to work together, just as we have been discussing. The object is to work through a problem as a group.

We will go to an area where we have enough space to stand together in groups of 8 to 12 students each.

Once we have divided into groups, everyone in a group will stand in a circle. They will reach their hands into the middle of the circle and grab the hands of two different people. The group will then be connected in a kind of knot.

Your goal as a group will be to figure out how to get your group untangled—without breaking any handholds—so that you are all in a single circle together, holding hands with the two people next to you.

Ask the students to go outside or into another room without chairs and tables to participate in this activity. If it is impossible to change rooms or go outside, ask the students to push the tables to the sides of the room so there is open space in the middle.

5 Teach One Another

This activity works best with groups of 8–12 students. If you have 15–30 students, divide the class into groups of 7–12 students.

Teacher:

Please listen closely to my instructions. Raise your hand if you have a question.

1) Tell the groups to form a circle.
2) Tell the students to put their right hands up in the air and then with that hand take hold of the right hand of someone across the circle from them.
3) Tell the students to put their left hands up in the air and then take hold of the left hand of a different person across the circle from them.
4) Make sure that all students are holding the hands of two different people who are not standing on either side of them.
5) Tell the students to try to untangle themselves to form a circle without breaking the chain of hands. Give them 15 minutes to do so.
6) Watch the groups as they try to untangle themselves. Ask them not to tug or pull on each other. Encourage them to help their friends if they have to step over other people's hands.
7) Tell the students that they must keep hold of each other's hands as they untangle. If the chain of hands is broken at any point, they must start over again.

Once the groups have untangled themselves successfully or the 15 minutes have passed, ask the students to return to the classroom for a review of the activity.

Step 4: Practice

Have students think about the acitivity and answer the questions in their workbook. Give the students 2–3 minutes to record their thoughts.

What did you learn as you untangled yourselves in your group? How did your group work together? Take a moment to write your thoughts in your workbook.

Let several students share what they wrote, and discuss each response as a class. Emphasize the value of working together as a group and learning from each other.

Step 5: Closing

Bear your testimony about Heavenly Father's desire for His children to learn. Share your feelings about the importance of teaching one another so that we can become more like Him. Ask the students to talk with a friend or family member about how we can become more like Heavenly Father when we teach each other and learn together.

Everyone can learn, and everyone has something to teach. In these Succeed in School classes, you are studying reading, writing, mathematics, and skills to become better students and better test takers.

We will do lots of activities as we learn. Often, we will work in groups of two or more people. As you work with other students, if you understand what to do and others do not, please help your group members. The best way to help other students is not to solve problems for them but to help them learn how to solve the problems themselves.

Sometimes you will be the one to teach your group how to solve problems. Other times you will need someone to teach you. It is OK to be both the teacher and the learner at different times.

How has the Succeed in School class been a different learning experience for you so far? When you go home today, talk with a friend or family member about what you have been learning in class and how it can help you become both a better teacher and a better learner.

Step 6: Reflection (after class)

Think of students who worked together today, and make note of groups or partners who worked well together. Students need to support one another. It is important that you recognize both those students who can help more and the students who need more help than others. Make sure that those who need more help are paired with others who will motivate and support them.

6

Add or Subtract Fractions with Like Denominators

Part A

Step 1: Lesson Overview

Learning Outcomes

- Students will add and subtract fractions with like denominators.
- Students will simplify (reduce) fractions.

Helpful Video

- **Adding Fractions with Like Denominators:** https://youtu.be/EJjnEau6aeI

Vocabulary Words

- **numerator:** the top number of a fraction, indicating how many parts we have
- **denominator:** the bottom number of a fraction, indicating how many equal parts make a whole
- **simplify:** to make a mathematics expression look different with smaller digits but retain the same value
- **reduce:** to simplify a fraction so that its denominator and numerator are as small as possible

Note

This lesson includes problems about currency or money. In the problems about currency, there are blank lines like this ____ next to the numbers in the problem. Before today's lesson, write the currency symbol of your country in each blank line (for example: $5 ; ¢5 ; £5). Then, in class, ask your students to write the currency symbols in the lines before they begin each problem.

Step 2: Discussion

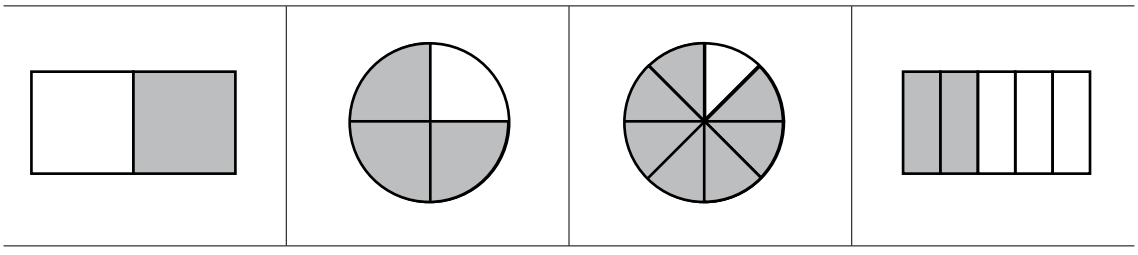
Teacher:

Today we are going to learn what fractions are and how to add and subtract them. What is a fraction? Briefly discuss with someone next to you what a fraction is.

Who would like to tell what you found out? You can write down notes while we dicuss it. *(**Possible answers:** Fractions are parts of a whole; fractions are numbers between whole numbers.)*

The English word *fraction* comes from the Latin word *fractio*, which means "to break." When we "break," or divide, whole numbers, we get fractions!

Let's look at some examples. Open your workbook to the lesson for today. Look at each figure. Can you write the fraction that matches each of these figures, as well as the fraction's name?



Give the students a minute to work.

Teacher:

Who can tell us the answers?

$\frac{1}{2}$	$\frac{3}{4}$	$\frac{7}{8}$	$\frac{2}{5}$
One-half	Three-fourths	Seven-eighths	Two-fifths

Teacher:

Who can tell me what the bottom number, or denominator, of each fraction represents? *(**Answer:** The number of parts the whole was divided into.)*

What does the top number, or numerator, represent? *(**Answer:** The number of parts that are shaded.)*

When two fractions have the same denominator, we call them "like fractions."

Why is it important that the denominators be the same number when you want to add the numerators? *(**Answer:** You can only add or subtract like fractions.)*

Adding like fractions is similar to how we add whole numbers. For example, what is 1 + 3? We know it is 4.

A. Adding Fractions with Like Denominators

Problem 1

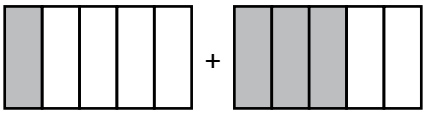
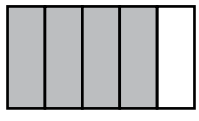
$$\frac{1}{5} + \frac{3}{5} =$$

Teacher:

In your workbook, try to figure out what one-fifth plus three-fifths equals. If you are not sure, that is OK. We will have someone show us the answer.

Answer: $\frac{4}{5}$. This is because if we have 1 fifth and we add 3 more fifths, we end up with 4 fifths.

If the students need a visual example, draw the following pictures:

 $\frac{1}{5} + \frac{3}{5} =$	 $\frac{4}{5}$
One-fifth plus three-fifths . . .	. . . equals four-fifths

B. Simplifying Fractions

Problem 2

$$\frac{2}{8} =$$

Teacher:

Look at the next three fractions in your workbook. Some fractions can be simplified, or reduced, by dividing the top and bottom numbers by the same whole number. What number divides into 2 and 8 equally? (***Answer:*** *2*)

Who can show us how to reduce $\frac{2}{8}$?

Answer:

$$\frac{2}{8} = \frac{2 \div 2}{8 \div 2} = \frac{1}{4}$$

Teacher:

$\frac{2}{8}$ can be reduced to $\frac{1}{4}$ by dividing the top and bottom numbers by 2.

A fraction is fully reduced when the top and bottom numbers can no longer be divided by any whole number (other than the number 1). For example, the fraction $\frac{2}{3}$ is fully reduced. There isn't any whole number, other than 1, that both 2 and 3 can be divided by without having a remainder.

Can you think of other examples of fully reduced fractions?
(***Possible answers:*** $\frac{7}{8}$, $\frac{5}{9}$, *and* $\frac{11}{12}$)

Problem 3

$$\frac{2}{4} =$$

Teacher:

In your workbook, try to simplify $\frac{2}{4}$.

When they look ready, ask a pair of students to share their answer.

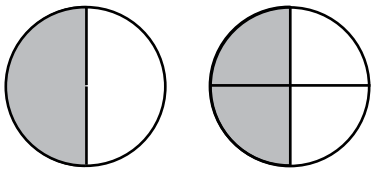
Answer:

$$\frac{2 \div 2}{4 \div 2} = \frac{1}{2}$$

Teacher:

Another example of a fraction that isn't fully reduced is $\frac{2}{4}$ (two-fourths). This is because both 2 and 4 can be divided by 2 to equal the fraction $\frac{1}{2}$ (one-half).

Draw the shapes on the board if the students need to see a visual of the problem:



$\frac{1}{2} = \frac{2}{4}$

Problem 4

$\frac{3}{6} =$

Teacher:

What number divides into both 3 and 6 evenly? *(**Answer:** 3)*

How can we write $\frac{3}{6}$ in the simplest form? Write your answer in your workbook and then raise your hand when you have the answer.

Answer:

$$\frac{3 \div 3}{6 \div 3} = \frac{\mathbf{1}}{\mathbf{2}}$$

If the students seem confused and need additional explanations or examples, guide them through the "Extra Practice" section at the end of this lesson, after the "Reflection" section.

Step 3: Activity

Teacher:

Turn to the activity in your workbook. Add or subtract these fractions with a partner. It is OK if you are not sure how to solve the problem. We are here to support and learn from each other. If you notice that someone else is stuck, show them an example or give them a hint. After everyone has finished, I will have different pairs of students come to the board and show the class how they solved the problems.

Problems with Answers

1) $\frac{4}{7} + \frac{2}{7} = \frac{\mathbf{6}}{\mathbf{7}}$	2) $\frac{2}{5} - \frac{1}{5} = \frac{\mathbf{1}}{\mathbf{5}}$	3) $\frac{3}{8} + \frac{1}{8} = \frac{\mathbf{4}}{\mathbf{8}} = \frac{\mathbf{1}}{\mathbf{2}}$

Partner the students who struggle with this skill with those who have mastered it. Encourage both students to work through each problem individually. This will help both of them to learn and improve.

Ask three different pairs to come up to the board and explain their answers. Kindly guide the students if they answer the problems incorrectly.

Step 4: Practice

Ask the students to solve the following problems individually. Encourage them to ask a partner for help if they get stuck. Once most of the students are finished, ask the students to take turns showing the class how they solved the problems.

Problems with Answers

Add or subtract fractions with like denominators.

1) $\frac{3}{5}+\frac{1}{5}=\frac{4}{5}$ Three-fifths plus one-fifth	2) $\frac{7}{9}+\frac{1}{9}=\frac{8}{9}$ Seven-ninths plus one-ninth
3) $\frac{7}{9}-\frac{6}{9}=\frac{1}{9}$ Seven-ninths minus six-ninths	4) $\frac{6}{11}-\frac{3}{11}=\frac{3}{11}$ Six-elevenths minus three-elevenths
Simplify the following fractions.	
5) $\frac{2}{6}=\frac{1}{3}$	6) $\frac{4}{10}=\frac{2}{5}$
7) $\frac{4}{12}=\frac{1}{3}$	8) $\frac{6}{36}=\frac{1}{6}$
Add or subtract the following fractions, and then simplify the answer.	
9) $\frac{3}{6}+\frac{1}{6}=\frac{4}{6}$ or $\frac{2}{3}$	10) $\frac{4}{9}-\frac{1}{9}=\frac{3}{9}$ or $\frac{1}{3}$
11) $\frac{10}{8}-\frac{4}{8}=\frac{6}{8}$ or $\frac{3}{4}$	12) $\frac{5}{10}+\frac{5}{10}=\frac{10}{10}$ or 1

Word Problems

Solve the following problems using the skills you learned today. Look at the underlined words to determine which operation (add or subtract) to use. Simplify if needed.

13) Two brothers left home for seminary. They walked $\frac{3}{10}$ of a kilometer and then sat down to rest. They then walked $\frac{2}{10}$ of a kilometer. What is the total distance they walked?

Answer:

$\frac{3}{10} + \frac{2}{10} = \frac{5}{10}$ **or** $\frac{1}{2}$ *kilometer*

14) On Monday, Sister May spent $\frac{1}{4}$ of an hour studying for her lesson. On Friday, she spent another $\frac{1}{4}$ of an hour studying. What is the total amount of time she spent studying?

Answer:

$\frac{1}{4} + \frac{1}{4} = \frac{2}{4}$ **or** $\frac{1}{2}$ *an hour*

Step 5: Closing

At the end of the lesson, talk about how you and your students use fractions in your daily lives. For example, you might use fractions when following a recipe, talking about sports, or figuring out how much to buy at the market. Encourage the students to talk with a friend or family member about how they use fractions in their work or at home.

Today we learned about adding and subtracting fractions. There are many ways we use fractions every day. For example, you might use them when following a recipe, talking about sports, or figuring out how much to buy at the market.

Discuss with a family member or friend what you learned about fractions and how you can use them in your daily life.

Step 6: Reflection (after class)

Take a few minutes to write down what went well during the lesson. What partners or groups worked well together today? Make note of what you can do next time to help all the students participate.

Extra Practice

If you notice that the students are struggling with today's skill, you can show them these additional examples.

A. Adding Fractions with the Same Denominator

Problem 1

$\frac{2}{3} + \frac{2}{3} =$

Teacher:

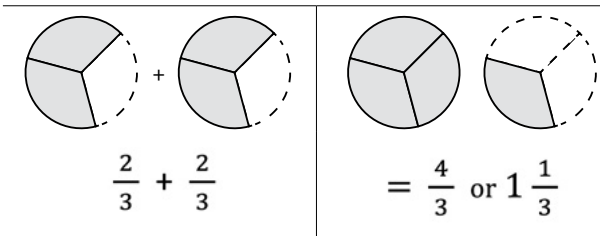
What is two-thirds plus two-thirds?

Answer: $\frac{4}{3}$ (four-thirds), because if we have 2 *thirds* and then add 2 more *thirds*, we have *4 thirds.*

The diagram is in the workbook to help show the answer:

Teacher:

What pattern do you notice when adding "like fractions"? ***(Answer:*** *We add the numerators but keep the denominator the same because the denominator is the piece size.)*



$\frac{2}{3} + \frac{2}{3}$	$= \frac{4}{3}$ or $1\frac{1}{3}$
two-thirds plus two-thirds	four-thirds, or one and one-third

This is a key concept, so you may want to say it a couple times or have the students say it with you once or twice.

B. Simplifying Fractions

Another way to simplify a fraction is to divide both the top and bottom of the fraction by the greatest common factor (GCF).

Problem 2

$\frac{3}{12} =$

Answer:

$\frac{3}{12} \div \frac{3}{3} = \frac{1}{4}$

Teacher:

Let's discuss how to simplify the fraction three-twelfths. What is the largest number that goes evenly into both 3 and 12? (***Answer:*** *3, so the GCF is 3.)*

If you divide both the numerator and denominator of $\frac{3}{12}$ by 3, what fraction do you get? (***Answer:*** *When you divide both top and bottom by 3, the fraction simplifies to* $\frac{1}{4}$*.)*

Problems with Answers

3) $\frac{8}{12}$	4) $\frac{16}{20}$	5) $\frac{5}{10}$
The GCF is 4. Divide the top and bottom by 4 to get $\frac{2}{3}$*.*	*The GCF is 4. Divide the top and bottom by 4 to get* $\frac{4}{5}$*.*	*The GCF is 5. Divide the top and bottom by 5 to get* $\frac{1}{2}$*.*

Teacher:

Who would like to come to the board and show us how to simplify these fractions? Let's have someone different solve each problem.

7

Add or Subtract Fractions with Like Denominators

Part B

Step 1: Lesson Overview

Learning Outcomes

- Students will add and subtract fractions with like denominators.
- Students will simplify (reduce) fractions.

Helpful Videos

- **adding fractions with Like denominators:** https://youtu.be/EJjnEau6aeI
- **solving fraction word problems:** https://youtu.be/0njioQqIxKY

Vocabulary Word

- **like fractions:** fractions with the same denominator

Step 2: Discussion

Ask the students to turn to lesson 7 in their workbook. Ask someone to read the problem out loud for the class. Instruct everyone else to follow along and circle words that are unfamiliar.

Problem

The Church wants to build a playground in a lot next to a chapel. The lot is shaped like a rectangle. They give the job of planning the playground to the youth. The youth decide to use $\frac{4}{12}$ of the playground for a basketball court and $\frac{5}{12}$ of the playground for a football field. How much room is left for the swings?

Teacher:

Turn to a partner and explain to each other what the problem is asking you to do. Talk about how you might solve this problem. Do not solve it yet.

Gather the students to discuss their responses before solving the problem.

Teacher:

What are some key words and numbers in the problem? *(**Possible answers:** $\frac{4}{12}$ and $\frac{5}{12}$, rectangle, "How much . . . is left" [implies you will use subtraction].)*

What are some ways to start solving the problem? *(**Possible answers:** Draw a picture and label each section. Write out an equation: $\frac{4}{12}+\frac{5}{12}=\_\_\_\_$.)*

Step 3: Activity

Divide the class into groups of 2–3 students. Ask the students to work together to solve the problems. If a group gets stuck, encourage them to raise their hand for help or to ask another group. This problem has many steps to find the answer. Make sure to keep track of each step.

When the students work in small groups together, it is easier to make sure that every student is working and no one is left out. Encourage the students who understand how to solve this problem to help those students who are less experienced or do not understand how to solve it. Walk around the room to monitor their discussions. Give groups hints if needed. Look for students who use different strategies when solving the problem.

Once most of the groups are done, select a group to share how they solved the problem.

Answer: To add $\frac{4}{12}$ *and* $\frac{5}{12}$, since the denominator is the same, you can add the numerators straight across: $\frac{4}{12}+\frac{5}{12}=\frac{9}{12}$. Now subtract from 1, or $\frac{12}{12}$, to find how much is left: $\frac{12}{12}-\frac{9}{12}=\frac{3}{12}$. Simplify $\frac{3}{12}$ to $\frac{1}{4}$. One-fourth of the field is left for the swings.

$\frac{4}{12}$ or $\frac{1}{3}$: basketball	**$\frac{5}{12}$: football**	**$\frac{3}{12}$ or $\frac{1}{4}$: swings**

Teacher:

Can any other group show a different way to solve the problem?

Ask groups to share other strategies to solve the problem. If you noticed someone using a different strategy, ask them ahead of time to share their strategy with the class.

Teacher:

How can we check if our answer is correct? ***Possible answer:*** *Add the parts of the playground together. If they equal 1, our answer is correct.)*

$\frac{4}{12}+\frac{5}{12}+\frac{3}{12}=\frac{12}{12}$ or 1

Step 4: Practice

Teacher:

Next you will practice subtracting fractions by writing your own word problem. You are going to complete the problem by filling in the blanks with two fractions with like denominators. Figure out whether the key words are instructing you to add or subtract. Make sure to simplify your answer if needed. After you solve the problem, ask a partner to check your work.

Problem

A jug contains _____ of a liter of orange juice.

After you pour _____ of a liter into a glass, how much is **left** in the jug?

An example of a problem the students could write follows:

Example Problem

A jug contains $\frac{3}{4}$ of a liter of orange juice.

After you pour $\frac{1}{4}$ of a liter into a glass, how much is **left** in the jug?

Walk around the room and help those students who need help. Remind them to use the skills you have been working on in class.

Example Answer:

$\frac{3}{4} - \frac{1}{4} = \frac{2}{4}$ or $\frac{1}{2}$. There is one-half of a liter left in the jug.

Ask a student or a pair of students to read their word problem aloud to the class and then show how they solved the problem. Additional students can share if there is time.

Step 5: Closing

Ask the students to think about what they have learned today. Have someone read the quote from Elder David A. Bednar of the Quorum of the Twelve Apostles that is found in their workbooks.

After the quote has been read, bear your testimony of how the students can learn by faith. Ask the students to talk with a friend or family member about how they can learn by faith at home, at church, and at school.

Elder David A. Bednar of the Quorum of the Twelve Apostles helps us better understand what it means to learn by faith:

> Learning by faith requires both "the heart and a willing mind" (D&C 64:34). Learning by faith is the result of the Holy Ghost carrying the power of the word of God both unto and into the heart. Learning by faith cannot be transferred from an instructor to a student . . . ; rather, a student must exercise faith and act in order to obtain the knowledge for himself or herself. ("Seek Learning by Faith," *Ensign*, Sept. 2007, 64)

When you go home today, discuss with a friend or family member how you can learn by faith at home, at church, and at school.

Step 6: Reflection (after class)

Think of students who worked together today, and make note of groups or partners who worked well together. Students need to support one another. It is important that you recognize both those students who can help more and the students who need more help than others. Make sure that those who need more help are paired with others who will motivate and support them.

8

Add or Subtract Fractions with Unlike Denominators

Part A

Step 1: Lesson Overview

Learning Outcomes

- Students will add and subtract fractions with unlike denominators.
- Students will simplify (reduce) fractions.

Helpful Video

- **adding fractions with unlike denominators:** https://youtu.be/bcCLKACsYJ0

Vocabulary Words

- **numerator:** the top number of a fraction, indicating how many parts we have
- **denominator:** the bottom number of a fraction, indicating how many equal parts make a whole
- **least common multiple (LCM):** the lowest number that is a multiple of two or more given numbers (for example, 12 is the least common multiple of 2, 3, and 4)
- **simplify:** to make a mathematics expression look different with smaller digits but retain the same value

Step 2: Discussion

Teacher:

In the last lesson, we worked on adding and subtracting fractions with like denominators. When adding "unlike fractions," or fractions without the same denominator, we have to convert the fractions so they have the same denominator. Then we can add or subtract the numerators.

The denominator tells us how many parts the whole has been split into. For example, the denominator in $\frac{1}{2}$ tells us that the whole has been split into two parts (because the denominator is 2).

Problem 1

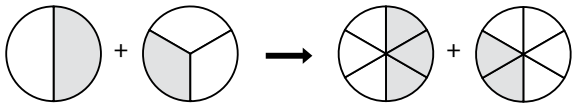
$$\frac{1}{2}+\frac{1}{3}=$$

Answer:

$$\frac{1}{2}+\frac{1}{3}=\frac{3}{6}+\frac{2}{6}=\frac{5}{6}$$

Teacher:

Let's solve one-half plus one-third together. In your workbook, there is a diagram that shows the problem in a visual way.



These fractions have different denominators, or labels, and mean different things. One-half is larger than one-third. We cannot combine them at this point. So, what do we do? We rewrite $\frac{1}{2}$ and $\frac{1}{3}$ as fractions that look different but have the same values.

To do this, we ask ourselves, "What is the smallest number that both bottom numbers could divide evenly?" Or, in other words, "What is the least common multiple (LCM) of the two denominators?"

As I explain how to add these fractions, you can take notes in your workbook. The least common multiple (LCM) of 2 and 3 is 6. Now we are going to divide each of the wholes into sixths. If you look at the diagram of the fractions, the area of the shaded regions has not changed, so our new circles have the same value as before. But $\frac{1}{2}$ has now been changed to $\frac{3}{6}$, and $\frac{1}{3}$ has been changed to $\frac{2}{6}$.

Write on the board:

$$\frac{1}{2}+\frac{1}{3}=\frac{3}{6}+\frac{2}{6}$$

Teacher:

Now that we have made $\frac{1}{2}$ and $\frac{1}{3}$ into equivalent fractions that are "like fractions," we can add them together: $\frac{3}{6}+\frac{2}{6}=\frac{5}{6}$.

Ask students to take turns explaining to a partner how to add $\frac{1}{2}$ and $\frac{1}{3}$.

While students are talking to each other, listen for their explanations. Select one class member to summarize the process of adding fractions: First, we get a common denominator. Second, we add the numerators but keep the denominators the same. (This is a key concept, so you may consider having a student or two share this strategy with the class and then repeat it yourself.)

If the students are confused or need more examples, additional explanation and examples are provided in the "Extra Practice" section at the end of this lesson.

Step 3: Activity

Teacher:

Go to the activity in your workbook. Add the fractions with a partner or in a group of three. Remember that the denominators need to be the same before adding. After everyone has finished, I will ask different pairs of students to come to the board and show the class how they solved each problem.

Students who struggle with this skill may be partnered with stronger mathematics students. Encourage them to work together so they both learn the skill.

Problems with Answers

1) $\frac{3}{8}+\frac{1}{4}=$	2) $\frac{4}{7}+\frac{2}{14}=$	3) $\frac{2}{5}+\frac{10}{25}=$
$\frac{3}{8}+\frac{1}{4}=\frac{3}{8}+\frac{2}{8}=\frac{5}{8}$	$\frac{4}{7}+\frac{2}{14}=\frac{8}{14}+\frac{2}{14}=\frac{10}{14}$ or $\frac{5}{7}$	$\frac{2}{5}+\frac{10}{25}=\frac{2}{5}+\frac{2}{5}=\frac{4}{5}$

Step-by-Step Answers

Multiply both the numerator and the denominator of $\frac{1}{4}$ by 2 to get an equivalent fraction, $\frac{2}{8}$, which has a like denominator. Then add $\frac{3}{8}+\frac{2}{8}$ to get $\frac{5}{8}$.	Multiply both the numerator and the denominator of $\frac{4}{7}$ by 2 to get $\frac{8}{14}$, which has a like denominator, 14. Then add $\frac{8}{14}+\frac{2}{14}$. Doing so results in $\frac{10}{14}$. Simplify the result by dividing the numerator and denominator by 2 to get $\frac{5}{7}$.	Divide both the numerator and the denominator of $\frac{10}{25}$ by 5 to get $\frac{2}{5}$, which has a like denominator, 5. Then add $\frac{2}{5}+\frac{2}{5}$. Or you can multiply both the numerator and the denominator of $\frac{2}{5}$ by 5 to get $\frac{10}{25}$, which has a like denominator, 25. Then add $\frac{10}{25}+\frac{10}{25}$. Then simplify the result by dividing both the numerator and denominator by 5: $\frac{20}{25}=\frac{4}{5}$.

After the students have worked on the problems, ask three different partners to come to the board and show their answers to the class. Make sure they show how to simplify the fraction if needed.

Step 4: Practice

Ask the students to solve the following problems individually. Discuss the example if needed. Encourage them to ask a partner for help if they get stuck. Once most of the students are finished, ask them to take turns showing the class how they solved the problems.

Example

Add fractions with unlike denominators: $\frac{3}{9}+\frac{1}{3}=$

- To add two fractions, both denominators need to be the same.
- Convert $\frac{1}{3}$ by multiplying both the numerator and denominator by 3 to get the like denominator: $\frac{1\times3}{3\times3}=\frac{3}{9}$.
- Now you can add: $\frac{3}{9}+\frac{3}{9}=\frac{6}{9}$
- Simplify by dividing both the numerator and denominator by 3: $\frac{6\div3}{9\div3}=\frac{2}{3}$

Problems with Answers

Add or subtract the following fractions. Make sure to convert the fractions so the denominators are the same before adding or subtracting. Simplify if possible.

1) $\frac{1}{2} + \frac{2}{8} = \frac{4}{8} + \frac{2}{8} = \frac{6}{8} = \frac{3}{4}$

One-half plus two-eighths

2) $\frac{5}{6} - \frac{1}{2} = \frac{5}{6} - \frac{3}{6} = \frac{2}{6} = \frac{1}{3}$

Five-sixths minus one-half

3) $\frac{1}{6} + \frac{8}{12} = \frac{2}{12} + \frac{8}{12} = \frac{10}{12} = \frac{5}{6}$

One-sixth plus eight-twelfths

4) $\frac{1}{2} + \frac{2}{7} = \frac{7}{14} + \frac{4}{14} = \frac{11}{14}$

One-half plus two-sevenths

5) $\frac{7}{10} - \frac{2}{5} = \frac{7}{10} - \frac{4}{10} = \frac{3}{10}$

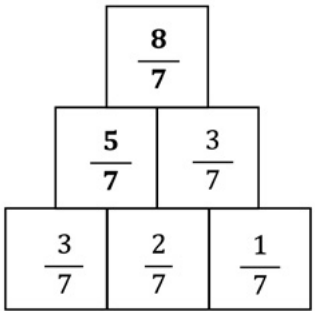
Seven-tenths minus two-fifths

6) $\frac{2}{3} + \frac{1}{5} = \frac{10}{15} + \frac{3}{15} = \frac{7}{15}$

Two-thirds plus one-fifth

Each pair of blocks totals the block above them. Use addition and subtraction to fill in the missing fractions in each box. **There is no need to simplify your answers.**

7)



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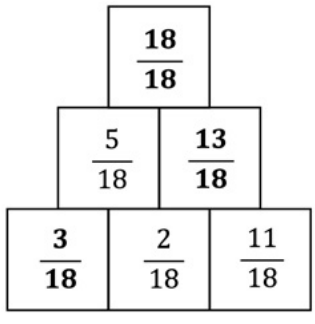

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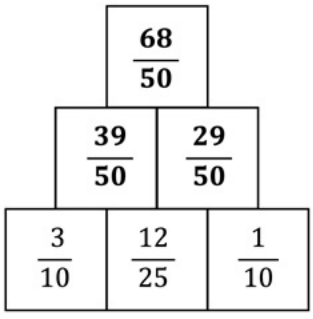

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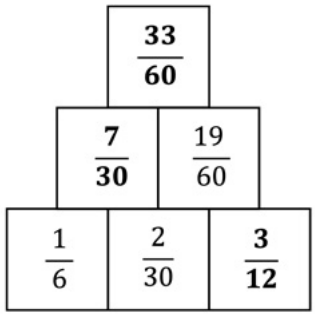


Step 5: Closing

Ask a student to read aloud the "Closing" section in their workbook. Then bear your testimony of Jesus Christ and how you are building upon the rock of Christ.

The boxes in today's activity were built on each other. Just as some of the boxes acted as a foundation on which the boxes above them were built, we must build our foundation on the Lord Jesus Christ. In Helaman 5:12 we read:

> And now, my sons, remember, remember that it is upon the rock of our Redeemer, who is Christ, the Son of God, that ye must build your foundation; that when the devil shall send forth his mighty winds, yea, his shafts in the whirlwind, yea, when all his hail and his mighty storm shall beat upon you, it shall have no power over you to drag you down to the gulf of misery and endless wo, because of the rock upon which ye are built, which is a sure foundation, a foundation whereon if men build they cannot fall.

When you go home today, share your testimony of how you are working to build your foundation on the rock of your Redeemer. How can you help those around you strengthen their foundations and have faith in Jesus Christ?

Step 6: Reflection (after class)

Take a few minutes to write the names of students who may need more help with this skill. Think of ways you can help them learn it for next class.

Extra Practice

If you notice that students are struggling with today's skill, you can show them these additional examples.

Adding Fractions with Unlike Denominators

With a partner, add each fraction. Make sure to add only after you have common denominators.

Problems with Answers

1) $\frac{1}{3}+\frac{5}{8}=$	2) $\frac{3}{8}+\frac{1}{4}=$	3) $\frac{2}{5}+\frac{1}{15}=$
$\frac{8}{24}+\frac{15}{24}=\mathbf{\frac{23}{24}}$	$\frac{3}{8}+\frac{2}{8}=\mathbf{\frac{5}{8}}$	$\frac{6}{15}+\frac{1}{15}=\mathbf{\frac{7}{15}}$

Subtracting Fractions with Unlike Denominators

Subtracting fractions is just like adding fractions. We need to have the same denominator first, and then we subtract the numerators.

4) $\frac{5}{6}-\frac{1}{4}=$

Answer:

$\frac{10}{12}-\frac{3}{12}=\frac{7}{12}$

5) $\frac{5}{6}-\frac{7}{12}=$

Answer: We need to make the denominators the same by finding the least common multiple (LCM). The LCM of 6 and 12 is 12, so we need to change $\frac{5}{6}$ into a fraction with a denominator of 12. We do this by multiplying the numerator and denominator by 2, and we get $\frac{10}{12}$. Now we can subtract: $\frac{10}{12}-\frac{7}{12}=\frac{3}{12}$. This simplifies to $\frac{1}{4}$.

9

Add or Subtract Fractions with Unlike Denominators

Part B

Step 1: Lesson Overview

Learning Outcomes

- Students will add and subtract fractions with unlike denominators.
- Students will simplify (reduce) fractions.

Helpful Videos

- **adding fractions with Like denominators:** https://youtu.be/bcCLKACsYJ0
- **fractions with unlike denominators, word problem:** https://youtu.be/PKh5B9xyzSc

Vocabulary Words

- **numerator:** the top number of a fraction, indicating how many parts we have
- **denominator:** the bottom number of a fraction, indicating how many equal parts make a whole
- **least common multiple (LCM):** the lowest number that is a multiple of two or more given numbers (for example, 12 is the least common multiple of 2, 3, and 4)

Step 2: Discussion

Ask the students to turn to lesson 9 in their workbooks. Have someone read the problem out loud for the class. Instruct everyone else to follow along and circle words that are unfamiliar.

Problem

For Ken's 50th birthday party, his wife ordered a giant sandwich to feed all the guests. Their friends ate $\frac{3}{5}$ of the sandwich, their family ate $\frac{3}{10}$ of it, and Ken ate $\frac{1}{15}$ himself!

a. How much more did their friends eat than their family (not including Ken)?
b. How much more did their family eat than Ken?
c. How much of the sandwich, if any, was left after the party?

Teacher:

Turn to a partner and explain to each other what the problem is asking you to do. Talk about how you might solve this problem. Do not solve it yet. *(**Possible answers:** Draw a picture to help you see the problem; convert all the fractions to like fractions; add the fractions.)*

Gather the students to discuss their responses before solving the problem.

Teacher:

What are some ways to start the problem? *(**Possible answers:** Start by drawing a picture to show each person's sandwich amounts.)*

Step 3: Activity

Divide the class into groups of 2–3 students. Ask the students to work together to solve the problem. If a group gets stuck, encourage them to raise their hand for help or to ask another group.

Encourage the students who understand this concept to help those who are less experienced or do not understand. Walk around the room to monitor and to make sure no student gets left out. Give groups hints if needed. Look for students who use different strategies when solving the problem.

Answer:

The first step is to find the least common multiple (LCM) between 5, 10, and 15 so we can get the same denominator for all of them. 5, 10, and 15 can all go into 30 evenly.

Now we convert our fractions so that each has a denominator of 30:

Friends: $\frac{3 \times 6}{5 \times 6} = \frac{18}{30}$ Family: $\frac{3 \times 3}{10 \times 3} = \frac{9}{30}$ Ken: $\frac{1 \times 2}{15 \times 2} = \frac{2}{30}$

a. How much more did their friends eat than their family (not including Ken)?

$\frac{18}{30} - \frac{9}{30} = \frac{9}{30} = \frac{3}{10}$ **The friends ate $\frac{3}{10}$ more of the sandwich than the family.**

b. How much more did their family eat than Ken?

$\frac{9}{30} - \frac{2}{30} = \frac{7}{30}$ **The family ate $\frac{7}{30}$ more of the sandwich than Ken.**

c. How much of the sandwich, if any, was left after the party?

Find the total amount of sandwich eaten: $\frac{18}{30} + \frac{9}{30} + \frac{2}{30} = \frac{29}{30}$

Now subtract: $\frac{30}{30} - \frac{29}{30} = \frac{1}{30}$

$\frac{1}{30}$ of the sandwich was left.

Bring the class together after everyone has worked on the problem. Ask different groups to show the class how to solve each part of the problem.

If there are groups who are struggling to answer the problem correctly, kindly offer corrections or guidance.

Step 4: Practice

Have the students think about what they learned in the lesson and write or draw it in their workbook.

Take a few minutes to share with someone sitting near you one thing you learned about adding or subtracting fractions with unlike denominators. Write or draw what you learned below.

Step 5: Closing

If there is time remaining, ask a student to read the quote from Sister Mary N. Cook that is found in their workbooks.

Sister Mary N. Cook, former First Counselor in the Young Women General Presidency, said, "God gave you moral agency and the opportunity to learn while on earth, and He has a work for you to do. To accomplish this work, you have an individual responsibility to seek learning" ("Seek Learning: You Have a Work to Do," *Liahona*, May 2012, 120).

As your family is studying from *Come, Follow Me* this week, talk about how you can seek learning in all areas of your lives.

Share with the students how you "seek learning" in your life.

Step 6: Reflection (after class)

Take a few minutes to write the names of students who may need more help with this skill. Think of ways you can help them learn it for next class.

10

Mathematics Exam Preparation

Problem Study Guide

Step 1: Lesson Overview

Learning Outcomes

- Students will learn and apply study skills that they can use throughout the school year to help prepare for mathematics exams.
- Students will create a study guide for specific mathematics skills.

Vocabulary Word

- **study guide:** a guide that has the information, hints, skills, and examples a student needs to study for an exam

Step 2: Discussion

Teacher:

There are many things you can do to help you prepare for exams. What do you do to prepare for exams? Can you think of any things your teachers have suggested to help you prepare for your mathematics exams?

Encourage the students to respond to these questions. Praise them and discuss their responses.

Ask the students to open their workbooks to lesson 10, "Mathematics Exam Preparation: Problem Study Guide."

Teacher:

This lesson has a list of ways you can prepare for your mathematics exams.

Take turns reading the list of "Ways to Prepare for Your Mathematics Exams" aloud (one student reads number 1, another student reads number 2, and so on).

Ways to Prepare for Your Mathematics Exams

In the Succeed in School class, you will get to practice most of these strategies. Each one will help you prepare for your mathematics exams.

1. **Know your basic mathematics facts** (addition, subtraction, multiplication, and division for numbers 0–12). They are the foundation of mathematics. The ability to solve basic mathematics facts quickly will help you when you are solving more difficult mathematics problems.
2. **Use your school assignments and class tests to help prepare for exams.** Circle all the problems that you do not know how to do. Ask for help with those problems in class the next day. As you correct your school assignments in class, circle all the problems you did wrong, and take notes on how to do them correctly. Save these notes to help make study guides as the exam gets closer.
3. **Know your mathematics vocabulary.** Keep a list of vocabulary words and study them. Make flash cards or have a friend or family member quiz you on them.
4. **Pray for help** to focus on the things you are learning and to help you remember them for your tests.
5. **Be prepared.** The night before a test, make sure you **have all the things you will need**, such as paper, pens, or a calculator.
6. **Study at a time when you are alert** and not hungry or tired. Study in places where there are few distractions.

7. **Work through mathematics problems once a week or more regularly.** Practice the problems that you struggle with. Do not wait until the last minute to study. Short daily or weekly study sessions are better than one long session the night before the exam.
8. **Repetition is important!** Read and reread your class notes, mathematics worksheets, homework, and topics in the textbook. While you are reviewing your notes, close your eyes or cover your notes to see if you can remember important details without looking at them. You can also pretend that you are explaining the material to someone else and summarize the material out loud.
9. **Create your own study guides** for each mathematics skill. A **study guide** is a document that has the information, hints, skills, and examples you need to study for an exam. Here are some ideas to help you make your study guide:
   - From your notes, make an outline of each major mathematics skill.
   - Make flash cards for studying mathematics vocabulary.
   - Create a list of mathematics equations that need to be memorized, and add to this as you learn new ones.
   - Make up your own quiz or test based on your notes, and have a friend, parent, or sibling test you.

Another strategy is to review mathematics exam questions from past years. Practice solving problems and notice which problems and skills are more difficult for you. Solving problems and practicing the skills you will need on your exams will help you feel more confident and ready to take your exams.

What other things have you learned that can help you prepare for your exams? Write them in the space below:

Step 3: Activity

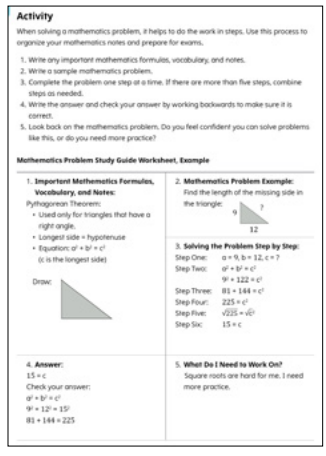
Teacher:

Today we will be focusing on one of the strategies to help you with your mathematics exams: creating study guides. A study guide is a text that has the information, hints, skills, and examples a student needs to study for an exam.

You can create study guides throughout the year to help you organize the information you learn in class. I will show you one example of a study guide you can create for your mathematics exams.

Example Study Guide

Ask the students to turn to the example study guide on the next page of their workbooks. Have them read through the study guide steps at the top of the page.


Activity

When solving a mathematics problem, it helps to do the work in steps. Use this process to organize your mathematics notes and prepare for exams.

1. Write any important mathematics formulas, vocabulary, and notes.
2. Write a sample mathematics problem.
3. Complete the problem one step at a time. If there are more than five steps, combine steps as needed.
4. Write the answer and check your answer by working backwards to make sure it is correct.
5. Look back on the mathematics problem. Do you feel confident you can solve problems like this, or do you need more practice?

Mathematics Problem Study Guide Worksheet, Example

1. Important Mathematics Formulas, Vocabulary, and Notes:
Pythagorean Theorem:
- Used only for triangles that have a right angle.
- Longest side = hypotenuse
- Equations: $a^2 + b^2 = c^2$ (c is the longest side)

Draw:

2. Mathematics Problem Example:
Find the length of the missing side in the triangle:

3. Solving the Problem Step by Step:
Step One: $a = 9, b = 12, c = ?$
Step Two: $9^2 + b^2 = c^2$
$9^2 + 122 = c^2$
Step Three: $81 + 144 = c^2$
Step Four: $225 = c^2$
Step Five: $\sqrt{225} = \sqrt{c^2}$
Step Six: $15 = c$

4. Answer:
$15 = c$
Check your answer:
$a^2 + b^2 = c^2$
$9^2 + 12^2 = 15^2$
$81 + 144 = 225$

5. What Do I Need to Work On?
Square roots are hard for me. I need more practice.

Teacher:

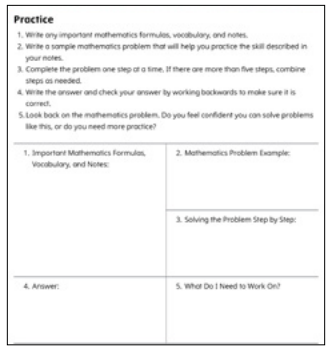
In this example, the mathematics skill is about the Pythagorean Theorem. Each step is designed to keep your notes organized so that when you are ready to study for your exam, you will have the information you need to help you remember it.

Read through the example study guide for the Pythagorean Theorem with the class. Pay attention to how the information is organized. Make sure the students understand the steps of the study guide before they do the practice.

Step 4: Practice

Create a Study Guide

For the rest of this lesson, each student is going to create a study guide sheet for a specific mathematics skill. Ask the students to turn to the next page of their workbook, where there is a blank study guide sheet to be filled out. You can walk them through each step of the study guide together.


Practice

1. Write any important mathematics formulas, vocabulary, and notes.
2. Write a sample mathematics problem that will help you practice the skill described in your notes.
3. Complete the problem one step at a time. If there are more than five steps, combine steps as needed.
4. Write the answer and check your answer by working backwards to make sure it is correct.
5. Look back on the mathematics problem. Do you feel confident you can solve problems like this, or do you need more practice?

1. Important Mathematics Formulas, Vocabulary, and Notes:

2. Mathematics Problem Example:

3. Solving the Problem Step by Step:

4. Answer:

5. What Do I Need to Work On?

Teacher:

First, think of the mathematics skills that you are learning right now or that you have already learned. What skill can you use for your study guide?

Encourage the students to respond. Discuss the mathematics skills they are learning or have learned in school. Explain that each student must think of a specific mathematics skill they can use as the focus of their study guide. If there are students who need ideas, you could suggest that they create a study sheet for one of the concepts they have learned so far in the Succeed in School class (for example, adding, subtracting, multiplying, or dividing decimals; and adding or subtracting like and unlike fractions).

Teacher:

In the first box on the left, write the mathematics skill that you chose. Now think of any vocabulary words, equations, or anything you know about that mathematics skill, and write it all down. You can work on this with a partner.

Come up with a sample problem for your mathematics skill, and write it in the second box. Then in the third box, solve the problem step by step. Include all your work.

Encourage the students to help each other if anyone is struggling to know what to write. If they need more help coming up with a sample problem, encourage them to look through past lessons they have completed.

After the students have solved the problem, gather them together to complete the last steps.

Teacher:

Now that you have completed all the steps for solving your problem, check your answer by either working backwards or putting your final numbers back into the equation to make sure they are accurate. If it does not work, go back and try to solve the problem differently, and then check your work again to make sure your calculations are accurate.

The last step is to look back on this mathematics skill and think of what you may still need help with. Ask yourself: Do I need more practice with this skill? Do I still need to memorize the equation or steps to solve this problem? What part am I struggling with?

Ask several students to share examples. If there is extra time, they can complete another study guide for a different skill so they can practice more.

If any students struggle with creating a study guide, find a time either at the end of class or afterwards when you can work with them one on one or in a small group. Help them figure out why they are struggling, and encourage them to create a plan to improve.

Step 5: Closing

Encourage the students to talk with a friend or family member about ways they can prepare for their exams.

Your family members and friends can support you in preparing for your exams. Think about a strategy you learned today, and discuss with a family member or friend how it will help you prepare for your exams.

Step 6: Reflection (after class)

Take a few minutes to think about today's lesson. How did the students respond to making a study guide? Do you think making study guides will help them as they prepare for their exams?

Mathematics Problem Study Guide Worksheet—Example

When solving a mathematics problem, it helps to do the work in steps. Use this process to organize your mathematics notes and prepare for exams.

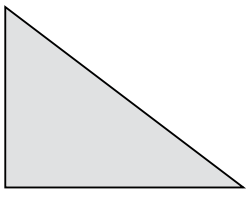
1. Write any important mathematics formulas, vocabulary, and notes.
2. Write a sample mathematics problem.
3. Complete the problem one step at a time. If there are more than five steps, combine steps as needed.
4. Write the answer and check your answer by working backwards to make sure it is correct.
5. Look back on the mathematics problem. Do you feel confident you can solve problems like this, or do you need more practice?

1. Important Mathematics Formulas, Vocabulary, and Notes:

Pythagorean Theorem:

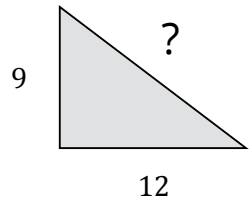
- Used only for triangles that have a right angle.
- Longest side = hypotenuse
- Equation: $a^2 + b^2 = c^2$
  (c is the longest side)

Draw:



2. Mathematics Problem Example:

Find the length of the missing side in the triangle:



3. Solving the Problem Step by Step:

Step One: $a = 9, b = 12, c = ?$

Step Two: $a^2 + b^2 = c^2$
$9^2 + 12^2 = c^2$

Step Three: $81 + 144 = c^2$

Step Four: $225 = c^2$

Step Five: $\sqrt{225} = \sqrt{c^2}$

Step Six: $15 = c$

4. Answer:

$15 = c$

Check your answer:

$a^2 + b^2 = c^2$
$9^2 + 12^2 = 15^2$
$81 + 144 = 225$

5. What Do I Need to Work On?

Square roots are hard for me. I need more practice.

Create a Mathematics Problem Study Guide

When solving a mathematics problem, it helps to do the work in steps. Use this process to organize your mathematics notes and prepare for exams.

1. Write any important mathematics formulas, vocabulary, and notes.
2. Write a sample mathematics problem.
3. Complete the problem one step at a time. If there are more than five steps, combine steps as needed.
4. Write the answer and check your answer by working backwards to make sure it is correct.
5. Look back on the mathematics problem. Do you feel confident you can solve problems like this, or do you need more practice?

1. Important Mathematics Formulas, Vocabulary, and Notes:	**2. Mathematics Problem Example:**
	3. Solving the Problem Step by Step:
	4. Answer:
5. What Do I Need to Work On?	

11

Multiply Fractions

Part A

Step 1: Lesson Overview

Learning Outcomes

- Students will multiply fractions by whole numbers.
- Students will multiply fractions by fractions.

Helpful Video

- **multiplying fractions using an area model:** https://youtu.be/hr_mTd-oJ-M

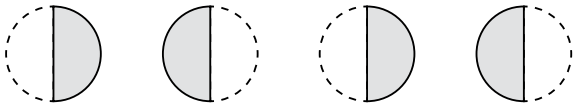
Vocabulary Words

- **product:** the answer after multiplying (for example, in $3 \times 4 = 12$, 12 is the product)
- **area model:** a way of representing multiplication graphically using a rectangle (for example, the length and width of the rectangle represent the factors, and the area of the rectangle represents their product)
- **commutative property of multiplication:** when two values, a and b, are multiplied, the order in which they are multiplied does not matter. Thus, $a \times b = b \times a$ (for example, when multiplying 5 and 3, $5 \times 3 = 3 \times 5$).

Step 2: Discussion

Teacher:

Today we are going to deepen our understanding of how to multiply fractions. In the last lesson, we learned that when multiplying fractions, we just multiply the numerators and multiply the denominators. By the end of our lesson today, you will understand why this works.



Problem 1

If I have 4 halves of cake, how many cakes do I have? Draw a picture to represent that.

Answer:

$$\frac{4}{1} \times \frac{1}{2} = \frac{4}{2} = 2$$

Teacher:

How many total cakes would this be? *(**Answer:** 2)*

We could write this as $4 \times \frac{1}{2}$, which means "four multiplied by one-half." This equals 4 halves, or 2 whole cakes. Notice that $4 \times \frac{1}{2}$ could have been written as $\frac{4}{1} \times \frac{1}{2}$ since $\frac{4}{1}$ equals 4. By multiplying the numerators and denominators, we get $\frac{4}{2}$, which equals 2.

Ask the class to turn to a classmate and share either what they learned from this example or what questions they may still have about this example.

While the students are talking to each other, walk around the classroom, listening for anyone who is still confused. If their partner is unable to help them, you might offer an explanation or show another example, such as the following: "If I have 12 quarters of cake, how many cakes do I have?" This would be $12 \times \frac{1}{4}$ *or* $\frac{12}{1} \times \frac{1}{4}$*. This would simplify to* $\frac{12}{4}$*, or 3.*

Problem 2

$$4 \times \frac{1}{2} =$$

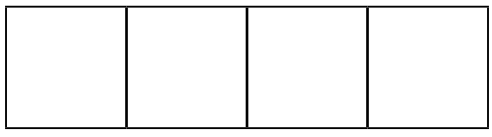
Answer:

$$\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}=\frac{4}{2}=2$$

Teacher:

Let us think about this problem in another way. Multiplication is "commutative." This means that a × b = b × a. So $4 \times \frac{1}{2}$ could be rewritten as $\frac{1}{2} \times 4$, or "half of 4." Now suppose we had 4 squares, like this:

Draw the squares on the board:



Teacher:

In our problem, we want half of 4. Let 4 be the total area of these squares. If we want half of its area, we could divide each square into 2 pieces and shade half of each square.

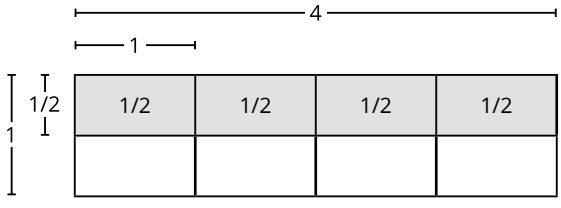
Shade in half of each square:

1/2	1/2	1/2	1/2

Teacher:

The shaded area would represent the answer to $\frac{1}{2} \times 4$, or "half of 4." From this, we can see that we have 4 halves, which equals $\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}$, or **2**.

Label the drawing and draw the equation:



$$\frac{1}{2}+\frac{1}{2}+\frac{1}{2}+\frac{1}{2}=\frac{4}{2}=2$$

Teacher:

This is called an **area model**. When we find the area of a rectangle, we multiply the length by the width. In the above example, when we multiplied $\frac{1}{2}$ by 4, $\frac{1}{2}$ was the length and 4 was the width. The total shaded area was **2**.

Problem 3

$\frac{3}{4} \times \frac{5}{8} =$

Teacher:

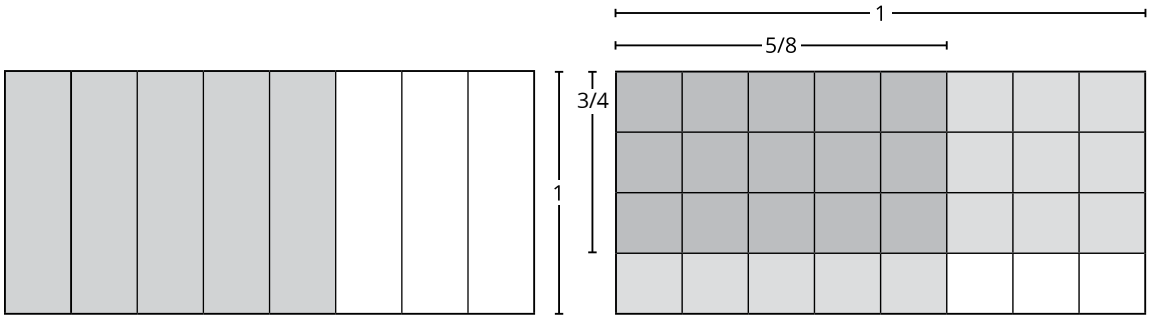
How can we find $\frac{3}{4}$ of $\frac{5}{8}$ (three-fourths of five-eighths)? Try solving the problem by creating an area model. When you think you have figured it out, discuss your drawing with a partner. If someone else at your table is confused or is not sure how to make an area model, give them a hint or teach them what you know.

Give the students 5–7 minutes to work on the problem. While they are working, notice which students are struggling. You may wish to give them a hint so that they can solve the problem on their own. For example, you may show the first drawing (on the left) below. Explain that this represents five-eighths of the rectangle's width. Then you might ask, "How could you show three-fourths of the rectangle's length?"

Answer:

$\frac{3}{4} \times \frac{5}{8} = \frac{15}{32}$

Draw a rectangle in which 5 of the 8 columns are shaded. Then divide each of those columns into 4 pieces by creating 4 rows, and shade in 3 out of the 4 rows.



Select someone who was able to create a drawing showing that $\frac{3}{4} \times \frac{5}{8} = \frac{15}{32}$. Ask them to show their answer to the class. One possibility is shown above.

Teacher:

This activity is hard, but sometimes when we try hard things, we can learn not to give up and we can see things in a new way. This activity helped us learn two things. First, it helped us remember that when we multiply fractions, we just multiply straight across: numerators times numerators, denominators times denominators. Second, this activity helped us see how multiplying straight across works.

Step 3: Activity

Ask the class to turn to the activity in their workbook. Have someone read the directions out loud for the class.

Fill out the chart and show how to solve the multiplication problem in four different ways. The first way is to draw an area model. The second way is to write a story problem. The third way is to draw a picture. The fourth way is to solve it using numbers, like an equation.

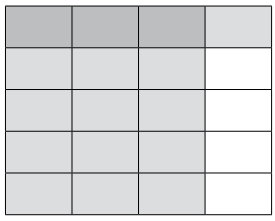
Teacher:

Some of you may feel more comfortable or confident solving a mathematics problem by drawing pictures, or you may really like creating a story about it. We all learn differently. Mathematics can be fun when you can look at it in different ways.

Ask the students to turn to a partner and explain to each other how they think they learn best. Do they think drawing pictures helps them? How about thinking about it like it is a story? Are the numbers easiest for them?

After the students discuss these questions for 2–3 minutes, ask someone to share with the class some ideas discussed with their partner or to ask any questions they might have.

Area Model



One-fifth of the rows are shaded, and three-fourths of the columns are shaded. The area that overlaps is 3 (1 × 3) out of 20 (4 × 5), or $\frac{3}{20}$.

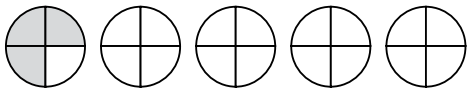
Story

In a certain ward, $\frac{1}{5}$ of the members play a musical instrument. Of those that play an instrument, $\frac{3}{4}$ play the piano. What fraction of the whole ward plays the piano?

If there were 200 members of the ward, then 40 of them ($\frac{1}{5}$ of the whole ward) would play an instrument. Of these 40, 30 of them ($\frac{3}{4}$ would play the piano. Of the 200 total members, 30 would play the piano. This could be expressed as $\frac{30}{200}$, or simplified, $\frac{3}{20}$.

$$\frac{1}{5} \times \frac{3}{4}$$

Visual



We start with 5 cakes. The cakes are each divided into 4 equal parts. One whole cake of the 5 cakes $\left(\frac{1}{5}\right)$ is selected. Then 3 of the 4 slices $\left(\frac{3}{4}\right)$ are eaten from the selected cake. This means 3 of the 20 total slices are eaten, or $\frac{3}{20}$.

Numerical

$$\frac{1}{5} \times \frac{3}{4} = \frac{3}{20}$$

Teacher:

Thank you for sharing all your ideas. Now with a partner or in a group of three, spend about 15 minutes completing each box of the chart to show how to multiply $\frac{1}{5} \times \frac{3}{4}$. After you have solved the problem, we will have each pair or group come show us on the board different ways to solve the problem. While you are watching others share their ideas, look for a new way to solve this problem that you had not thought of before.

Step 4: Practice

Have the students solve the following problems individually. Encourage them to ask a partner for help if they get stuck. Once most of the students are finished, have different students take turns showing the class how they solved the problems.

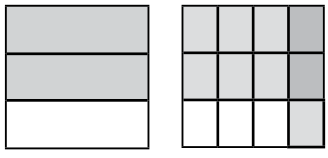
Problems and Answers

1. What is $\frac{2}{3} \times \frac{1}{4}$?

Answer: $\frac{2}{12}$, *or* $\frac{1}{6}$.

2. Check your answer using an area model.

Answer:



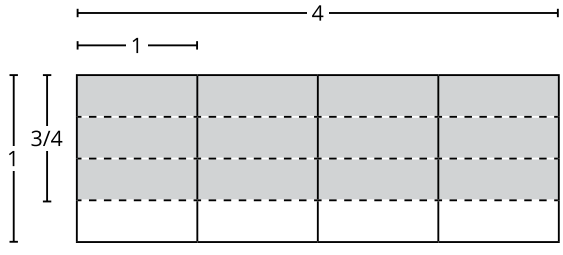
Start by drawing a 1 × 1 square. Then divide it into 3 equal rows and shade in 2 of the 3 rows. This represents $\frac{2}{3}$. Next, divide the square into 4 equal columns and shade in 1 of the columns. This represents $\frac{1}{4}$. The original square is now divided into 12 parts, and 2 of those parts, or $\frac{2}{12}$, are darkly shaded. You can simplify $\frac{2}{12}$ to $\frac{1}{6}$.

3. What is three-fourths of 4?

Answer: $\frac{3}{4} \times 4 = \frac{3}{4} + \frac{3}{4} + \frac{3}{4} + \frac{3}{4} = \frac{12}{4} = 3.$

4. Check your answer using an area model.

Answer:



$$\frac{3}{4} \times 4 = \frac{3}{4} + \frac{3}{4} + \frac{3}{4} + \frac{3}{4} = \frac{12}{4} = 3$$

In the diagram, we see that there are 12 shaded pieces that are each $\frac{1}{4}$ *in size.*

Step 5: Closing

Ask the students to notice where they use mathematics in their everyday lives. For example, they may use mathematics when buying something at the market or measuring something. Ask them to talk with a family member or friend about how they use mathematics outside of school.

As you go throughout the week, notice where mathematics is used in your daily life. For example, you might use mathematics when buying something at the market or when calculating how fast you are traveling. Share what you find with a family member or friend.

Step 6: Reflection (after class)

As you prepared to teach this lesson, what did you learn about multiplying fractions? Hopefully you are having insights and making connections during each class that you have not considered before. This is a blessing and a natural consequence of teaching. Teaching is one of the most powerful methods of learning. Consider sharing the insights you had about multiplying fractions with the students in the next class, or have them share their insights.

12

Multiply Fractions

Part B

Step 1: Lesson Overview

Learning Outcomes

- Students will multiply fractions by whole numbers.
- Students will multiply fractions by fractions.

Helpful Video

- **multiplying two fractions:** https://youtu.be/x6xtezhuCZ4

Vocabulary Word

- **product:** the answer after multiplying (for example, in $3 \times 4 = 12$, 12 is the product)

Step 2: Discussion

Teacher:

We use fractions every day, even outside of school. There are items in our houses that are measured in fractions. For example, when you are buying meat at the market, you can ask for $\frac{1}{2}$ kg or $\frac{1}{4}$ kg of meat. Sometimes juice or milk may come in containers that are one liter or one-half of a liter.

Can you think of any other things that are measured in fractions?

Encourage the students to respond. Praise them and thank them for sharing.

Teacher:

Not only do we often measure things in fractions, but we even use multiplication and division of fractions in things we do each day. For example, if I am going to take one-half of a liter of juice to five different friends, how many liters will I bring with me? To decide how much juice to bring, I will need to multiply $\frac{1}{2} \times 5$.

It is important for us to know how to use fractions in different ways.

Ask the students to turn to lesson 12, "Multiplying Fractions, Part B," in their workbooks. Ask them to look at the first problem. Read it together as a class.

Problem

Imagine that you have 5 containers of rice, and each container has $\frac{1}{4}$ of a kilogram of rice in it. How many kilograms of rice do you have in all?

Answer: $5 \times \frac{1}{4} = \frac{5}{4}$.

Ask the students to work on this problem for a few minutes. Encourage them to try different ways to find the answer. As the students work, walk around and watch for the different methods students are using.

Teacher:

There are multiple ways to find the answer to this problem. Some of you may have added $\frac{1}{4}$ five times, which looked like this: $\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{1}{4}$. In our lesson about adding fractions, we know that we add the numerators in fractions but keep the denominators the same, since these represent the size of each piece. When we add these fractions together, we get $\frac{5}{4}$ kilograms as our answer.

We can also use multiplication and say $5 \times \frac{1}{4}$.

Why would this work as well?

(***Answer:*** *Multiplication is repeated addition, so* $\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{1}{4} = 5 \times \frac{1}{4}$)

Write on the board: $5 \times \frac{1}{4} = \frac{5}{4}$.

Teacher:

Now I am going to show you something important about multiplying fractions. Please pay close attention to the next few steps. *(Show the equation on the board as you explain.)*

Remember that the number 5 is the same as $\frac{5}{1}$. So we can write the multiplication problem as $5 \times \frac{1}{4} = \frac{5}{4}$.

How do you think we got the answer $\frac{5}{4}$? Do you notice something when we look across the numerators and across the denominators?

(***Answer:*** *We see that to multiply* $\frac{5}{1}$ *by* $\frac{1}{4}$*, we multiply the numerators to get the new numerator and we multiply the denominators to get the new denominator.)*

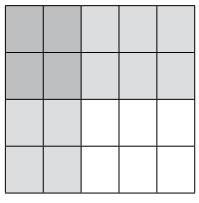
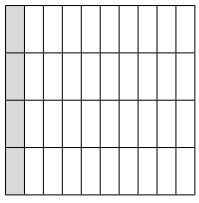
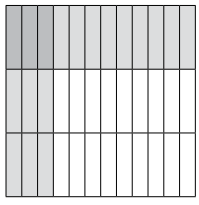
Read the following statement and ask the students to fill in the blanks in their workbook:

When multiplying fractions, we **multiply** the **numerators** to get the **new numerator,** and we **multiply** the **denominators** to get the **new denominator**. As an equation, we can write this rule as $\frac{a}{b} \times \frac{c}{d} = \frac{ac}{bd}$

Step 3: Activity

Ask the students to work with a partner and solve the following three problems. Remind them to simplify the answers. As the students are working, give them ideas to help them. However, encourage them to think through the problems on their own as much as they can. When the students are able to figure things out and solve problems on their own, their confidence grows.

Problems with Answers

1) $\frac{2}{5} \times \frac{2}{4} =$ 	2) $4 \times \frac{1}{10}$ 	3) $\frac{3}{12} \times \frac{1}{3}$ 
$\frac{2}{5} \times \frac{2}{4} = \frac{4}{20}$ or $\frac{1}{5}$	$\frac{4}{1} \times \frac{1}{10} = \frac{4}{10}$ or $\frac{2}{5}$	$\frac{3}{12} \times \frac{1}{3} = \frac{3}{36}$ or $\frac{1}{12}$

After most of the students are done, ask three different pairs of partners to come to the board and answer each problem. Ask the students to show how to simplify the fraction.

If there are no volunteers, select three pairs of partners that you noticed could solve each problem correctly to come to the board. Encourage different strategies to solve the problems.

Step 4: Practice

Ask the students to solve the following problems individually. Encourage them to ask a partner for help if they get stuck. Once most of the students are finished, ask them to take turns showing the class how they solved the problems.

Teacher:

Solve each problem and simplify the answer. Find your answer below the practice problems, and then write the matching letter on the blank line above the answer. Complete each problem to reveal the hidden phrase.

Problems and Answers

H $\frac{2}{3} \times \frac{1}{5} = \frac{2}{15}$	**I** $7 \times \frac{1}{2} = \frac{7}{2}$	**P** $\frac{2}{3} \times \frac{5}{7} = \frac{10}{21}$	**E** $3 \times \frac{2}{9} = \frac{6}{9} = \frac{2}{3}$
S $32 \times \frac{1}{2} = 16$	**T** $5 \times \frac{2}{10} = 1$	**R** $\frac{1}{10} \times \frac{2}{5} = \frac{1}{25}$	**O** $\frac{4}{7} \times \frac{10}{10} = \frac{40}{70} = \frac{4}{7}$
C $\frac{1}{6} \times \frac{3}{1} = \frac{1}{2}$	**G** $\frac{2}{5} \times \frac{1}{5} = \frac{2}{25}$	**Y** $2 \times \frac{2}{10} = \frac{2}{5}$	
L $\frac{3}{4} \times \frac{12}{3} = 3$	**A** $\frac{2}{5} \times \frac{3}{2} = \frac{6}{10} = \frac{3}{5}$	**U** $\frac{3}{8} \times 2 = \frac{6}{8} = \frac{3}{4}$	

T	H	E
1	$\frac{2}{15}$	$\frac{2}{3}$

H	O	L	Y
$\frac{2}{15}$	$\frac{4}{7}$	3	$\frac{2}{5}$

G	H	O	S	T
$\frac{2}{25}$	$\frac{2}{15}$	$\frac{4}{7}$	16	1

T	E	A	C	H	E	S
1	$\frac{2}{3}$	$\frac{3}{5}$	$\frac{1}{2}$	$\frac{2}{15}$	$\frac{2}{3}$	16

T	R	U	T	H
1	$\frac{1}{25}$	$\frac{3}{4}$	1	$\frac{2}{15}$

After the students have completed the practice, ask a student to read aloud the hidden phrase they discovered by completing the problems.

Teacher:

How can the Holy Ghost help you learn truth?

Encourage the students to respond. Bear your testimony about how we can learn truth through the Holy Ghost.

Step 5: Closing

Ask a student to read aloud Moroni 10:5, included in the student workbook. Ask the students to think about how the Holy Ghost helps us to know the truth. Bear your testimony of the power of the Holy Ghost. Encourage the students to share their testimonies with a friend or family member.

Moroni 10:5 states, "And by the power of the Holy Ghost ye may know the truth of all things."

Think about this question: How does the Holy Ghost help you to know the truth?

When you go home today, talk with a friend or family member about how the Holy Ghost can act as a personal guide. You may also wish to share your testimony about how the Holy Ghost blesses your life.

Step 6: Reflection (after class)

Which students are understanding things well? Which students are struggling? What might you do to help both types of students continue to learn?

13

Divide Fractions

Part A

Step 1: Lesson Overview

Learning Outcomes

- Students will divide fractions by fractions.
- Students will divide fractions by whole numbers.

Helpful Video

- **dividing fractions:** https://youtu.be/zQMU-lsMb3U

Vocabulary Word

- **reciprocal of a fraction:** the fraction turned upside down (In other words, the reciprocal of a fraction is found by "flipping" the numerator and denominator. For example, the reciprocal of $\frac{a}{b}$ is $\frac{b}{a}$. The reciprocal of $\frac{2}{3}$ is $\frac{3}{2}$. The reciprocal of $\frac{1}{4}$ is $\frac{4}{1}$, or 4.)

Step 2: Discussion

Teacher:

In the last two lessons, we learned how to multiply with fractions. We can also divide with fractions. When we divide a number by a fraction, we are seeing how many times that fraction fits inside the number. For example, if we wanted to know how many fourths of a meter are in 3 meters, we would divide 3 by one-fourth.

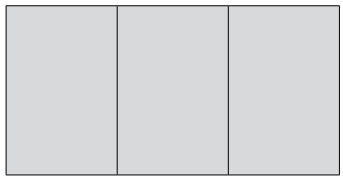
Problem 1

$3 \div \frac{1}{4} =$

Answer:

$3 \div \frac{1}{4} = \frac{3}{1} \times \frac{4}{1} = \frac{12}{1} = 12$

Draw on the board:



Teacher:

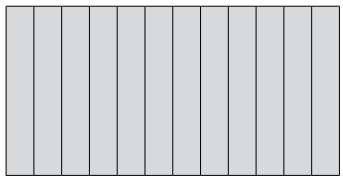
This board is 3 meters long. How many $\frac{1}{4}$ meter–long boards can we fit across this board?

Divide each section of the board into fourths:

Teacher:

3 divided by one-fourth is 12. What number multiplied by 3 is also 12? *(**Answer**: 4)*

If we write this out, it looks like this:



Write on the board: $3 \div \frac{1}{4} = \frac{3}{1} \times \frac{4}{1} = \frac{12}{1} = 12$.

Teacher:

The numbers $\frac{1}{4}$ and 4 are called "reciprocals." Reciprocals are numbers whose numerator and denominator have been flipped. So we see that 3 divided by $\frac{1}{4}$ is the same as 3 multiplied by the reciprocal of $\frac{1}{4}$.

Problem 2

A recipe calls for 2 cups of flour, but your measuring cup only holds $\frac{1}{3}$ of a cup. How many thirds of a cup should you add?

Have the students write out the equation they would use to solve this problem. Have them hold it up for you to see after they are done.

Answer:

$2 \div \frac{1}{3}$

Teacher:

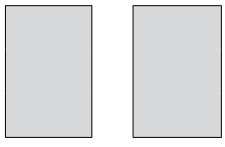
We can think of this problem as $2 \div \frac{1}{3}$. We can also think of this as 2 *times* a number.

Ask the students: $2 \div \frac{1}{3}$ *is equivalent to 2 times what number? (**Answer**: 3)*

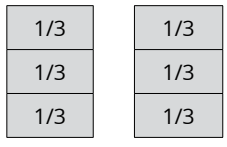
Teacher:

Like we discussed in the previous problem, dividing by a number is the same as multiplying by its reciprocal. So $2 \div \frac{1}{3}$ is the same as 2 × 3, or 6. Visually, it looks like this:

We need 2 cups of flour.



We need 6 one-third cups to fill 2 cups.



Problem 3

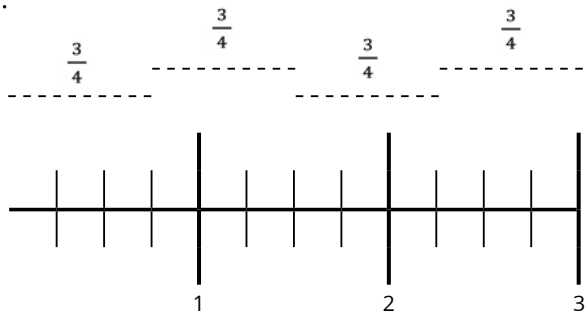
Ask the students to write out the division problem "three divided by three-fourths" as a mathematics expression in their workbook. Have them hold it up so you can see it when they are done. $(3 \div \frac{3}{4})$

Have them solve the problem with a partner. Encourage them to solve the problem just like you showed on the board. Walk around and monitor the students. Make sure they are all participating and working together. If necessary, give them small hints to help them solve the problems.

Answer:

$$3 \div \frac{3}{4} = \frac{3}{1} \times \frac{4}{3} = \frac{12}{3}$$

If the students are confused, you may want to show the diagram as an additional way to explain why $3 \div \frac{3}{4} = 4$.



There are 4 groups of $\frac{3}{4}$ *. That is why 3 divided by* $\frac{3}{4}$ *equals 4.*

Teacher:

The answer is $\frac{12}{3}$, which is an improper fraction. We will be reviewing how to convert this to a mixed number in a future lesson. But for now, you would write it as 4.

Explain to the students that they may use the phrase "keep, switch, flip" as a way to remember how to divide fractions. You "keep" the first number the same. Then you "switch" division to multiplication. Lastly, you "flip" the last number's numerator and denominator: "keep, switch, flip."

"Keep, switch, flip"

1. "Keep" the first number the same.
2. "Switch" division to multiplication.
3. "Flip" the last number's numerator and denominator.

Step 3: Activity

Ask the students to complete the activity with a partner. Encourage them to divide the fractions using the "keep, switch, flip" method. They should simplify the answer if possible. As the students are working on the problems, let them make mistakes and work together.

Problems and Answers

Problem A	Problem B
$6 \div \frac{3}{4} =$	$\frac{1}{4} \div \frac{1}{12} =$
$6 \div \frac{3}{4} = \frac{6}{1} \times \frac{4}{3} = \frac{24}{3} = \mathbf{8}$	$\frac{1}{4} \div \frac{1}{12} = \frac{1}{4} \times \frac{12}{1} = \frac{12}{4} = \mathbf{3}$

For students looking for an extra challenge, have them create a picture of these problems. They can use circles, squares, or whatever they want to visually show these equations. Once they finish, have them compare their work with a classmate and explain their thinking to each other.

Ask a pair of students to come to the board and show the class how they solved the problems. Encourage other students to show different ways to solve the problems.

Fraction Tic-Tac-Toe Game

You can play a game for more practice dividing fractions. Ask students to find a classmate to play against. Remind them that the purpose of the game is not to win but to get better at mathematics and have fun!

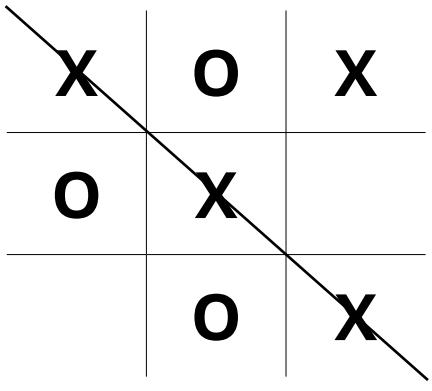
This game is called Tic-Tac-Toe. It is a simple game children often play. Today the students will play Tic-Tac-Toe using mathematics.

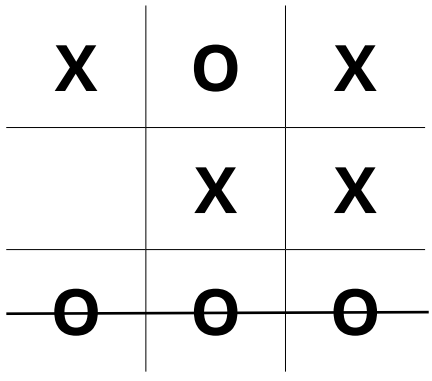
Player 1 chooses a square and solves the problem. If the answer is correct, player 1 draws an "X" over the square. Then player 2 chooses a square and solves the problem.
If the answer is correct, player 2 draws an "O" over the square. The two players take turns. Whichever player gets three "X"s or "O"s in a row first wins. Make sure to simplify your answers.

Problems and Answers

$\frac{1}{3} \div \frac{3}{5}$ $\frac{5}{9}$	$\frac{1}{4} \div 2$ $\frac{1}{8}$	$\frac{2}{5} \div \frac{1}{2}$ $\frac{4}{5}$	$\frac{4}{6} \div \frac{2}{3}$ $\frac{12}{12}$ *or* **1**	$\frac{1}{2} \div 6$ $\frac{1}{12}$	$\frac{6}{8} \div \frac{4}{5}$ $\frac{30}{32}$ *or* $\frac{15}{16}$
$2 \div \frac{1}{5}$ $\frac{10}{1}$ or **10**	$\frac{2}{6} \div \frac{2}{5}$ $\frac{10}{12}$ or $\frac{5}{6}$	$10 \div \frac{1}{4}$ $\frac{40}{1}$ or **40**	$10 \div \frac{2}{3}$ $\frac{30}{2}$ or **15**	$\frac{3}{10} \div \frac{1}{2}$ $\frac{6}{10}$ or $\frac{3}{5}$	$1 \div \frac{1}{6}$ $\frac{6}{1}$ or **6**
$\frac{1}{7} \div \frac{2}{3}$ $\frac{3}{14}$	$\frac{1}{8} \div \frac{5}{6}$ $\frac{6}{40}$ or $\frac{3}{20}$	$\frac{2}{7} \div 3$ $\frac{2}{21}$	$\frac{7}{10} \div \frac{3}{4}$ $\frac{28}{30}$ or $\frac{14}{15}$	$\frac{1}{3} \div \frac{4}{5}$ $\frac{5}{12}$	$\frac{1}{3} \div 2$ $\frac{1}{6}$

Examples of Tic-Tac-Toe Game Winners





Step 4: Practice

If there is time remaining, ask the students to solve the following problems individually. Encourage them to ask a partner for help if they are confused. Once most of the students are finished, ask different students to take turns showing the class how they solved the problems.

Problems and Answers

Divide the following fractions. Make sure to simplify the answer.

1) $\frac{2}{4} \div \frac{3}{4} = \quad \frac{2}{4} \times \frac{4}{3} = \frac{8}{12} = \frac{2}{3}$ Two-fourths divided by three-fourths	4) $6 \div \frac{1}{4} = \quad \frac{6}{1} \times \frac{4}{1} = \frac{24}{1} = 24$ Six divided by one-fourth
2) $\frac{1}{5} \div \frac{1}{5} = \quad \frac{1}{5} \times \frac{5}{1} = \frac{5}{5} = 1$ One-fifth divided by one-fifth	5) $\frac{2}{3} \div 3 = \quad \frac{2}{3} \times \frac{1}{3} = \frac{2}{9}$ Two-thirds divided by three
3) $\frac{1}{6} \div \frac{2}{6} = \quad \frac{1}{6} \times \frac{6}{2} = \frac{6}{12} = \frac{1}{6}$ One-sixth divided by two-sixths	6) $\frac{3}{5} \div 4 = \quad \frac{3}{5} \times \frac{1}{4} = \frac{3}{20}$ Three-fifths divided by four

Step 5: Closing

Encourage the students to play Tic-Tac-Toe with a friend or family member. They do not need to play this game with fractions. They can just draw a Tic-Tac-Toe board using paper and pen or even using a stick to draw in the dirt on the ground.

When you go home today, play Tic-Tac-Toe with a friend or family member. You do not have to use mathematics. You can draw the Tic-Tac-Toe board using paper and pen or even using a stick to draw in the dirt on the ground.

Step 6: Reflection (after class)

Which students are understanding things well? Which students are struggling? What might you do to help both groups continue to learn?

14

Divide Fractions

Part B

Step 1: Lesson Overview

Learning Outcomes

- Students will divide fractions by fractions.
- Students will divide fractions by whole numbers.

Helpful Video

- **dividing fractions:** https://youtu.be/zQMU-lsMb3U

Vocabulary Word

- **reciprocal of a fraction:** the fraction turned upside down (In other words, the reciprocal of a fraction is found by "flipping" the numerator and denominator. For example, the reciprocal of $\frac{a}{b}$ is $\frac{b}{a}$. The reciprocal of $\frac{2}{3}$ is $\frac{3}{2}$. The reciprocal of $\frac{1}{4}$ is $\frac{4}{1}$, or 4.)

Step 2: Discussion

Teacher:

Turn to today's lesson in your workbook. Last time, we learned an important connection between dividing and multiplying fractions. Please take a moment and try to fill in the blanks.

Problem 1

Dividing by 5 is the same as multiplying by _____.

Answer: $\frac{1}{5}$

Problem 2

Dividing by $\frac{2}{7}$ is the same as multiplying by _____.

Answer: $\frac{7}{2}$

Problem 3

Dividing by a number is the same as _____.

Answer: "multiplying by the number's reciprocal"

Teacher:

The important thing to remember about dividing fractions is that it can always be rewritten as multiplication. The phrase "keep, switch, flip" can be helpful in remembering what to do. We "keep" the first number the same, we "switch" division to multiplication, and we "flip" the numerator and denominator of the second number.

"Keep, switch, flip"

1. "Keep" the first number the same.
2. "Switch" division to multiplication.
3. "Flip" the last number's numerator and denominator.

Step 3: Activity

The students can work in groups of three to complete the two problems in their workbook. Remind them to simplify their answers. Encourage them to work together. It is OK if students find different ways to solve the problem. For example, they may draw a picture, write out an equation, or make a chart. If there are unfamiliar words, they can use a dictionary and help each other.

While the students work in groups, walk around the room to make sure they are on task and to help if needed. After every group is done, have different groups show the rest of the class how they solved each problem.

Problems and Answers

1. A real estate developer has 20 hectares of land. She wants to build homes on the land. The city requires each housing plot to be $\frac{2}{5}$ of a hectare in size. How many houses can fit on the 20 hectares?

   Answer: $20 \div \frac{2}{5} = 20 \times \frac{5}{2} = \frac{20}{1} \times \frac{5}{2} = \frac{100}{2} = \mathbf{50}$ ***houses***

2. Kwesi is trying to solve $\frac{8}{9} \div \frac{2}{3}$. He rewrites the statement as $\frac{9}{8} \times \frac{2}{3}$ and gets $\frac{18}{24}$, or $\frac{3}{4}$. Is Kwesi correct? If so, explain why. If not, explain why and rework the problem correctly.

   Answer: Kwesi is incorrect. He flipped the first fraction when he should have flipped the second fraction. The expression $\frac{8}{9} \div \frac{2}{3}$ is really equal to $\frac{8}{9} \times \frac{3}{2}$. When we solve this, we get $\frac{24}{18} = \frac{4}{3}$.

Make sure that everyone is participating in the groups. Move students around if needed.

Teacher:

What group would like to show us how to solve the first problem? The rest of the class should follow along to make sure the group is solving it correctly. If you notice their answer is different from yours, figure out what step you did incorrectly or point out to the group, in a kind way, that they may have done a step incorrectly. Your group may also find different ways to solve the problem. You can share other ways to solve the problem when we discuss the answers.

Step 4: Practice

Ask the students to solve the following problems individually. Encourage them to ask a partner for help if they get stuck. Once most of the students are finished, have different students take turns showing the class how they solved the problems.

Problems with Answers

Problem 1

Which expression is greater, $\frac{7}{8} \div \frac{3}{16}$ or $\frac{8}{9} \div \frac{2}{3}$?

Answer:

When we simplify each expression, we find that $\frac{7}{8} \div \frac{3}{16}$ is greater than $\frac{8}{9} \div \frac{2}{3}$. This is because $\frac{7}{8} \div \frac{3}{16} = \frac{7}{8} \times \frac{16}{3} = \frac{112}{24} = \mathbf{\frac{14}{3}}$, *while* $\frac{8}{9} \div \frac{2}{3} = \frac{8}{9} \times \frac{3}{2} = \frac{24}{18} = \mathbf{\frac{4}{3}}$.

Problem 2

Evaluate each expression. In other words, find the final value after you add, subtract, multiply, or divide.

a: $\frac{2}{3} + \frac{5}{6} =$

Answer: $\frac{2}{3} + \frac{5}{6} = \frac{4}{6} + \frac{5}{6} = \mathbf{\frac{9}{6}} = \mathbf{\frac{3}{2}}$

b: $\frac{4}{5} - \frac{2}{11} =$

Answer: $\frac{4}{5} - \frac{2}{11} = \frac{44}{55} - \frac{10}{55} = \mathbf{\frac{34}{55}}$

c: $\frac{8}{9} \times \frac{3}{4} =$

Answer: $\frac{8}{9} \times \frac{3}{4} = \frac{24}{36} = \mathbf{\frac{2}{3}}$

d: $\frac{12}{7} \div \frac{24}{14} =$

Answer: $\frac{12}{7} \div \frac{24}{14} = \frac{12}{7} \times \frac{14}{24} = \frac{12}{7} \times \frac{7}{12} = \frac{84}{84} = \mathbf{1}$

Step 5: Closing

Ask the students to teach the "keep, switch, flip" method for dividing fractions to a friend or family member. Teach them to "keep" the first number the same, "switch" division to multiplication, and "flip" the numerator and denominator of the second number.

In the next two days, find a sibling or friend to whom you can teach the "keep, switch, flip" method for dividing fractions. Teach them to "keep" the first number the same, "switch" division to multiplication, and "flip" the numerator and denominator of the second number.

Step 6: Reflection (after class)

Which pairs of students are working well together? What is it about their interactions that makes them effective? How can you encourage other students to also work well together?

15

Mathematics Exam Preparation

Using a Study Guide

Step 1: Lesson Overview

Learning Outcome

Students will learn how to create and use a study guide to prepare for an upcoming exam.

Step 2: Discussion

Teacher:

We have already talked about making study guides to help us prepare for exams. Does anyone remember what a study guide is?

Encourage the students to respond. If necessary, remind the students that a study guide is a guide that has the information, hints, skills, and examples a student needs to study for an exam.

Ask students to turn to lesson 15 in their workbooks. Have a student read the list of "Tips to Creating a Study Guide" aloud for the class.

Tips to Creating a Study Guide:

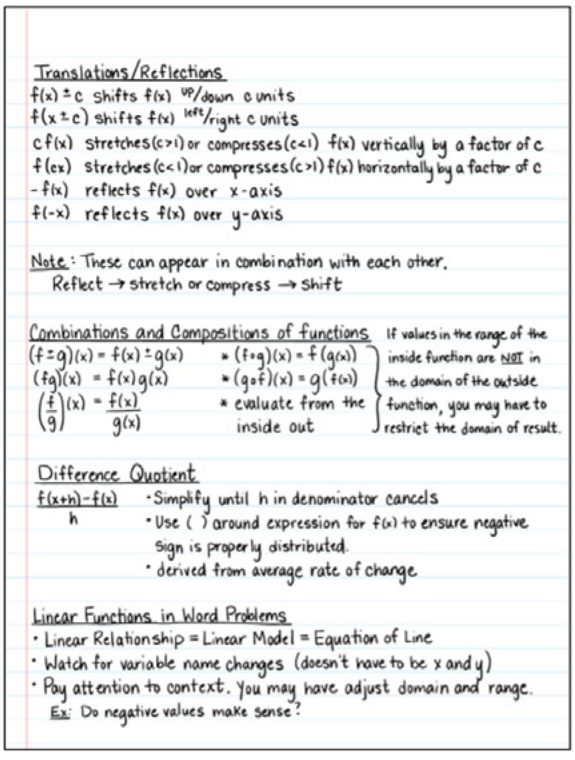
- First, you can gather together class notes, textbooks, homework assignments, and past tests or quizzes.
- When you have gathered all the information, identify which facts and terms are most important.
- Try not to put too much on your study guide. Be brief and choose what is most important.
- If you know a term or subject really well, you do not need to include it. Do not spend time studying what you already know.
- If information is unlikely to be included on a test, do not spend time studying that either.

Teacher:

A fraction that is less than one whole is called a proper fraction. This fraction's numerator is less than the denominator. A fraction that is greater than one whole is called an improper fraction. This fraction's numerator is greater than the denominator, which tells us that the fraction is greater than one whole.

Step 3: Activity

Have the students look at the example in their workbook of one way to create a study guide for an upcoming math test. Then discuss the questions below as a class.



Translations/Reflections

$f(x) \pm c$ shifts $f(x)$ up/down c units

$f(x \pm c)$ shifts $f(x)$ left/right c units

$cf(x)$ stretches ($c>1$) or compresses ($c<1$) $f(x)$ vertically by a factor of c

$f(cx)$ stretches ($c<1$) or compresses ($c>1$) $f(x)$ horizontally by a factor of c

$-f(x)$ reflects $f(x)$ over x-axis

$f(-x)$ reflects $f(x)$ over y-axis

Note: These can appear in combination with each other.
Reflect → stretch or compress → shift

Combinations and Compositions of functions

$(f \pm g)(x) = f(x) \pm g(x)$

$(fg)(x) = f(x)g(x)$

$\left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)}$

* $(f \circ g)(x) = f(g(x))$
* $(g \circ f)(x) = g(f(x))$
* evaluate from the inside out

If values in the range of the inside function are NOT in the domain of the outside function, you may have to restrict the domain of result.

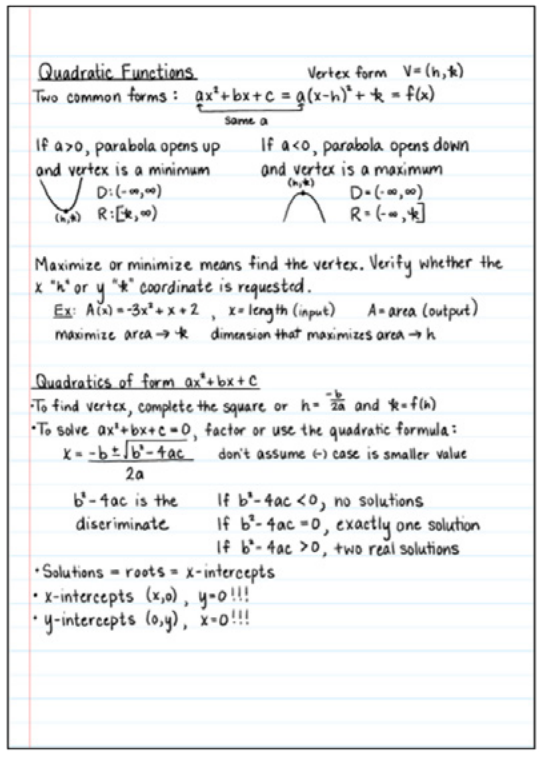
Difference Quotient

$\frac{f(x+h)-f(x)}{h}$

- Simplify until h in denominator cancels
- Use ( ) around expression for $f(x)$ to ensure negative sign is properly distributed.
- derived from average rate of change

Linear Functions in Word Problems

- Linear Relationship = Linear Model = Equation of Line
- Watch for variable name changes (doesn't have to be x and y)
- Pay attention to context. You may have adjust domain and range.
  Ex: Do negative values make sense?



Quadratic Functions

Vertex form $V=(h,k)$

Two common forms: $ax^2+bx+c = a(x-h)^2+k = f(x)$ (same a)

If $a>0$, parabola opens up and vertex is a minimum
D: $(-\infty,\infty)$
R: $[k,\infty)$

If $a<0$, parabola opens down and vertex is a maximum
D: $(-\infty,\infty)$
R: $(-\infty,k]$

Maximize or minimize means find the vertex. Verify whether the x "h" or y "k" coordinate is requested.

Ex: $A(x) = -3x^2+x+2$, x = length (input) A = area (output)
maximize area → k dimension that maximizes area → h

Quadratics of form ax^2+bx+c

- To find vertex, complete the square or $h = \frac{-b}{2a}$ and $k = f(h)$
- To solve $ax^2+bx+c=0$, factor or use the quadratic formula:

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

don't assume (-) case is smaller value

b^2-4ac is the discriminate

If $b^2-4ac<0$, no solutions
If $b^2-4ac=0$, exactly one solution
If $b^2-4ac>0$, two real solutions

- Solutions = roots = x-intercepts
- x-intercepts $(x,0)$, $y=0$!!!
- y-intercepts $(0,y)$, $x=0$!!!

- What makes this guide easy to use when studying for an exam?
- What is something you like about how this guide is organized?

Possible answers: *Topics are underlined, it's neat, formulas have examples, it uses bullet points, and it includes summaries.*

Step 4: Practice

Have the students take turns reading through the list of ways they can use a study guide to help them prepare for an exam.

Ways to Use a Study Guide:

- Find a way to recall or remember the information. Have someone quiz you, or just cover up the bullet points under each key word or concept and try to remember the definitions and details on your own.
- You can also use your study guide to create note cards. Put key words or formulas on one side and the bulleted information on the other. Go over these note cards over and over until you can remember the information on them.
- Studying in a group can be helpful because other students might have information in their notes or on their study guides that you missed.

Teacher:

Think about someone in your life who can help you study. Perhaps it is an older sibling, a teacher, a parent, or a friend. Make a list of people who can help you study.

If you notice that some students are having a hard time thinking of someone, give them some ideas. Maybe there is another youth or a leader in the ward who they could ask for help.

Step 5: Closing

Explain to the students that we learn a lot in school, but that is not the only place where we learn important lessons. We learn lessons as we speak with those around us and as we complete our daily tasks. Ask a student to read aloud Alma 34:32 from the student workbook. Challenge the students to discuss with a family member or friend how the things they are learning now will prepare them for the future.

We learn a lot in school, but that is not the only place where we learn important lessons. Alma 34:32 reminds us that life itself is a time to prepare: "This life is the time for men to prepare to meet God; yea, behold the day of this life is the day for men to perform their labors."

We prepare to meet God in many ways as we keep the commandments, exercise faith, and so forth. As we complete our daily tasks, we also prepare for our future and for opportunities to serve, work, and lead.

When you go home today, talk with a family member or friend about how the things you are learning now can help prepare you for your future.

Step 6: Reflection (after class)

As you taught, did you make any changes to the lesson plan that helped your students understand the lesson? Describe the changes you made below:

16

Improper and Mixed Fractions

Part A

Step 1: Lesson Overview

Learning Outcomes

- Students will multiply and divide mixed fractions.
- Students will convert improper fractions to mixed fractions, and vice versa.

Helpful Video

- **mixed numbers and improper fractions:** https://youtu.be/1xuf6ZKF1_I

Vocabulary Words

- **proper fraction:** a fraction where the numerator is less than the denominator (for example, $\frac{2}{3}$)
- **improper fraction:** a fraction where the numerator is greater than the denominator (for example, $\frac{4}{3}$)
- **mixed number:** a number made up of a whole number and a proper fraction (for example, $3\frac{1}{2}$ or $12\frac{1}{4}$)
- **convert:** to change the units of measurement without changing the actual size or amount of the thing being measured (for example, converting millimeters to centimeters)

Note

The discussion in this lesson includes two sections: parts A and B. Each part covers a different mathematics skill. Students need to understand each section to be able to complete the practice and activity. This lesson may take more than one class to complete.

Step 2: Discussion

Ask the students to turn to lesson 16, "Improper and Mixed Fractions, Part A."

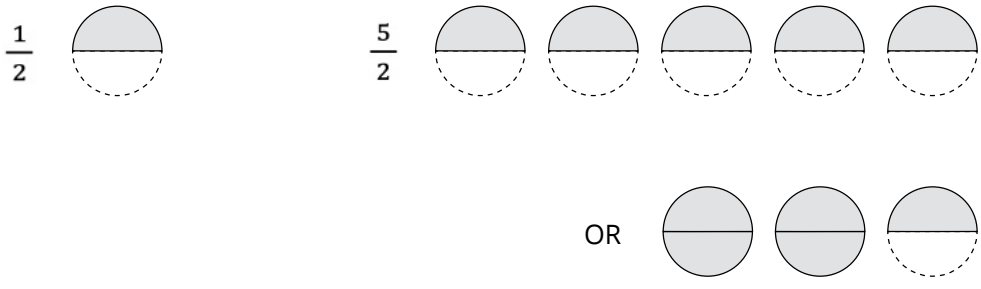
A. Types of Fractions

Problem

Draw pictures to represent the fractions $\frac{1}{2}$ and $\frac{5}{2}$.

Allow the students to work on their pictures for 1–2 minutes. If they are struggling with this exercise, encourage them to work with a partner. While the students are working, select two students to share their work. Invite the students you selected to share their drawings. If they are confused about how to draw pictures to represent $\frac{5}{2}$, you may wish to draw the following pictures and explain why both can represent $\frac{5}{2}$.

Possible Answers:



Teacher:

What do you notice about these two fractions? How is $\frac{5}{2}$ (five-halves) different from many of the fractions like $\frac{1}{2}$ (one-half) that we have discussed in the past? *(**Possible answer:** Most of the fractions we discussed in the past have been smaller than one whole. $\frac{5}{2}$ is greater than one whole.)*

Discuss how the pictures show that $\frac{1}{2}$ is less than one whole. The pictures for $\frac{5}{2}$ show that this fraction is greater than one whole.

Teacher:

A fraction that is less than one whole is called a proper fraction. This fraction's numerator is less than the denominator. A fraction that is greater than one whole is called an improper fraction. This fraction's numerator is greater than the denominator, which tells us that the fraction is greater than one whole.

Have the students fill in the blanks in their workbook as you read the following information about fractions.

The fraction $\frac{1}{2}$ is called a "proper fraction" because the numerator (1) is *less* than the denominator (2).

The fraction $\frac{5}{2}$ is called an "improper fraction" because the numerator (5) is *greater* than the denominator (2).

Ask the students to look at section B, "Converting a Mixed Number to an Improper Fraction," in their workbooks.

B. Converting a Mixed Number to an Improper Fraction

Write on the board: $\frac{5}{2} = 2\frac{1}{2}$

Teacher:

Notice that $\frac{5}{2}$ is equal to two wholes plus one half, or $2\frac{1}{2}$. (Five-halves equals two wholes and one-half.) Two halves make one whole. So if you have four halves, that is two wholes. If you have five halves, then you have two wholes and one-half.

$2\frac{1}{2}$ is called a mixed number because it has a whole number, 2, as well as a proper fraction, $\frac{1}{2}$.

Teacher:

There will be times when you will need to write a fraction as a mixed number, and there will be times when you will need to write it as an improper fraction. First, we will discuss how to rewrite a mixed number as an improper fraction.

Writing Whole Numbers as Fractions

Ask students to complete the exercise "Writing Whole Numbers as Fractions" with a partner. Give the students 1–2 minutes to complete this exercise. Check answers together using the answers below:

1) Write the whole number 1 as a fraction with 2 as the denominator: $1 = \frac{2}{2}$	2) Write the whole number 2 as a fraction with 2 as the denominator: $2 = \frac{4}{2}$
3) Write the whole number 1 as a fraction with 3 as the denominator: $1 = \frac{3}{3}$	4) Write the whole number 2 as a fraction with 3 as the denominator: $2 = \frac{6}{3}$

Teacher:

When we convert a mixed number to an improper fraction, we must first rewrite the whole numbers as fractions. The number $2\frac{1}{2}$ means $2 + \frac{1}{2}$. To add 2 and $\frac{1}{2}$ together, we first need to rewrite the 2 as a fraction with the same denominator as $\frac{1}{2}$.

Problem 1

$$2 + \frac{1}{2} = \frac{4}{2} + \frac{1}{2}$$

Teacher:

When we add these two fractions together, we get $\frac{5}{2}$.

Ask the students if they know another way to convert the mixed number $2\frac{1}{2}$ into the improper fraction $\frac{5}{2}$. Invite them to show other methods they have learned. Explain that it is also possible to convert mixed numbers to fractions with multiplication using the three steps below:

Step 1: Multiply the whole number (2) by the denominator (2). (2 × 2 = 4)

Step 2: Add the result (4) to the original numerator (1) to get 5. (4 + 1 = 5)

Step 3: Put 5 over the denominator (2) to get $\frac{5}{2}$.

Teacher:

We just converted a mixed number into an improper fraction in three easy steps. Now let's practice with another problem.

Problem 2

$$2\frac{3}{5} =$$

Ask the students to try to convert $2\frac{3}{5}$ (two and three-fifths) into an improper fraction in their workbooks. Give the students a few minutes to work, and then ask for a volunteer to share his or her work on the board.

Answer: $2\frac{3}{5} = 2\frac{2\times5+3}{5} = \frac{10+3}{5} = \frac{13}{5} =$

Step-by-Step Answer: Multiply the whole number (2) by the denominator (5). Add the result (10) to the original numerator (3) to get the new numerator, 13. Put 13 over the denominator to get $\frac{13}{5}$.

C. Converting an Improper Fraction to a Mixed Number

Teacher:

Now we will discuss how to convert an improper fraction to a mixed number. To convert the improper fraction $\frac{5}{2}$ to a mixed number, we must reverse the process we just did. We must find how many wholes we have and what fraction remains. To do this, we divide the numerator by the denominator. The quotient is the whole number part of the mixed number, and the remainder is the numerator of the fractional part of the mixed number.

Ask the students to look at section C, "Converting an Improper Fraction to a Mixed Number."

Problem 1

Convert $\frac{5}{2}$ to a mixed number.

Answer: $\frac{5}{2} = 2\frac{1}{2}$

Teacher:

If we divide the numerator, 5, by the denominator, 2, what is the answer? *(**Answer:** 2 goes into 5 twice, with 1 left over. So we write it as* $2\frac{1}{2}$*.)*

Encourage the students to respond.

Problem 2

Convert the improper fraction $\frac{13}{5}$ to a mixed number.

Answer: $\frac{13}{5} = 2\frac{3}{5}$

Teacher:

How can we convert the improper fraction $\frac{13}{5}$ (thirteen-fifths) to a mixed number? *(Encourage the students to respond. **Answer:** First we divide 13 by 5. The number 5 goes into 13 twice, with 3 left over. So the answer is* $2\frac{3}{5}$ *[two and three-fifths].)*

Problem 3

What is the method for converting an improper fraction to a mixed number?

Encourage the students to respond. Ask them to write the method in their workbooks.

Answer: Divide the numerator by the denominator. The quotient becomes the whole number, while the remainder becomes the numerator of the proper fraction. In the example above, 13 divided by 5 equals 2, with a remainder of 3. The quotient, 2, becomes our whole number. And the remainder, 3, becomes the numerator of our fraction.

Teacher:

We have discussed ways to convert improper fractions to mixed numbers and mixed numbers to improper fractions. In our activity today, you are going to work with a lot of mixed numbers. The calculations will be much easier if you convert the mixed numbers into improper fractions first.

Step 3: Activity

Encourage the students who understand how to solve this problem to help those students who are less experienced or do not understand how to solve it.

Teacher:

Turn to the "Activity" section in your workbooks and work on the problems with a classmate. Once you have completed all four problems, turn to the key on the next page to check your work. Once you have checked your work, move on to the "Practice" section.

Allow the students to work on the "Activity" and "Practice" sections with a partner. The students should check their answers to the "Activity" section problems using the answers in their workbooks. After the students complete both sections, check the answers to the "Practice" section problems together using the answers on the next page. If many students are struggling with the same problem, you may want to discuss it as a class. The answers to the "Activity" section are included below.

Solve each expression and write the answer as a mixed number or a proper fraction. Once you have solved all four, turn to the answer key on the next page to check your work.

Problems with Answers

1) $2\frac{3}{5}+1\frac{3}{5}$

Convert to improper fractions:

$=\frac{13}{5}+\frac{8}{5}$

Add the fractions:

$=\frac{21}{5}$

Convert to mixed number:

$=\mathbf{4\frac{1}{5}}$

---

2) $3\frac{1}{4}-2\frac{3}{8}$

Convert to improper fractions:

$=\frac{13}{4}-\frac{19}{8}$

Get a common denominator:

$=\frac{26}{8}-\frac{19}{8}$

Subtract the fractions:

$=\mathbf{\frac{7}{8}}$

---

3) $1\frac{1}{3}\times 2$

Convert to improper fractions:

$=\frac{4}{3}\times\frac{2}{1}$

Multiply the fractions:

$=\frac{8}{3}$

Convert to mixed number:

$=\mathbf{2\frac{2}{3}}$

---

4) $\frac{7}{4}\div\frac{3}{4}$

"Keep, switch, flip":

$=\frac{7}{4}\times\frac{4}{3}$

Multiply the fractions:

$=\frac{28}{12}$

Simplify the fractions:

$=\frac{14}{6}=\frac{7}{3}$

Convert to mixed number:

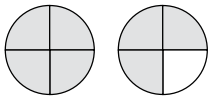
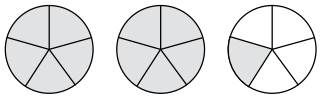
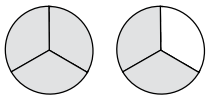
$=\mathbf{2\frac{1}{3}}$

Step 4: Practice

As you correct these practice problems together as a class, ask the students to take turns showing how they solved each problem.

Problems with Answers

Look at each image and then write the improper fraction and mixed number that it represents.

		Improper Fraction	Mixed Number
1)		$\frac{7}{4}$	$1\frac{3}{4}$
2)		$\frac{11}{5}$	$2\frac{1}{5}$
3)		$\frac{5}{3}$	$1\frac{2}{3}$

Multiply or divide the fractions. Convert them to a mixed or whole number.

4) $\frac{7}{3} \times \frac{4}{3} =$ ***Answer:*** $1\frac{3}{8} \div 3\frac{3}{4} = \frac{11}{30}$

5) $\frac{9}{4} \times \frac{2}{3} =$ ***Answer:*** $\frac{9}{4} \times \frac{2}{3} = \frac{18}{12} = \frac{3}{2} = 1\frac{1}{2}$

6) $\frac{9}{3} \div \frac{3}{2} =$ ***Answer:*** $\frac{9}{3} \div \frac{3}{2} = \frac{9}{3} \times \frac{2}{3} = \frac{18}{9} = \frac{2}{1} = 2$

Multiply or divide the mixed numbers. Convert them to improper fractions before multiplying. Then convert them back to mixed numbers.

7) $1\frac{1}{4} \times 2\frac{2}{3} =$

Answer: $1\frac{1}{4} \times 2\frac{2}{3} = \frac{5}{4} \times \frac{8}{3} = \frac{40}{12} = \frac{10}{3} = \mathbf{3\frac{1}{3}}$

8) $2\frac{1}{4} \div 1\frac{1}{4} =$

Answer: $2\frac{1}{4} \div 1\frac{1}{4} = \frac{9}{4} \div \frac{5}{4} = \frac{9}{4} \times \frac{4}{5} = \frac{36}{20} = \frac{9}{5} = \mathbf{1\frac{4}{5}}$

9) $3\frac{1}{2} \times 1\frac{1}{3} =$

Answer: $3\frac{1}{2} \times 1\frac{1}{3} = \frac{7}{2} \times \frac{4}{3} = \frac{28}{6} = \frac{14}{3} = \mathbf{4\frac{2}{3}}$

Word Problem

10) An envelope's height is $8\frac{3}{5}$ centimeters. Its width is $1\frac{1}{2}$ times longer than its height. What is the envelope's width?

Answer: First, convert both mixed numbers to improper fractions: $8\frac{3}{5} = \frac{43}{5}$ and $1\frac{1}{2} = \frac{3}{2}$. Then multiply: $\frac{43}{5} \times \frac{3}{2} = \frac{129}{10}$. Then convert the improper fraction back to a mixed number: 129 divided by 10 equals 12 with a remainder of 9, or $\mathbf{12\frac{9}{10}}$ ***centimeters***.

Step 5: Closing

Ask the students if there were any problems in today's lesson that were difficult for them. Ask them what they can do when problems are difficult. Encourage them to respond.

Ask the students to think about what they have learned today. Explain that just as mathematics can be difficult, there are many things in our lives that can be difficult and challenging. Ask them to talk with a friend or family member about what gives them comfort and strength during difficult times.

Bear your testimony about what gives you comfort and strength in your life during difficult times.

Sometimes learning mathematics, just like many things in our lives, can be difficult. Speak with a friend or family member about what helps them when they face difficult things in life. What gives them comfort and strength during these times?

Step 6: Reflection (after class)

Take a few minutes to write what went well during the lesson. Then write what did not go well. What will you do next time to improve?

17

Improper and Mixed Fractions

Part B

Step 1: Lesson Overview

Learning Outcomes

- Students will apply their knowledge of adding, subtracting, multiplying, and dividing fractions to real-life situations.
- Students will practice converting between mixed numbers and improper fractions.

Vocabulary Words

- **proper fraction:** a fraction where the numerator is less than the denominator (for example, $\frac{2}{3}$)
- **improper fraction:** a fraction where the numerator is greater than the denominator (for example, $\frac{4}{3}$)
- **mixed number:** a number made up of a whole number and a proper fraction (for example, $3\frac{1}{2}$ or $2\frac{1}{4}$)
- **convert:** to change the units of measurement without changing the actual size or amount of the thing being measured (for example, converting millimeters to centimeters)

Step 2: Discussion

Teacher:

Over the past couple weeks, we have learned how to add, subtract, multiply, and divide fractions. We have also learned how to work with proper, improper, and mixed fractions. Today we are going to use all these skills to solve some problems that relate to our lives.

Open your workbook to today's lesson and find the first problem. Who will read this problem out loud for the class?

Ask a student to read the first problem aloud.

Problem

Sara picked tomatoes from her garden and got about 12 liters of chopped tomatoes. She used $6\frac{1}{2}$ liters of the tomatoes to make a sauce. She then used $1\frac{5}{6}$ liters of the tomatoes to make soup. She separated the remaining chopped tomatoes into 4 equal portions and froze them. About how many liters of tomatoes were in each portion that she froze?

Teacher:

With a partner, briefly discuss the following questions:

- Are there any words that you do not understand?
- What operations (add, subtract, multiply, divide) will you need to use, and how do you know?
- What strategy would you use to find the answer?

Ask the students to share what they discussed with their partners without giving the answer to the problem.

Teacher:

Now solve the problem with your partner.

Walk around the room, monitoring the students and helping them as needed. Encourage the students to try their best, even when the problems are difficult. Give hints to those who are struggling.

Answer:

Step 1: Subtract: $12 - 6\frac{1}{2} = 5\frac{1}{2}$. There are $5\frac{1}{2}$ liters of tomatoes left for soup and freezing.

Step 2: Subtract: $5\frac{1}{2} - 1\frac{5}{6}$. First, convert to improper fractions: $\frac{11}{2} - \frac{11}{6}$. Then rewrite the fractions with a common denominator: $\frac{33}{6} - \frac{11}{6}$. Then subtract and simplify: $\frac{22}{6} = \frac{11}{3}$ liters of tomatoes left for freezing.

Step 3: Divide: $3\frac{2}{3} \div 4$. First, convert to improper fractions: $\frac{11}{3} \div \frac{4}{1}$. Then apply the "keep, switch, flip" formula: $\frac{11}{3} \times \frac{1}{4}$. Then multiply: $\frac{11}{3} \times \frac{1}{4} = \frac{11}{12}$. There are $\mathbf{\frac{11}{12}}$ liters (or about 1 liter) left in each of the bags for freezing.

Ask a pair of students to show the class how they solved the problem. Then invite students to show a different way to solve the problem.

Step 3: Activity

Ask the students to work with a different partner to complete the "Activity" section in their workbooks. The students will write and solve their own word problems. They will also share their problems with another pair of students. Ask someone to read the instructions for this activity aloud.

With a new partner, write your own word problem using fractions. You can add, subtract, multiply, or divide them. After you write the problem, you and your partner will solve it and then show your answer to another pair of students. For more of a challenge, try using a mixed number in your word problem.

As the students are writing their problems, listen to their discussions. What aspects of adding, subtracting, multiplying, or dividing do they seem to understand best? What areas need additional work?

If the students are struggling to come up with their own problems, discuss the following example. You may wish to write it on the board and solve it together as a class.

Example

My friend and I bought a 2-liter container of ice cream. We ate $\frac{3}{8}$ of a liter on Monday. Then we ate $\frac{1}{2}$ of a liter on Tuesday. On Wednesday, we did not want to eat any more ice cream and decided to share the remaining amount equally with 3 other friends. How many liters of ice cream did each of the 3 friends eat?

Answer to Example:

Amount left after Monday: $2 - \frac{3}{8} = \frac{16}{8} - \frac{3}{8} = \frac{13}{8}$

Amount left after Tuesday: $\frac{13}{8} - \frac{1}{2} = \frac{13}{8} - \frac{4}{8} = \frac{9}{8}$

Amount that each of the 3 friends ate: $\frac{9}{8} \div 3 = \frac{9}{8} \times \frac{1}{3} = \frac{9 \times 1 \div 3}{8 \times 3 \div 3} = \frac{3}{8}$

Each of the 3 friends ate **three-eighths** of a liter of ice cream.

Step 4: Practice

Ask the students to solve the following problems individually. Encourage them to ask a partner for help if they are having a difficult time with one or more of the problems. Once most of the students are finished, ask them to take turns showing the class how they solved the problems.

Problems with Answers

Solve each problem. Remember to first convert mixed numbers to improper fractions.

1) $6\frac{4}{5}+\frac{1}{5}=$

Convert to improper fractions: $=\frac{34}{5}+\frac{1}{5}$

Add: $=\frac{35}{5}$

Simplify: $=7$

---

2) $\frac{5}{3}-1\frac{1}{6}$

Convert to improper fractions: $=\frac{5}{3}-\frac{7}{6}$

Find a common denominator: $=\frac{10}{6}-\frac{7}{6}$

Subtract $=\frac{3}{6}$

Simplify: $=\mathbf{\frac{1}{2}}$

---

3) $\frac{10}{4}\times\frac{12}{5}$

Multiply: $=\frac{120}{20}$

Simplify: $=6$

---

4) $3\frac{4}{7}\div\frac{10}{7}$

Convert to improper fractions: $=\frac{25}{7}\div\frac{10}{7}$

"Keep, switch, flip": $=\frac{25}{7}\times\frac{7}{10}$

Multiply and simplify: $=\frac{175}{70}=\frac{5}{2}$

Convert to mixed number: $=\mathbf{2\frac{1}{3}}$

Step 5: Closing

Talk to the students about their experiences writing word problems. Ask them to try to write at least one word problem after class today. Challenge them to use this word problem to teach someone what they learned in class today.

When you go home today, write a new word problem for a friend or family member. Use this word problem to teach someone what you learned in class today.

Step 6: Reflection (after class)

Which students are still struggling with this mathematics skill? Consider meeting with a small group of students before or after the next class to help them or to make a plan for how they will master this skill.

18

Add and Subtract Integers

Part A

Step 1: Lesson Overview

Learning Outcomes

- Students will add and subtract integers.
- Students will understand various ways to interpret the " – " sign (the minus sign).
- Students will understand that subtraction is equivalent to addition of the opposite.

Helpful Video

- **adding and subtracting integers:** https://youtu.be/X4sRy7_usYI

Vocabulary Words

- **integer:** a positive or negative whole number or zero
- **negative:** a number that is less than zero and is shown with the negative symbol: "–" (for example, negative 5, which is 5 units below zero, is written as –5)

Step 2: Discussion

Teacher:

When some of the early pioneers left the city of Nauvoo in the United States, it was late summer. The temperature during the day could go as high as 32 degrees Celsius. At night, the temperature could drop by as much as 20 degrees.

What would the weather feel like during the day? How would it feel at night? *(**Answer:** During the day it was very hot. During the night it became cool.)*

However, there were some groups of pioneers who didn't finish their journey until winter had set in. As the seasons changed to fall and then winter, the temperature dropped dramatically. Sometimes during the day, the temperature would only get up to 5 degrees Celsius. At night it often dropped by 20 degrees or more.

What might the weather have felt like during the day? How would it feel at night? (***Answer:** During the day it was cold, but with all the work and walking they had to do, they might not have been too cold. However, during the night it was deathly cold, below freezing.*)

If you feel inspired, share your gratitude for the early Saints and the sacrifices they made to establish Zion so we could enjoy the blessings of the Restoration today.

Negative Integers

Ask the students to turn to their workbooks and look at the questions related to the Saints' journeys in the summer and winter.

Read each problem to the class and give the students time to think about them. Ask the following questions: How are these problems similar, and how are they different? How might we write them out mathematically?

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1. If the summer temperature during the day was 32 degrees and in the evening it dropped by 20 degrees, what was the temperature at night?
   *(**Answer:** 32 – 20 = 12 degrees)*
2. If the winter temperature during the day was 5 degrees and in the evening it dropped by 20 degrees, what was the temperature at night?
   *(**Answer:** 5 – 20 = –15 degrees)*

Give the students several minutes to work on the problems in a group or with a partner. It is OK if they get stuck; wrestling with the problem will help prepare them to learn today's skill.

Write on the board: 32, 20, 12, 5, 20, –15

Teacher:

All of these numbers are called integers. The word "integer" means a positive or negative whole number. Zero is also an integer. Today's lesson will teach us how to add and subtract integers. Before we learn this, it is important to understand an important mathematics symbol: the minus or subtraction sign.

Write on the board: –

Teacher:

In mathematics, the minus sign has lots of meanings. Can anyone share with us some of the meanings of this sign?

Allow the students to share. Ask them to take notes as you teach the following meanings of the minus sign:

Possible Answers:

- "**Negative**," as in "–15," which is read as "negative 15" and means 15 units below 0.
- "**Opposite**," as in "the opposite of the number 4," which is written as "–4." When we put the minus sign in front of a number, it means the opposite of that number. This means it is the same distance from 0 as its opposite. For example, 8 and its opposite, –8, are both 8 units from 0 on a number line, but 8 is greater than 0, and –8 is less than 0.
- "**Minus**" and "subtract," as in a mathematics sentence like "32 – 20," which is read as "32 minus 20" or "32 subtract 20."

Teacher:

Now that we know what the minus sign can mean, we are ready to look at examples of adding and subtracting integers. As we do, we will connect their meaning to temperature, money, or a number line to help us understand the examples better.

Step 3: Activity

Ask the students to work on these problems individually for about 5 minutes. Walk around making notes of which problems most students answer correctly and which seem difficult. This will help you learn what your students already know and what they need to review. After five minutes, lead a discussion about these problems.

Problems with Answers

1) $12 - 4 = \mathbf{8}$	2) $-12 - 4 = \mathbf{-16}$
3) $12 + (-4) = \mathbf{8}$	4) $-12 + (-4) = \mathbf{-16}$

Teacher:

Let's compare the first four questions to each other. What do you notice about questions 1 and 3? What do you notice about questions 2 and 4? *(**Answer:** The expression 12 – 4 equals 12 + [–4], and the expression –12 – 4 equals –12 +[–4].)*

These problems help to illustrate one of the most important ideas in all of mathematics. In an earlier lesson, we learned that dividing by a number is the same as multiplying by the reciprocal of that number. In other words, any division statement can be rewritten in terms of multiplication. Today we have seen that a number statement using subtraction can be rewritten with addition. Subtracting a number is the same as adding the opposite (or the negative) of that number.

This concept is so important that I am going to say it again. I would like you to write it down in your mathematics workbook:

Subtracting a number is the same as adding the opposite (or the negative) of that number.

Use the explanations that follow to make sure the students understand how to complete each of the problems in the previous activity.

Step-by-Step Answer:

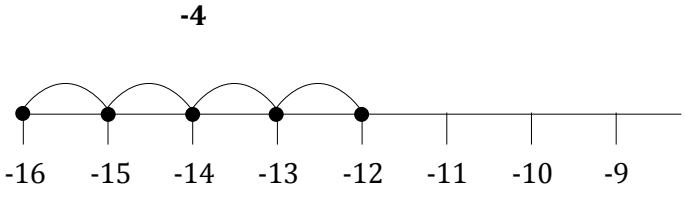
1) 12 – 4 = **8**
2) –12 – 4 = **–16**

Teacher:

Here is an example with temperature that explains why –12 – 4 = –16: The temperature is very cold, 12 degrees below 0, and then drops 4 more degrees. The temperature would then be 16 degrees below 0.

Notice that the first number is always our starting point. The first minus sign tells us that we are starting below zero, or in the "negative" range. The second minus sign is read as "minus" or "subtract" and means that we dropped temperature or spent money.

You can draw the number line on the board:



Teacher:

On a number line, it looks like this. We begin at –12, and then we drop by 4 to get –16.

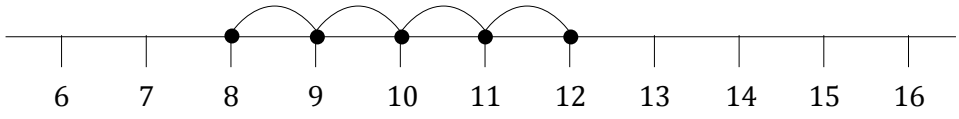
If we imagine we are going for a walk along this number line, notice that the first number is our starting point: –12. The second minus sign tells us which direction to face (the negative direction, toward the negative side), and the second number tells us how far to walk down the line in that direction.

3) 12 + (– 4) = 8

Teacher:

Now let's think about this with a number line. On the number line, we would start at 12. Then we would face the positive direction since the next symbol is a plus sign. Then we would walk *backwards* 4 steps, since we are adding negative 4.

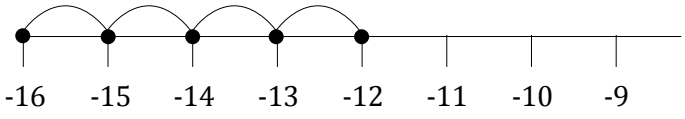
You can draw the number line on the board:



4) –12 + (–4) = –16

As you ask the following questions, illustrate the answers on a number line:

–12



Teacher:

What does the first number (–12) mean in terms of the number line? *(**Answer:** It is where we start.)*

What does the plus symbol mean? *(**Answer:** We face toward the positive side.)*

What does the second number (–4) mean in terms of the number line? *(**Answer:** Walk backwards 4 steps.)*

So what does –12 + (–4) equal? *(**Answer:** –16)*

Check to see if students have questions before continuing.

Step 4: Practice

Teacher:

We are now going to practice adding and subtracting integers to complete a puzzle. The answer to each of the problems below represents a letter. For example, the first problem is 4 + (–11). Who can tell us the answer?

Encourage the students to respond. (4 + (–11) = –7)

Teacher:

The answer to this problem is -7. We will write a *W* on any of the lines below that are above the number -7.

*Encourage the students to write a **W** on the line above –7. (See the answer key below to find where the letter **W** will be written.)*

Ask the students to work through the following puzzle. They can work individually or in pairs. If students get stuck, encourage them to write out a number line and use it to solve each problem.

Solve the following integer problems. The answer to each question represents a letter.

(W)	$4 + (-11) = \mathbf{-7}$	(O)	$-10 + (-3) = \mathbf{-13}$
(S)	$12 - (-4) = \mathbf{16}$	(C)	$-5 + 7 = \mathbf{2}$
(G)	$-6 - (-2) = \mathbf{-4}$	(T)	$11 - 8 = \mathbf{3}$
(I)	$11 - (-3) = \mathbf{14}$	(A)	$8 - (-7) = \mathbf{15}$
(E)	$15 - 11 = \mathbf{4}$	(H)	$7 - 10 = \mathbf{-3}$
(U)	$-2 + 8 = \mathbf{6}$	(M)	$-8 - (-20) = \mathbf{12}$
(D)	$8 + (-9) = \mathbf{-1}$	(R)	$1 - (-8) = \mathbf{9}$
(N)	$3 + (-2) = \mathbf{1}$	(L)	$-13 + 8 = \mathbf{-5}$

The completed mystery phrase should look like this:

I		C	A	N		D	O		A	L	L								
14		2	15	1		–1	–13		15	–5	–5								

T	H	I	N	G	S		T	H	R	O	U	G	H
3	–3	14	1	–4	16		3	–3	9	–13	6	–4	–3

C	H	R	I	S	T		W	H	I	C	H		
2	–3	9	14	16	3		–7	–3	14	2	–3		

S	T	R	E	N	G	T	H	E	N	S		M	E
16	3	9	4	1	–4	3	–3	4	1	16		12	4

Tell the students that this scripture is found in Philippians 4:13: "I can do all things through Christ which [strengthens] me." Ask the students to write in their workbook what this scripture means to them.

Encourage the students to share their answers with a partner or with the class.

Step 5: Closing

Bear your testimony of Philippians 4:13. Ask the students to talk with a friend or family member about this scripture after class today.

How can you do all things through Christ? Bear your testimony of this scripture to a friend or family member after class today.

Step 6: Reflection (after class)

Are there students who need support to persevere in their education? Write their names and think of other students to pair them with who can help motivate and encourage them.

19

Add and Subtract Integers

Part B

Step 1: Lesson Overview

Learning Outcomes

- Students will add and subtract integers.
- Students will understand various ways to interpret the " – " symbol (the minus sign).
- Students will understand that subtraction is equivalent to addition of the opposite.

Helpful Video

- **adding and subtracting integers:** https://youtu.be/X4sRy7_usYI

Vocabulary Words

- **integer:** a positive or negative whole number or zero
- **negative:** a number that is less than zero and is shown with the negative symbol: "–" (for example, negative 5, which is 5 units below zero, is written as –5)

Step 2: Discussion

Ask the students to discuss and write any questions or ideas that they had during the last lesson about adding and subtracting integers.

With a partner, discuss and write below any questions or ideas that you had last lesson about adding and subtracting integers. For example, when you add two negative numbers, will the sum be positive or negative?

Teacher:

Who can share something they learned that is helpful when adding or subtracting integers? You can write some examples on the board if you would like.

Possible Answers:

- Subtracting is the same as adding the opposite. For example, $12 - (-3) = 12 + 3$.
- When adding two negative numbers, the sum will always be negative.
- When adding two positive numbers, the sum will always be positive.
- The "–" symbol can mean minus, subtract, negative, or opposite.

Ask the students to look at the first problem and the number line in their workbooks.

Problem

$5 + 2 - (-4) =$

Teacher:

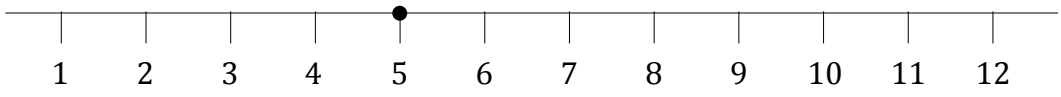
In your workbook, write what you think the answer is. Use the number line to either guide your thinking or check your work. Discuss your answer with another student sitting near you.

Answer: 11

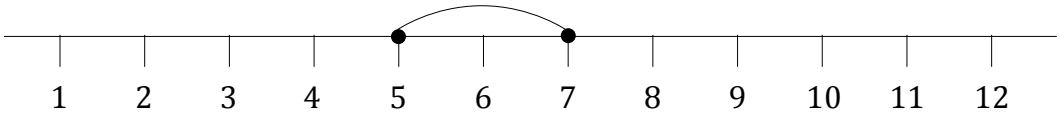
- Step 1: $5 + 2 = 7$
- Step 2: $7 - (-4) = 7 + 4 = 11$, since subtracting is adding the opposite.

Solve the problem using a number line:

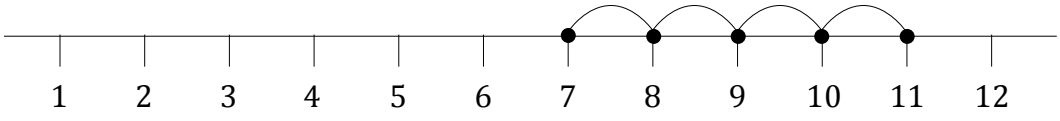
- ***Step 1:*** *Start at 5 because its a positive integer.*



- ***Step 2:*** *To perfom "5 + 2," go right, or forward, two units. It lands on 7.*



- ***Step 3:*** *To perform "7 – (–4)," subtracting a negative number is like adding a positive; you move to the right on the number line 4 units, landing on 11.*



Step 3: Activity

Ask a student to read the problem out loud for the class. Encourage everyone else to follow along and circle words that are unfamiliar.

Problem

Zane and Sabra were digging tunnels close to each other. Zane started 10 meters below the surface. He went down another 18 meters, then went up 5 meters. Then he went down 12 more meters and rested.

Sabra started at the surface. He went down 22 meters, then went up 5 meters. Then he went down another 18 meters and rested.

Who rested at a greater depth: Zane or Sabra? Write two equations—one to show Zane's digging and one to show Sabra's digging.

Ask the students to turn to a partner and explain to each other what the problem is asking them to do. They should not solve the problem yet, but they should discuss what strategy they could use to solve the problem. Encourage them to ask for help if there are words they do not know.

Teacher:

Now I will break you up into groups of three to solve the problem. Remember to work together and include everyone. If your group gets stuck, raise your hand and I will come help.

Encourage the students who understand how to solve this problem to help those who are less experienced or do not understand how to solve it. Walk around the room to monitor the discussions and make sure no student gets left out. Give groups hints if needed. Look for students who use different strategies when solving the problem.

Answer:

Zane:

$(-10) + (-18) + 5 + (-12) = -35$

$(-10) + (-18) = -28$

$(-28) + 5 = -23$

$(-23) + (-12) = -35$

Sabra:

$-22 + 5 + (-18) = -35$

$-22 + 5 = -17$

$-17 + (-18) = -35$

They rested at the same depth.

Teacher:

Let's ask a group to show us how to solve each part of the problem. Watch closely and ask the group to pause anytime you are uncertain about a step. If you disagree with how they are solving the problem, please raise your concern in a kind way. It is OK to disagree about something, but it is never OK to speak unkindly.

Because you are asking for volunteers rather than selecting a group or person ahead of time, the groups may or may not have the correct answers. As they present, let them make mistakes without interruption. The other students will most likely catch the error and bring it up. If the students do not catch the error, you might kindly point to the step with the error and say, "Can you explain this step? I thought we would get something else here." Then give them time to rethink and rework.

Step 4: Practice

Ask the students to solve the following problems in their workbooks individually. Encourage them to ask a partner for help if they do not know what to do. Once most of the students are finished, ask different students to show the class how they solved the problems.

Problems with Answers

Evaluate each expression.

1) $-12 + (-6) = -12 - 6 = \mathbf{-18}$	2) $-9 - (-1) = -9 + 1 = \mathbf{-8}$
3) $-10 + 3 = \mathbf{-7}$	4) $-8 - 6 = \mathbf{-14}$
5) $\frac{3}{4} \times 12 = \frac{3}{4} \times \frac{12}{1} = \frac{36}{4} = \mathbf{9}$	6) $\frac{1}{2} \times \frac{8}{3} = \frac{8}{6} = \frac{\mathbf{4}}{\mathbf{3}} = 1\frac{1}{3}$
7) $\frac{5}{6} \div \frac{1}{3} = \frac{5}{6} \times \frac{3}{1} = \frac{15}{6} = \frac{\mathbf{5}}{\mathbf{2}} = 2\frac{1}{2}$	8) $\frac{12}{5} \div 4 = \frac{12}{5} \times \frac{1}{4} = \frac{12}{20} = \frac{\mathbf{3}}{\mathbf{5}}$

Find the Error

Two students named Peace and Joseph both made mistakes while solving problems. Identify the error in their work. Then correctly rework each problem.

9) Peace's work: **Step 1:** $4 - (-2) + 10 = 4 + (-2) + 10$ **Step 2:** $4 + (-2) + 10 = 2 + 10$ **Step 3:** 12	**Peace's mistake was in Step 1.** **She wrote $4 - (-2) = 4 + (-2)$.** **This should have been $4 - (-2) = 4 + 2$.** **The final answer is 16.**
10) Joseph's work: **Step 1:** $-11 + (-2) - 10 = -13 - 10$ **Step 2:** $-13 - 10 = 13 + (-10)$ **Step 3:** 3	**Joseph's mistake was in Step 2.** **He wrote $-13 - 10 = 13 + (-10)$.** **This should have been** **$-13 - 10 = -13 + (-10) = -23$.** **The final answer is -23.**

Step 5: Closing

Explain to the students that anytime they count something, they are using integers. Integers are all positive and negative whole numbers and zero. We all use integers in our lives.

Encourage the students to notice how often they use integers in their lives. Ask them to share with a friend or family member ways they use integers. They may also show this person the rules for adding or subtracting integers.

Anytime you count something, you are using integers. Remember that integers are all positive and negative whole numbers and zero. Now that you have learned more about integers, try to notice throughout the week how often you use integers in your life. Share with a family member or friend ways you use integers. Show them the rules for adding or subtracting integers.

Step 6: Reflection (after class)

Do the students know of your love for them? What can you do to ensure that they know you love them and have confidence in their ability to learn mathematics?

20

Mathematics Self-Evaluation

Overview

The last lesson in this set is a mathematics self-evaluation. It is not a test. It is a way to see how well the students understand the mathematical skills that are covered in the lessons. This evaluation can help students know which mathematical skills they have mastered and which skills they still need to practice and improve.

Administering

The students should all take the self-evaluation even if they have missed some of the lessons. Encourage students to do their very best. Explain that this self-evaluation will help them evaluate which mathematical skills they still need to practice.

Correcting

After all the students finish taking the mathematics self-evaluation, ask them to trade their papers with partners. Correct the evaluation as a class using the answers in this lesson, and ask the students to place a small X or √ next to each question that has been answered incorrectly. Then ask them to pass the self-evaluations back to their partners. As a class, review all the questions that the students missed, and help them understand how to answer the questions correctly. Walk through extra problems with students who may need additional support.

Student Reflection

Ask the students to mark the mathematical skills and vocabulary words that they are struggling with at the bottom of their self-evaluation. Encourage them to reach out to their parents or to you for extra help. They can take this self-evaluation home so their parents or other family members can see what skills they are working on and have mastered. They have completed the 20 lessons in their workbooks and may take their workbooks home to share with their friends or family members.

This is not a test. It is a way to see how well you understand the mathematics skills that you have learned in these lessons. This evaluation will help you know which mathematics skills you have mastered and which skills you still need to practice.

Circle the answer for each question. Show your work next to each problem. After everyone has finished, the teacher will go through each question and explain the answer.

Adding and Subtracting Decimals	**Show Your Work**
1) $133.65 - 5.85 =$ **A) 127.80** B) 97.30 C) 132.20 D) 127.60	
Multiplying Decimals	
2) $13.2 \times 4 =$ A) 5.28 B) 47.6 **C) 52.8** D) 4.76	

Dividing Decimals

3) $1.36 \div 2 =$

A) 1.08
B) 0.48
C) 0.68
D) 0.46

4) $3.96 \div 0.9 =$

A) 0.04
B) 0.44
C) 1.40
D) 4.4

Adding Fractions with Unlike Denominators

5) $\frac{3}{4} + \frac{1}{8} =$

A) $\frac{4}{12}$
B) $\frac{3}{8}$
C) $\frac{7}{8}$
D) $\frac{4}{8}$

Simplifying Fractions

6) Simplify $\frac{8}{12} =$

A) $\frac{1}{8}$
B) $\frac{8}{4}$
C) $\frac{2}{3}$
D) $\frac{2}{4}$

Multiplying Fractions and Simplifying	
7) $\frac{4}{6} \times \frac{1}{4} =$ A) $\frac{2}{6}$ B) $\frac{6}{24}$ C) $\frac{4}{12}$ **D)** $\frac{1}{6}$	
Dividing Fractions and Simplifying	
8) $\frac{1}{5} \div \frac{2}{5} =$ **A)** $\frac{1}{2}$ B) $\frac{2}{25}$ C) $\frac{5}{25}$ D) $\frac{1}{5}$	
Mixed Numbers and Improper Fractions	
9) $1\frac{1}{2} \times \frac{4}{5} =$ A) $1\frac{4}{10}$ B) $1\frac{2}{5}$ **C)** $1\frac{1}{5}$ D) $\frac{12}{5}$	

10) $\frac{10}{8} + \frac{5}{16} =$

A) $\frac{10}{8}$

B) $\frac{25}{16}$

C) $\frac{9}{16}$

D) $\frac{15}{24}$

Adding or Subtracting Integers

11) $6 + (-4) - 2 =$

A) -5

B) 0

C) -4

D) 4

12) $(-7) - 1 + 10 + (-4) =$

A) -2

B) 2

C) 0

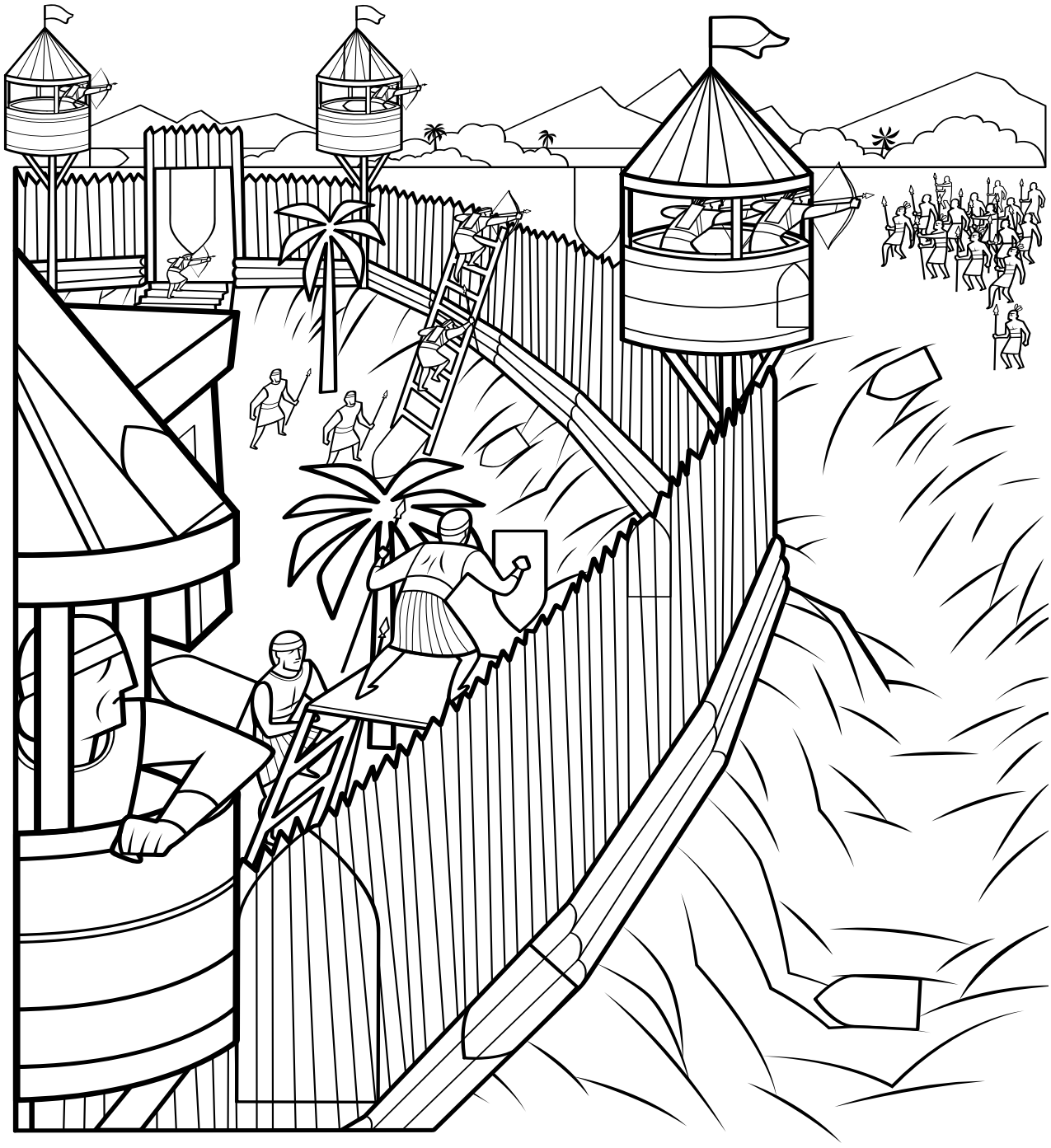
D) -4

Review the problems you missed. Then practice the skills you need to improve. Talk with your Succeed in School teacher if you need extra help to master these skills.

Extra Activity Pages

The following pages have extra activities for you to complete if you arrive early, if you're waiting for others to finish assessments or activities, or if you have extra time at the end of class.

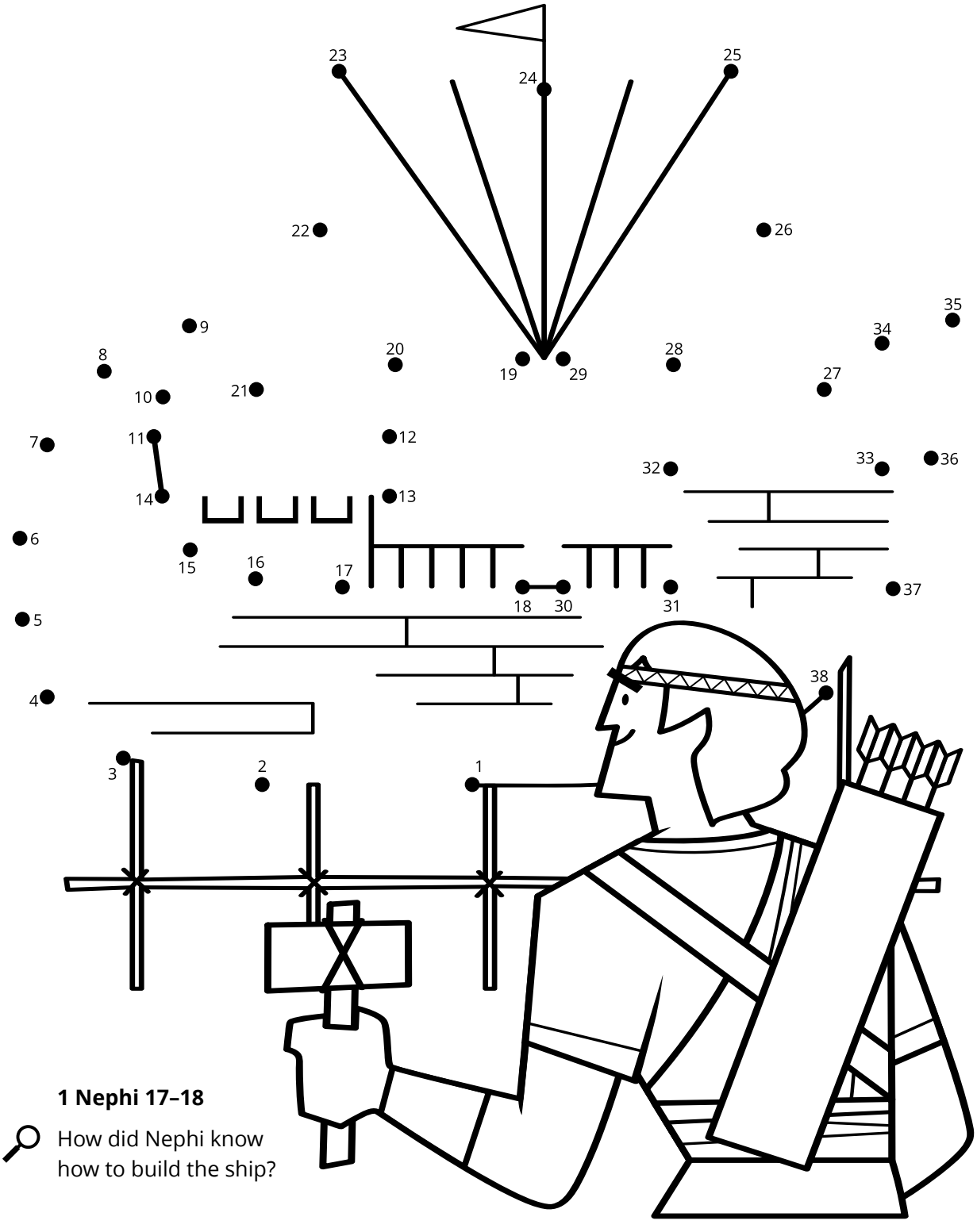
The Nephites built fortified (strong) walls and dug ditches around their cities to protect them from the Lamanite armies. Find 15 shields to help the Nephites protect their city.



Alma 49

Why were the Lamanites astonished (surprised)?

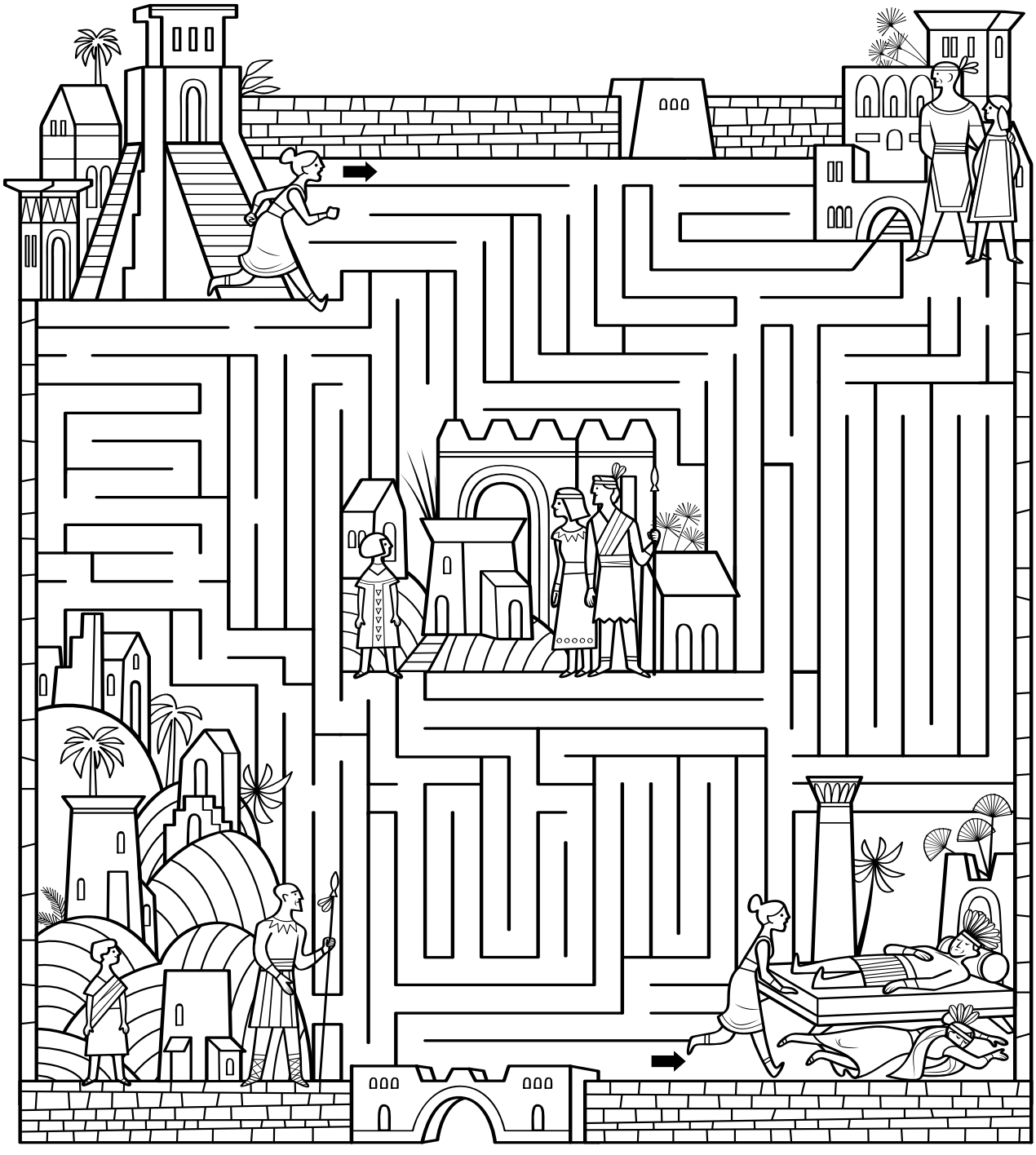
The Lord told Nephi to build a boat to carry his family across the waters to the promised land. Connect the dots to help **Nephi build the ship.**



1 Nephi 17–18

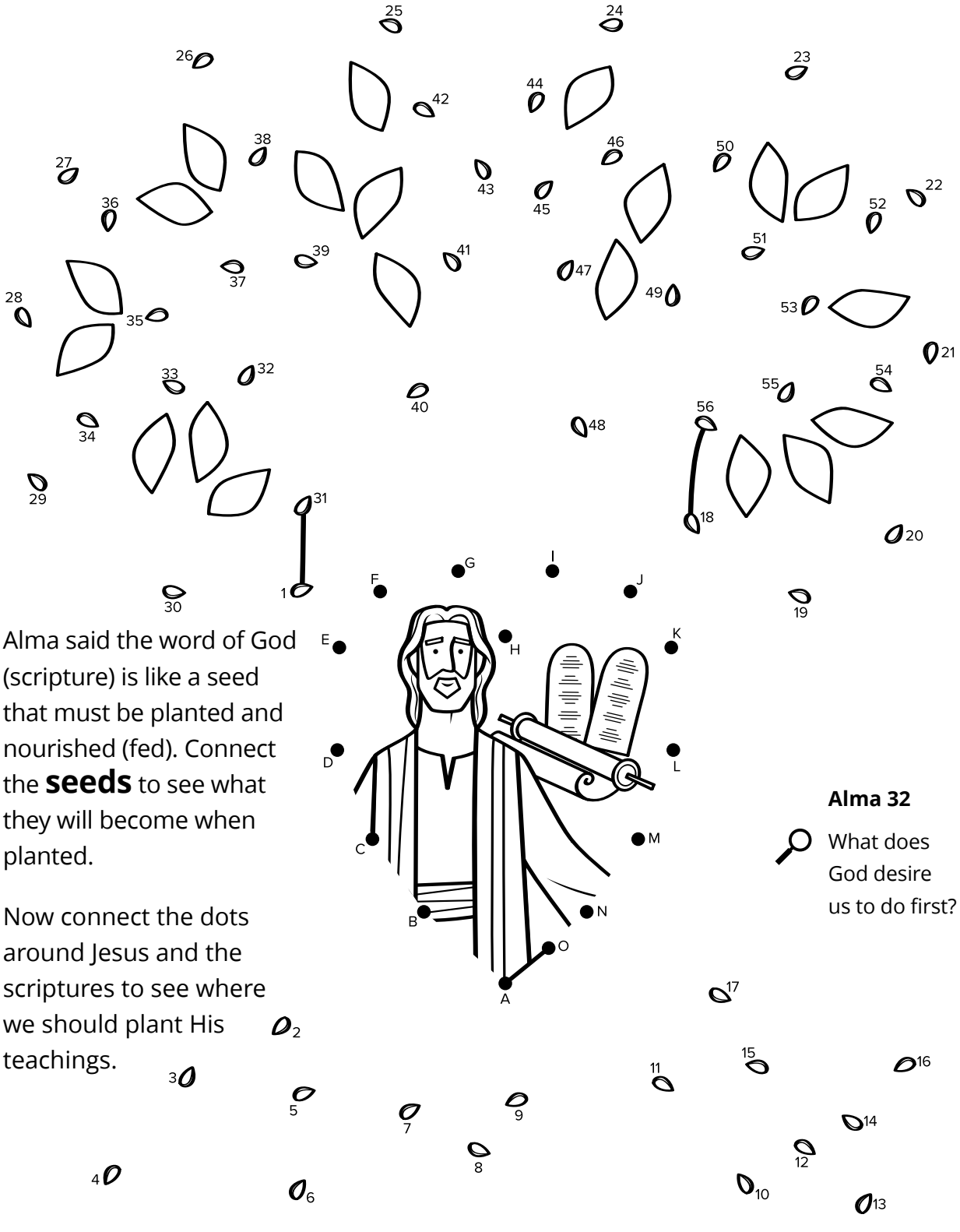
How did Nephi know how to build the ship?

King Lamoni and the queen fell into a trance (dream) when Ammon taught them about God's plan and the coming of Christ. Follow the path of **Abish** as she tells the people what happened.



Alma 19

Why did Abish want to tell everyone about the king and queen?



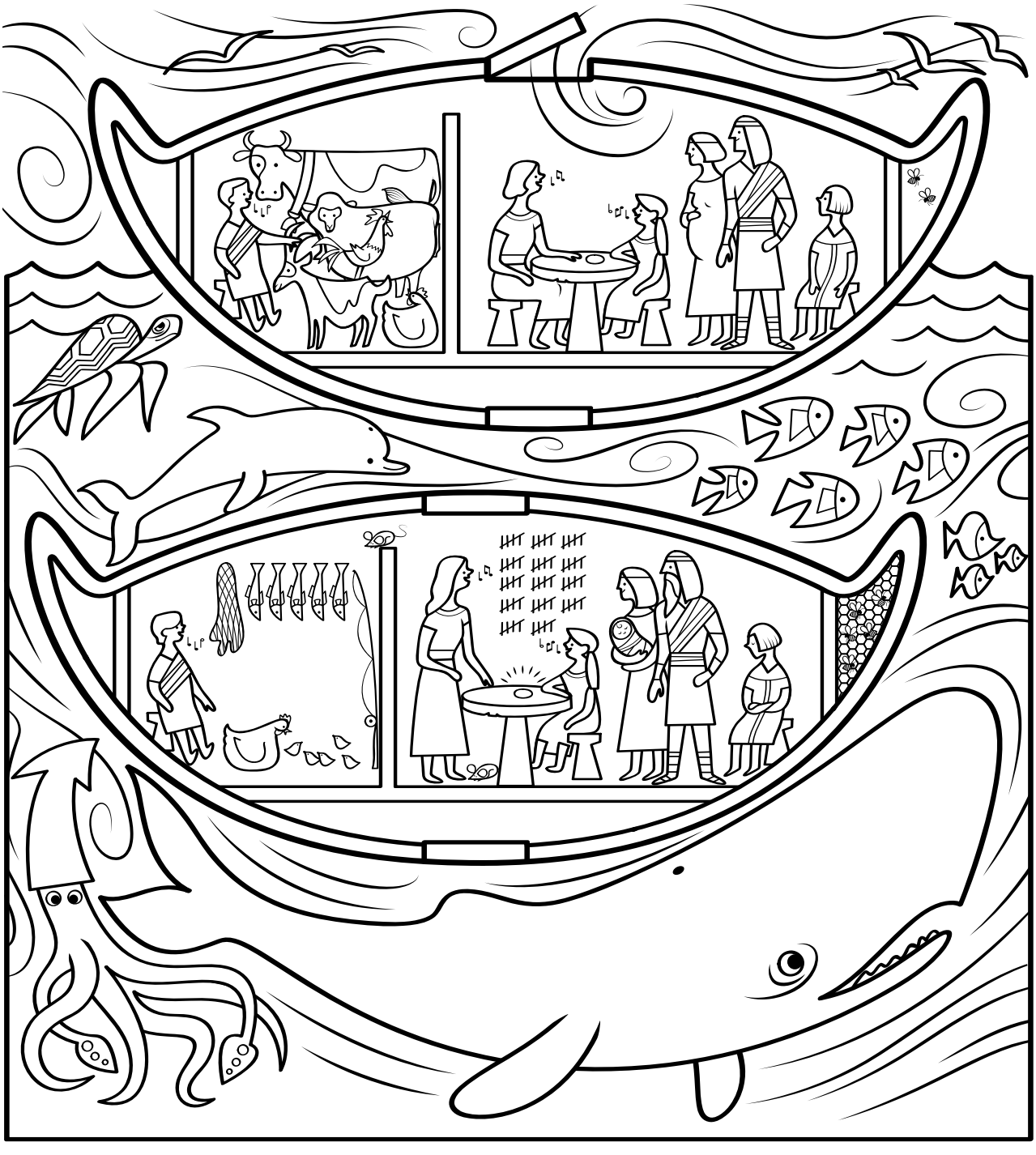
Alma said the word of God (scripture) is like a seed that must be planted and nourished (fed). Connect the **seeds** to see what they will become when planted.

Now connect the dots around Jesus and the scriptures to see where we should plant His teachings.

Alma 32

What does God desire us to do first?

The Lord caused the wind to blow the **Jaredites' barges** to the promised land. Find 13 differences in their journey above and below the sea.

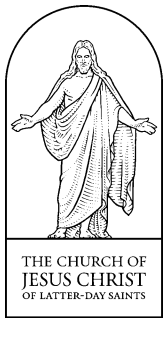


Ether 6

What did the Jaredites do while in the barges?

"To follow Christ is to become more like Him. It is to learn from His character. As spirit children of our Heavenly Father, we do have the potential to incorporate Christlike attributes into our life and character. The Savior invites us to learn His gospel by living His teachings. To follow Him is to apply correct principles and then witness for ourselves the blessings that follow."

—Elder Dieter F. Uchtdorf, "Christlike Attributes—the Wind beneath Our Wings," *Liahona*, Nov. 2005, 102



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