Primary 4

Student Edition

Math Term 2

2024-2025

Primary 4 Math

Name _____

منهاجي
متعة التعليم الهادف

FOREWORD

This is a pivotal time in the history of the Ministry of Education and Technical Education (MOETE) in Egypt. We are embarking on the transformation of Egypt's K-12 education system. We started in September 2018 with the rollout of KG1, KG2 and Primary 1. In 2021 we have rolled out Primary 4, and we will continue with the rollout until 2030. We are transforming the way in which students learn to prepare Egypt's youth to succeed in a future world that we cannot entirely imagine.

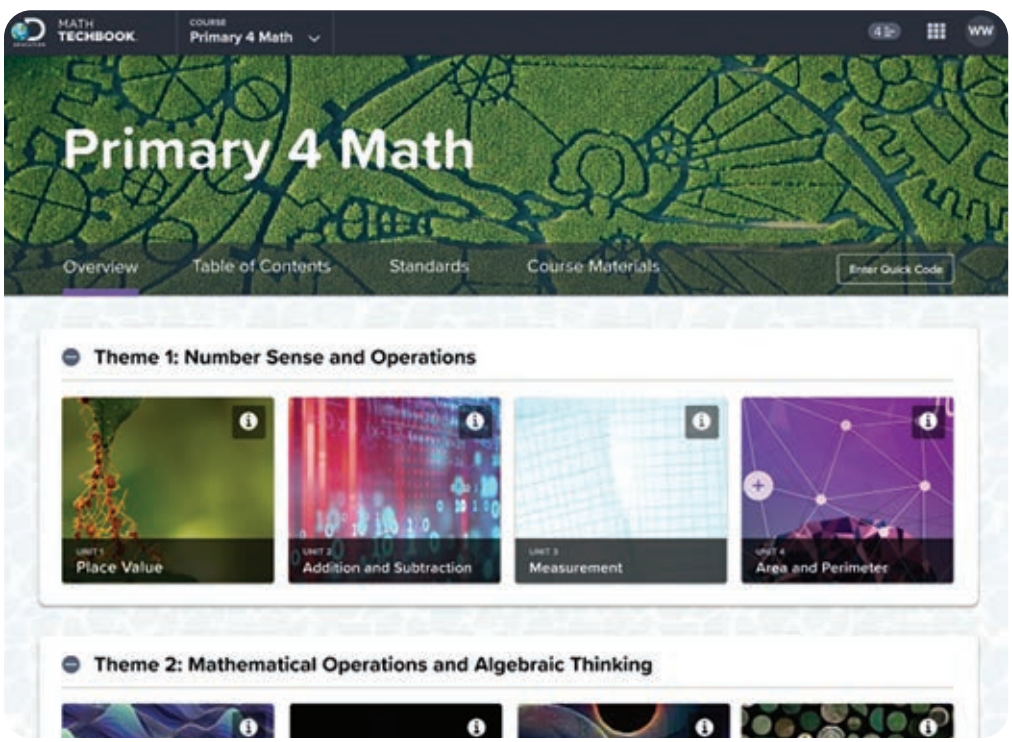
MOETE is very proud to present this new series of textbooks, with the accompanying digital learning materials that captures its vision of the transformation journey. This is the result of much consultation, much thought and a lot of work. We have drawn on the best expertise and experience from national and international organizations and education professionals to support us in translating our vision into an innovative national curriculum framework and exciting and inspiring print and digital learning materials.

The MOETE extends its deep appreciation to its own "Central Administration for Curriculum Development" (CACD) and "Discovery Education," .

This transformation of Egypt's education system would not have been possible without the significant support of Egypt's current president, His Excellency President Abdel Fattah el-Sisi. Overhauling the education system is part of the president's vision of "rebuilding the Egyptian citizen" and it is closely coordinated with the ministries of Higher Education & Scientific Research, Culture, and Youth & Sports. Education 2.0 is only a part in a bigger national effort to propel Egypt to the ranks of developed countries and to ensure a great future to all of its citizens.

Dear Parent/Guardian,

Welcome to Primary 4 Mathematics Techbook™! This comprehensive program inspires students to make sense of the world around them and to think and act like mathematicians. Throughout the digital and print program, students learn to reason mathematically, communicate using mathematical language, ask meaningful questions, solve complex problems, and work collaboratively with peers.



Primary 4 Mathematics Techbook was designed and written to teach to the Ministry of Education Primary 4 mathematics standards. The structure of Primary 4 Mathematics Techbook represents the Ministry's shifts in the Framework for Education 2.0, specifically focusing on accessing new and prior knowledge, building contextual understanding and procedural fluency, and making connections across mathematics to support application of skills and concepts. To help students make sense of mathematical content, the program also integrates a thematic approach and a variety of real-world scenarios.

Primary 4 Mathematics Techbook challenges students to build on what they learned in previous grades, applying concepts and skills in new ways. Students also learn new and complex concepts and skills that prepare them for the challenges of Primary 5 and beyond. Primary 4 students assume greater responsibility for their own learning and are encouraged to seek opportunities to apply the mathematics they are learning in the world around them.

The major work of Primary 4 includes multiplication, division, fractions, decimals, and plane figures such as lines, line segments, rays, and angles. Although these may seem like separate topics, students investigate and apply patterns and relationships among the topics to build a deeper understanding of each. They solve fraction multiplication problems, connect angle measurement to fractions, explore the inverse relationship between multiplication and division, and draw parallels among decimal numbers, fractions, and place value. Students learn to think like mathematicians as they notice patterns and rules, persevere to solve challenging problems, represent and explain their thinking, model their solutions, and strive for accuracy.

To inspire and motivate learning and curiosity, Primary 4 Mathematics Techbook features clear and engaging text, videos, digital tools, and Hands-On Activities. Hands-On Activities require students to investigate patterns and rules in mathematics and challenge them to communicate using mathematical language and models. The program also engages students in many kinds of writing and asks them to explain their reasoning and support their thinking using words, numbers, pictures, and symbols. When students engage in rich tasks that access prior knowledge and build reasoning, it is easier for them to make connections to the real world and to other mathematical learning.

Primary 4 Mathematics Techbook is divided into units. Each unit is divided into concepts, and each concept is divided into lessons. Each lesson has three main sections: ACCESS, BUILD, and CONNECT.

ACCESS Students activate their prior knowledge and begin to develop and express mathematical language.

BUILD Students focus on communicating their understanding, reasoning, evidence, and mathematical strategies.

CONNECT Students build deep conceptual understanding and a strong foundation for accessing knowledge in future lessons.

In addition, **WRAP-UP**, **PRACTICE**, and **CHECK YOUR UNDERSTANDING** features allow students to demonstrate their learning either verbally or in writing.

Within this Student Edition, you will find QR codes and quick codes that take you and your student to a corresponding section of Primary 4 Mathematics Techbook online.

We encourage you to support your student in using the print and online interactive materials on any device. Together, may you and your student enjoy a fantastic year of mathematics.

Sincerely,

Math Team

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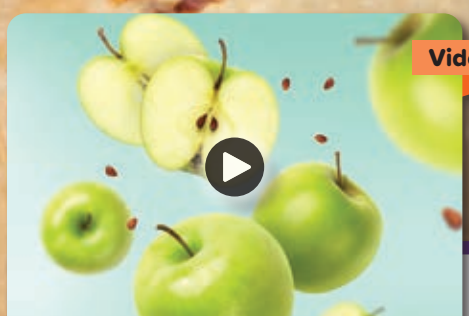
Unit 9 Fractions



Apple Fractions

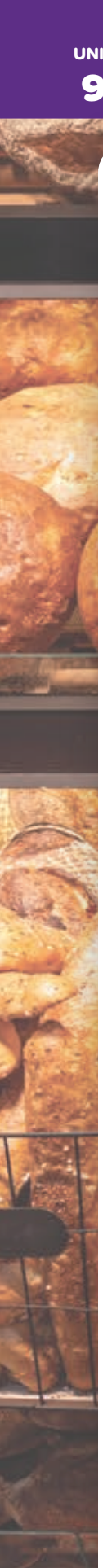
Photo Credit: SOMBERNK MITTHAYAVANT / Shutterstock.com

Unit Video Questions

The video Apple Fractions illustrates how to read, write, and compare fractions. We can cut an apple into fractions, we can think of fractions of a set of apples, or apples can be a fraction of a set of fruit.

Quick Code
egm4098

- [ ] How are fractions of a whole different from fractions of a set? How are they alike?
- [ ] As you eat meals throughout the day, think about how you could represent the quantities as fractions of a whole or fractions of a set.



LESSON 1

Unit Fractions

Learning Targets

- I can define **unit fractions**.
- I can identify unit fractions.
- I can **compose** other **fractions** with unit fractions.

ACCESS

Identify the Unit Fraction Fill in the table with information about each fraction.

		Total Number of Equal Parts	Total Number of Equal Parts Shaded	Word Form	Fraction Form
1.					
2.					
3.					
4.					
5.					
6.					

7. Record the definition of each term.

Numerator _____

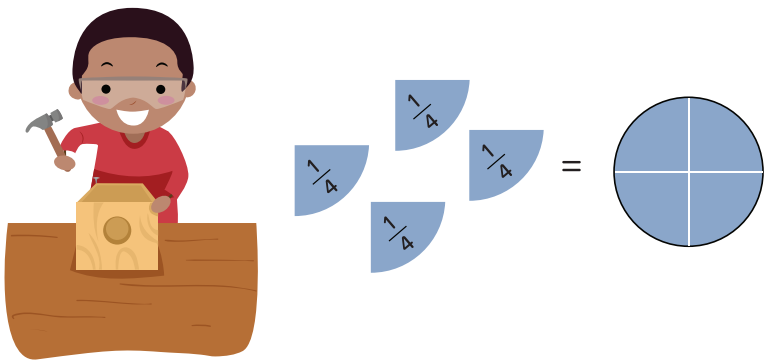
Denominator _____

Unit Fraction _____

Photo Credit: YesPhotographers / Shutterstock.com

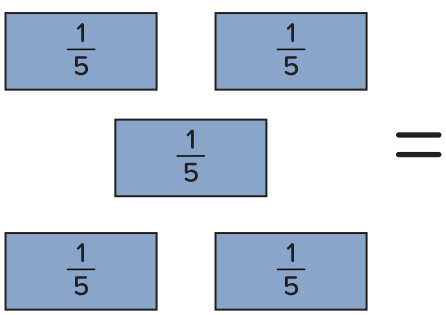
BUILD

Let's Build It Use the picture to help you understand what it means to compose a fraction. Then, compose fractions to solve the problems.



1. What do you think it means to compose a fraction? Record your ideas.

2. Draw and label a composed model for these unit fractions:



3. Create a model that represents $\frac{1}{3} + \frac{1}{3} + \frac{1}{3} = 1$ whole. Use circles or rectangles.

4. How many unit fractions compose five-eighths? _____

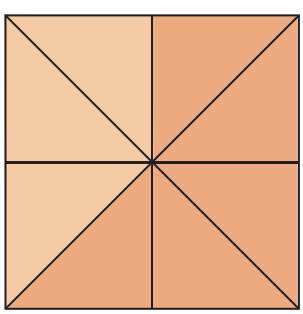
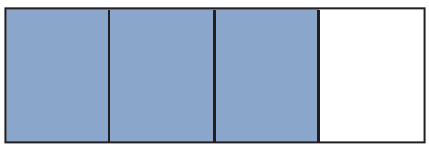


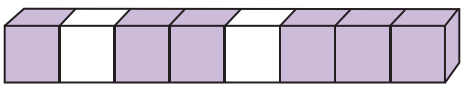
Photo Credit: YesPhotographers / Shutterstock.com

Photo Credit: (a) YesPhotographers / Shutterstock.com, (b) Lorelyn Medina / Shutterstock.com

5. Look at the strip diagram. Write an equation using unit fractions to show how to compose this fraction.



6. What fraction of the boxes are colored? Write an equation using unit fractions to show how to compose this fraction.



7. Look at point E on the number line. How many unit fractions of $\frac{1}{8}$ do you need to represent point E? _____

8. Which of the following expressions is the same as $\frac{5}{6}$? Highlight or circle the correct answer.

A. $\frac{1}{6}+\frac{2}{6}+\frac{3}{6}+\frac{4}{6}+\frac{5}{6}$

B. $\frac{5}{6}+\frac{5}{6}+\frac{5}{6}+\frac{5}{6}+\frac{5}{6}$

C. $\frac{1}{6}+\frac{1}{6}+\frac{1}{6}+\frac{1}{6}+\frac{1}{6}$

D. $\frac{1}{5}+\frac{1}{5}+\frac{1}{5}+\frac{1}{5}+\frac{1}{5}+\frac{1}{5}$

Draw a model to show this. Use circles or rectangles.

Photo Credit: YesPhotographers / Shutterstock.com

CONNECT

Food Fraction Fun Read the problem. Draw a model to show your solution.

Two families went to the local restaurant. Each family ordered the feteer meshaltet. Eman's family wanted their feteer cut into 6 equal pieces. Ayman's family wanted their feteer cut into 8 equal pieces. If both feteer are the same size, which family will have larger pieces to eat? How do you know?

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 2

Decomposing Fractions

Learning Target

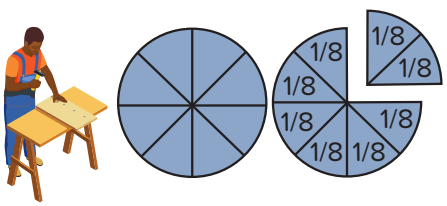
- I can **decompose** fractions into unit fractions.

ACCESS

Fraction Charades When directed by your teacher, work with a small group to act out a fraction. You will also guess what fraction other groups show.

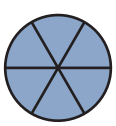
BUILD

Decompose It Use the picture to help you understand what it means to decompose a fraction.



1. What do you think it means to decompose a fraction? Record your ideas.

2. Write an equation decomposing this whole into unit fractions.

 = _____

3. Write an equation decomposing $\frac{3}{5}$ into unit fractions.

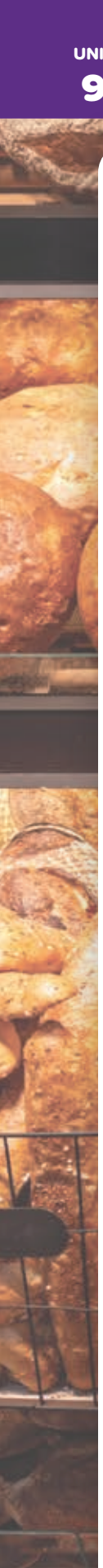
CONNECT

Food Fraction Fun Read the problem. Then, draw a model and write an equation using unit fractions to show your solution.

Mazen needed $\frac{3}{4}$ cup of sugar for his recipe. He had a measuring cup that held $\frac{1}{4}$ cup of sugar. How many times will he need to fill the measuring cup for his recipe?

Check Your Understanding
Follow your teacher's instructions to complete this activity.

Photo Credit: YesPhotographers / Shutterstock.com



LESSON 3

More of Decomposing Fractions

Learning Target

- I can represent fractions with repeated addition and subtraction of unit and other fractions.

ACCESS

Race to the Finish Line Mark where each runner stops running.

Start **Finish**

1. Runner 1 begins at Start, stops at _____.
2. Runner 2 begins at _____, stops at _____.
3. Runner 3 begins at _____, stops at Finish.

BUILD

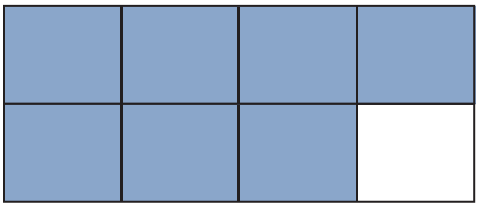
I Have . . . Who Has . . . ? Listen to your teacher for the rules for the game. Pay attention to what your classmates say and read aloud your card when it is your turn.

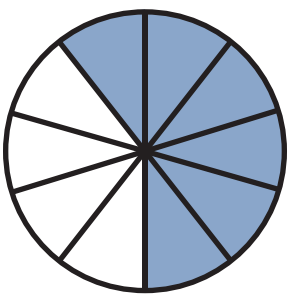
Many Ways to Break It Down Draw models and write as many equations as you can to decompose the given fractions.

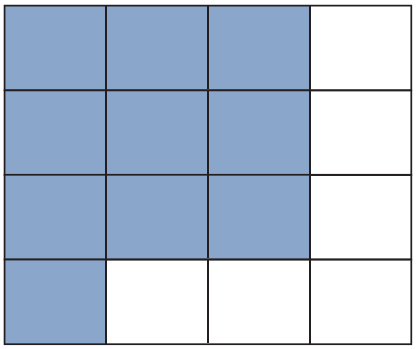
1. $\frac{9}{12}$
2. $\frac{12}{15}$
3. $\frac{15}{18}$
4. $\frac{18}{24}$

Photo Credit: YesPhotographers / Shutterstock.com

Write the fraction that represents each model, then write as many equations as you can to decompose each fraction:

1. 

2. 

3. 

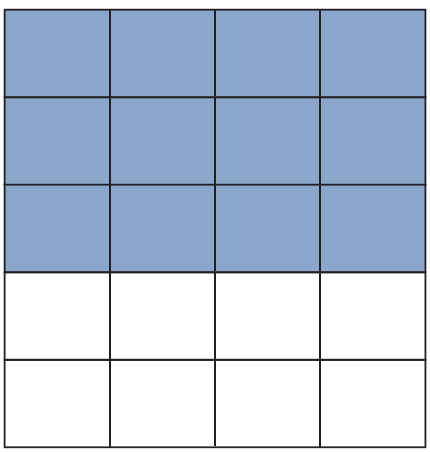
4. 

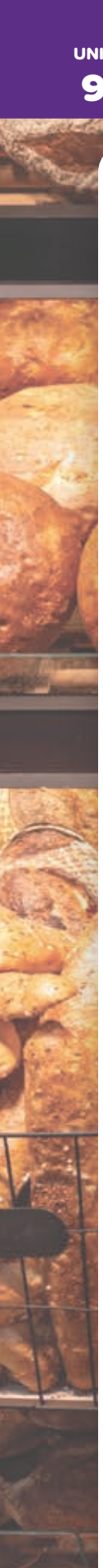
Photo Credit: YesPhotographers / Shutterstock.com

CONNECT

Sharing Popcorn Omar ate $\frac{1}{5}$ of a bag of popcorn. He and his brother Amir shared the rest of the bag. Write equations to show two ways they could share the remaining popcorn.

Popcorn Expanding as It Pops

Check Your Understanding
Follow your teacher's instructions to complete this activity.



LESSON 4

Fractions and Mixed Numbers

Learning Targets

- I can define **mixed numbers**.
- I can define **improper fractions**.
- I can explain how mixed numbers and improper fractions relate to unit fractions.

ACCESS

Error Analysis Analyze the student's work and answer. Identify what the student did correctly and incorrectly, and then try to correctly answer the question.

Problem: Decompose the following fraction $\frac{3}{5}$

Student Solution:

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

What did the student do correctly?	What did the student do incorrectly? Why do you think the student made this error?	Try to solve the problem correctly. Explain your thinking.

Photo Credit: YesPhotographers / Shutterstock.com

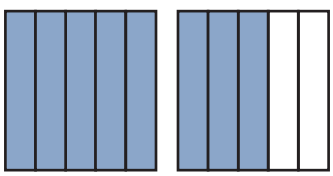
BUILD

Improper Fractions Work with a partner to solve the problems.

1. Draw a model for $\frac{3}{2}$.

2. Draw and label a model for $\frac{7}{3}$.

3. Look at the model and answer the questions.



What unit fraction is used to build this improper fraction? _____

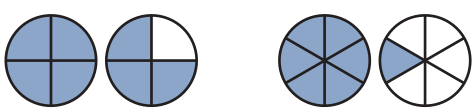
How many unit fractions are colored in? _____

What is the improper fraction represented by this model? _____

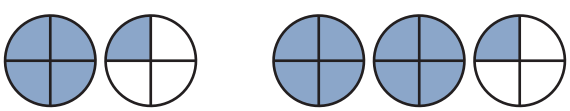
4. Draw and label a model for $\frac{16}{6}$.

Circle the correct model for the given improper fraction.

5. $\frac{7}{6}$



6. $\frac{5}{4}$



Mixed to Improper Part 1 Shade the model to represent the mixed number. Then, write the equivalent improper fraction.

$3\frac{1}{5}$

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Mixed to Improper Part 2 Shade a model to represent the mixed number. Then, write the equivalent improper fraction. $2\frac{1}{3}$

Mixed to Improper Part 3 Convert the mixed numbers to improper fractions.

1. $5\frac{1}{4} =$ _____

2. $2\frac{1}{6} =$ _____

3. $4\frac{1}{5} =$ _____

4. $3\frac{1}{2} =$ _____

CONNECT

Food Fraction Fun Mona baked a square cake for her mom's birthday. She wanted to put a border of frosting on the top of the cake. If one side of the cake measures $\frac{3}{8}$ meter, what is the perimeter of the top of the cake? Write the answer as both a mixed number and an improper fraction.

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 5

Adding and subtracting fractions

Learning Target

- I can add and subtract fractions and whole numbers.

ACCESS

Comparing Loaves Talk with a partner about the story problem, then explain your thinking using words, pictures, or numbers.

Jana thinks that $\frac{4}{4}$ of a loaf of bread is the same thing as 1 whole loaf. Do you agree or disagree?

Photo Credit: YesPhotographers / Shutterstock.com

BUILD

Add Them Up Solve the fraction addition problems. Show your work.

Rewrite the model with whole numbers and fractions, and then solve the problem.

_____ + _____ + _____ + _____ + _____ = _____

Solve the following problems using numbers.

1. $\frac{3}{5} + \frac{2}{5} =$ _____

2. $\frac{4}{9} + \frac{1}{9} + \frac{2}{9} + 4 =$ _____

3. $\frac{10}{12} + \frac{1}{12} + 3 + 2 =$ _____

4. $2 + 2 + \frac{3}{5} + \frac{3}{5} =$ _____

5. $4 + \frac{4}{8} + 2 + \frac{5}{8} =$ _____

6. $\frac{3}{6} + 5 + \frac{5}{6} + 2 =$ _____

Break Them Down Use the model to help you solve the problem. Then, show your work as an equation and solve.

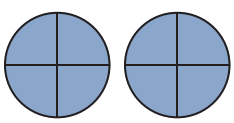
1. Adam has one loaf of bread. He uses $\frac{3}{4}$ of it to make sandwiches. How much of the loaf does Adam have left? Use the model to help you solve the problem.

2. Rewrite the problem with numbers and fractions, and then solve the problem.

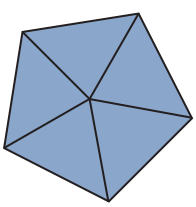
_____ – _____ =

3. Use the models to solve the problems.

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



$1 - \frac{2}{5} - \frac{1}{5} =$ _____



4. Draw a model to solve the problems.

$3 - \frac{1}{3} =$ _____

$1 - \frac{2}{8} =$ _____

$2 - \frac{2}{3} =$ _____

CONNECT

Party Planning Read and solve the story problem. Express your answer as an equation, and then solve.

Nadia is making falafel for a party. Her recipe calls for $\frac{1}{2}$ teaspoon sodium bicarbonate. The recipe makes enough for 10 people. Nadia is having 40 guests. In order to feed all her guests, she wants to quadruple her recipe. How many teaspoons of sodium bicarbonate will she use?

Falafel

Check Your Understanding
Follow your teacher's instructions to complete this activity.

Photo Credit: YesPhotographers / Shutterstock.com

LESSON 6

Adding Mixed Numbers

Learning Target

- I can add mixed numbers with **like denominators**.

ACCESS

Collecting Pineapple Juice Read the story problem. Talk to your Shoulder Partner about how you could solve the problem. Work together to solve it.

Rajaa has 1 full liter of pineapple juice and $\frac{1}{3}$ liter left in another container. Ola has 2 full liters of pineapple juice and $\frac{2}{3}$ liter left in another container. How much juice do they have altogether?

Pineapple Juice

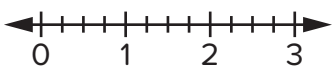
Photo Credit: YesPhotographers / Shutterstock.com

BUILD

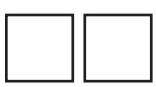
Mixed Together Add the mixed numbers. Solve each problem using a number line, a model, and an equation. For each model, color the first fraction one color and use a different color for the second fraction.

1. $1\frac{1}{4} + \frac{3}{4}$

Number line:



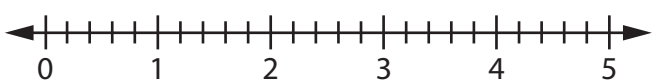
Model:



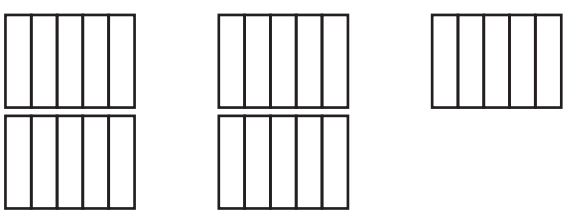
Equation: _____

2. $2\frac{1}{5} + 1\frac{2}{5}$

Number line:



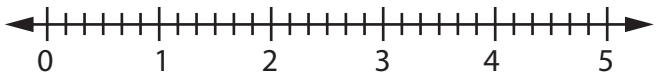
Model:



Equation: _____

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

Number line:



Model:

Equation: _____

4. Solve the problem using your favorite strategy.

$2\frac{4}{9} + 1\frac{2}{9}$

5. Solve the problem using your favorite strategy.

$2\frac{3}{5} + 1\frac{4}{5}$

CONNECT

Create Your Own Problem Write and solve your own addition story problem. You can use one of the equations provided or create your own.

Sample equations:

1. $2\frac{2}{9} + 3\frac{5}{9} =$ _____

2. $1\frac{4}{5} + 2\frac{1}{5} =$ _____

3. 3 $\frac{3}{10} + 1\frac{9}{10} =$ _____

Photo Credit: YesPhotographers / Shutterstock.com

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 7

Subtracting Mixed Numbers

Learning Target

- I can subtract mixed numbers with **like denominators**.

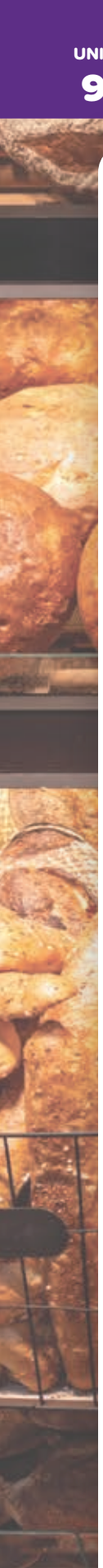
ACCESS

Error Analysis Read the story problem and analyze the student's work and answer. Identify what the student did correctly and incorrectly, and try to solve the problem correctly.

A student says that $2\frac{3}{4} + 1\frac{3}{4} = 3\frac{6}{4}$. Their teacher tells them their addition is correct, but their work is not complete.

What did the student do correctly?	What did the student do incorrectly? Why do you think the student made this error?	Try to solve the problem correctly. Explain your thinking.

Photo Credit: YesPhotographers / Shutterstock.com



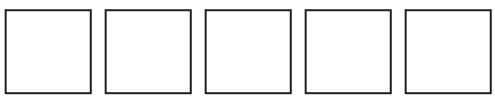
BUILD

Mixed Apart Subtract the mixed numbers. For each problem, solve it using a number line, a model, and an equation. For each model, color in the minuend one color and use a pencil to cross off the subtrahend.

1. $4\frac{3}{4} - 2\frac{1}{4}$

Number line:

Model:

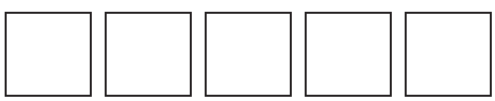


Equation: _____

2. $5 - 2\frac{1}{4}$

Number line:

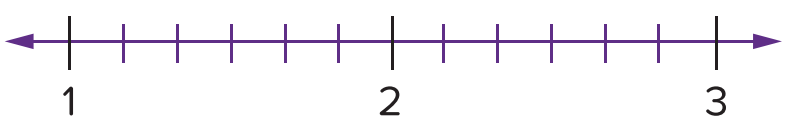
Model:



Equation: _____

3. $3 - 1\frac{1}{6}$

Number line:



Model:

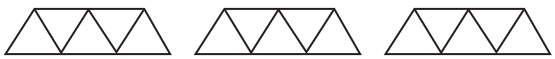
Equation: _____

Photo Credit: YesPhotographers / Shutterstock.com

4. $2\frac{1}{5} - 1\frac{2}{5}$

Number line:

Model:



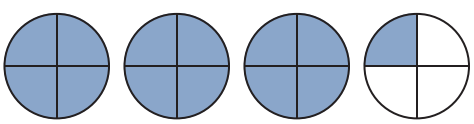
Equation: _____

Solve the problems using the strategy of your choice. Show your work.

5. $3\frac{2}{5} - 2\frac{1}{5} =$ _____

6. $3 - 2\frac{1}{8} =$ _____

Use the model to help you solve the story problem.



7. Hady had $3\frac{1}{4}$ cookies. He gave $2\frac{3}{4}$ to his sister. How many cookies does he have left?

CONNECT

Writing About Math Why do we sometimes need fractions to solve real-life problems? What is an example from your life when you could use fractions to help you solve a problem? Use words, pictures, or numbers to show your thinking.

Photo Credit: YesPhotographers / Shutterstock.com

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 8

Comparing Fractions with Like Denominators or Numerators

Learning Targets

- I can **compare** and **order** fractions with like denominators.
- I can compare and order fractions with like **numerators**.

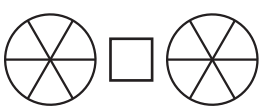
ACCESS

Fractional Candy Bars Would you rather have $\frac{5}{12}$ of a candy bar or $\frac{6}{12}$? Use numbers, pictures, or words to explain your thinking.

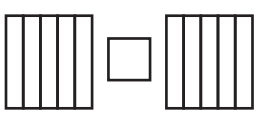
Candy Bar

BUILD

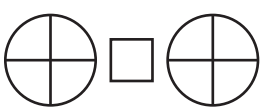
Comparing Fractions with Like Denominators Shade each shape to show the given fractions. Then, compare the fractions using the symbols <, >, or =.

1. 

   $\frac{5}{6}$ $\square$ $\frac{4}{6}$

2. 

   $\frac{3}{5}$ $\square$ $\frac{5}{5}$

3. 

   $\frac{1}{4}$ $\square$ $\frac{3}{4}$

4. Fill in the blanks to complete the statement.

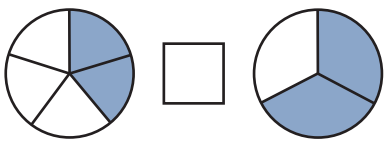
   If fractions have the same _____, then the one with the _____ numerator is the _____ fraction.

5. Order the following fractions from least to greatest.

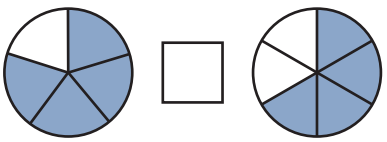
   $\frac{6}{8}$ $\frac{2}{8}$ $\frac{5}{8}$ $\frac{3}{8}$ $\frac{7}{8}$ $\frac{1}{8}$ $\frac{8}{8}$

   _____; _____; _____; _____; _____; _____; _____

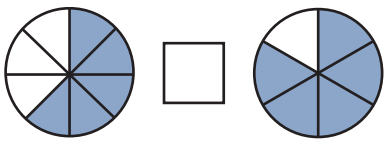
Comparing Fractions with Like Numerators Write the fractions shown underneath each shape, and then compare each pair of fractions using the symbols <, >, or =.

1. 

_____ _____

2. 

_____ _____

3. 

_____ _____

4. Fill in the blanks to complete the statement.

   If fractions have the same _____, then the one with the _____ denominator is the _____ fraction.

Write <, >, or = in each box to compare the two fractions.

5. $\frac{5}{6} \square \frac{5}{8}$

6. $\frac{3}{6} \square \frac{3}{4}$

7. $\frac{4}{8} \square \frac{4}{5}$

8. Order the following fractions from least to greatest.

   $\frac{3}{5}$ $\frac{3}{8}$ $\frac{3}{3}$ $\frac{3}{6}$ $\frac{3}{12}$

   _____; _____; _____; _____; _____

CONNECT

Top Heavy Compare the fractions.

1. $\frac{4}{7} \square \frac{4}{3}$

2. $\frac{5}{10} \square \frac{5}{2}$

3. Do improper fractions follow the rule you wrote about how to compare fractions with common numerators? How do you know? Use a model to explain your thinking.

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 9

Same Fraction, Different Ways

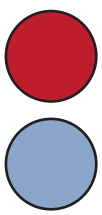
Learning Targets

- I can use visual models to generate equivalent fractions.
- I can explain what makes two fractions equivalent.

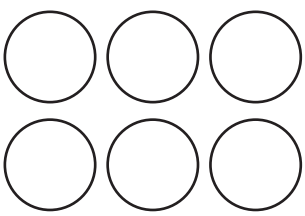
ACCESS

Equal Sets Read the problem and color in the buttons to answer the question.

Amany had 2 buttons and 1 of them was red.

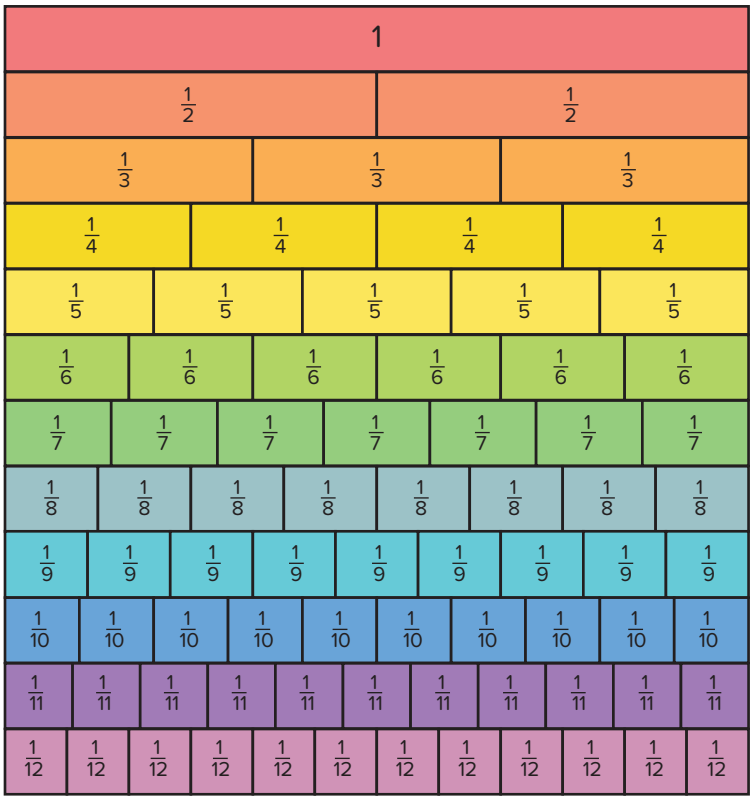


If Amany had 6 buttons and wanted to have the same fraction of the set be red, how many red buttons would that be? Color them and then write the equivalent fraction.



BUILD

Fraction Wall



1. Look at the fraction wall and talk to a partner about what you notice. Do you see any equivalent fractions? Record two fractions that are equivalent to $\frac{1}{4}$.

2. Record two fractions that are equivalent to $\frac{2}{3}$.

CONNECT

Recipe Trouble Read the problem, and then rewrite the recipe replacing the fractions in the recipe with equivalent fractions.

Samar has a recipe for healthy snack bars that she received from her friend. The recipe uses measuring cups and teaspoons. Her friend sent a $\frac{1}{4}$ cup and $\frac{1}{4}$ teaspoon, so Samar has to rewrite the recipe using equivalent fractions.

(Hint: Think about an equivalent fraction for $\frac{1}{2}$ using fourths.)

Granola Bars

Healthy Snack Bars

Ingredients:

$\frac{1}{2}$ cup rolled oats

2 cups crispy rice cereal

$\frac{1}{4}$ cup honey

$1\frac{1}{2}$ cups peanut butter

$\frac{1}{2}$ teaspoon of vanilla

1 cup chocolate chips

Rewrite:

_____ cup rolled oats

_____ cup crispy rice cereal

_____ cup honey

_____ cup peanut butter

_____ teaspoon of vanilla

_____ cup chocolate chips

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 10

Benchmark Fractions

Learning Targets

- I can identify **benchmark fractions**.
- I can generate fractions equivalent to benchmark fractions.

ACCESS

Walking the Path Read the problem and draw the benches in the appropriate spots along the path.

Sherif was in charge of placing benches along a 1 kilometer walking path in Cairo. He was supposed to put the benches at the beginning, middle, and end of the path.

At what kilometer marker posts should Sherif put benches? Draw benches in the appropriate spots along the path.

BUILD

Continuing Down the Path Read the questions and solve them with a partner.

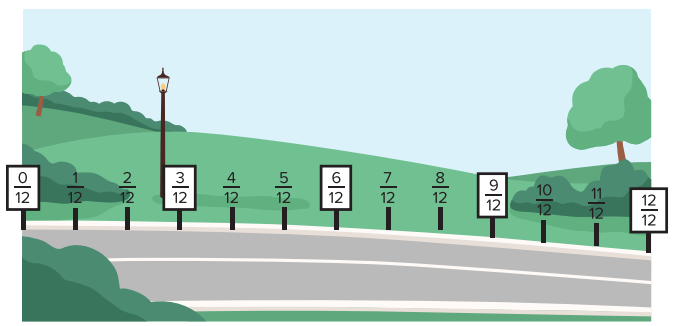
Sherif did such a great job placing benches along the walking path that he was hired again to do more. He needs to put a bench at the beginning, middle, and end of the following 1-kilometer paths. Draw benches in the appropriate spots along the path.

1.

Complete:

The fraction $\frac{2}{10}$ closed to the benchmark fraction _____

2.



Complete:

a. The fraction $\frac{8}{12}$ closed to the benchmark fraction _____

b. The fraction $\frac{11}{12}$ closed to the benchmark fraction _____

For Sherif's next job, the path is 2-kilometers long. He must place a bench every $\frac{1}{2}$ kilometer from the beginning to end. Where should he place them? Draw benches in the appropriate spots along the path.

3.

CONNECT

Writing About Math What strategies did you use to decide where to place the cards when you played Mixed-Up Fractions? Explain your thinking and share examples.

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 11

Applications on The Benchmark Fractions

Learning Target

- I can compare fractions to a benchmark fraction.

ACCESS

Error Analysis Analyze the student's work and answer. Identify what the student did correctly and incorrectly, and then try to solve the problem correctly.

Problem: Circle the fraction that is closer to 1 and explain your thinking.

$\frac{3}{12}$ $\frac{3}{8}$

Student's Solution:

$\frac{3}{12}$ $\frac{3}{8}$

$\frac{3}{12}$ is closer to 1 whole because both numerators are 3 but the denominator 12 is larger, so that means it is closer to being one whole.

What did the student do correctly?	What did the student do incorrectly? Why do you think the student made this error?	Try to solve the problem correctly. Explain your thinking.

BUILD

Use a Benchmark For her birthday party, Menna made two cakes because she had so many friends coming. The two cakes were the same size. Her mom cut one cake into 10 pieces and the other into 6 pieces. $\frac{5}{10}$ of one cake was eaten and $\frac{5}{6}$ of the other cake was eaten. Which cake had more eaten? Use benchmark fractions to solve the problem.

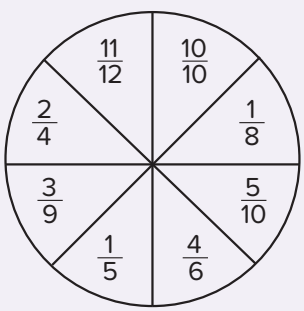
HANDS-ON ACTIVITY

Spin to Win

Play the game with your partner.

- Player 1 spins the spinner once.
- Player 1 writes their fraction in the first row of the chart.
- Player 2 takes their turn spinning and recording their fraction.
- Players work together to use benchmarks $0, \frac{1}{2}, 1$, to compare the two fractions.
- The biggest fraction wins the round.
- Keep playing until you complete the chart.

Spin Your Fraction



My Fraction	<, >, or =	My Partner's Fraction

Photo Credit: (a) Dina Saeed / Shutterstock.com, (b) Stiv_Leo / Shutterstock.com

Story Problems Use benchmark fractions to solve the story problems.

1. Rashad and Malek each got a candy bar that was the same size. Rashad ate $\frac{4}{6}$ of his candy bar and Malek ate $\frac{4}{8}$ of his. Who ate more than $\frac{1}{2}$? How do you know?

2. Mariam and Jana each had identical sandwiches. Mariam cut her sandwich into 12 pieces and ate 4 of them. Jana cut hers into 6 pieces and ate 3. Who ate more? How do you know?

Sandwich Wrap

3. At basketball practice, Hatam made 14 of his 18 shots. His best friend, Amir made 8 of his 16 shots. Who made a larger fraction of the shots taken?

4. Mazen and Ezz each had a candy bar. They each ate $\frac{1}{2}$ of the bar, but Mazen ate more candy than Ezz. How is this possible? Use a model to explain your thinking.

CONNECT

Writing About Math Reflect on your learning in this unit. Use words, numbers, or pictures to answer the following Essential Question: Why are benchmark fractions useful in problem-solving and in comparing fractions?

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 12

Equivalent Fractions Using the Identity Property

Learning Target

- I can use the Identity Property of Multiplication to create equivalent fractions.

ACCESS

Identity Property Review Solve each problem. Then, circle the problems that show the Identity Property of Multiplication.

1. $45 \times 1 =$ _____

2. $1 \times 34{,}953 =$ _____

3. $\frac{2}{3} \times 1 =$ _____

4. $0 \times 4 =$ _____

5. $1 \times \frac{4}{5} =$ _____

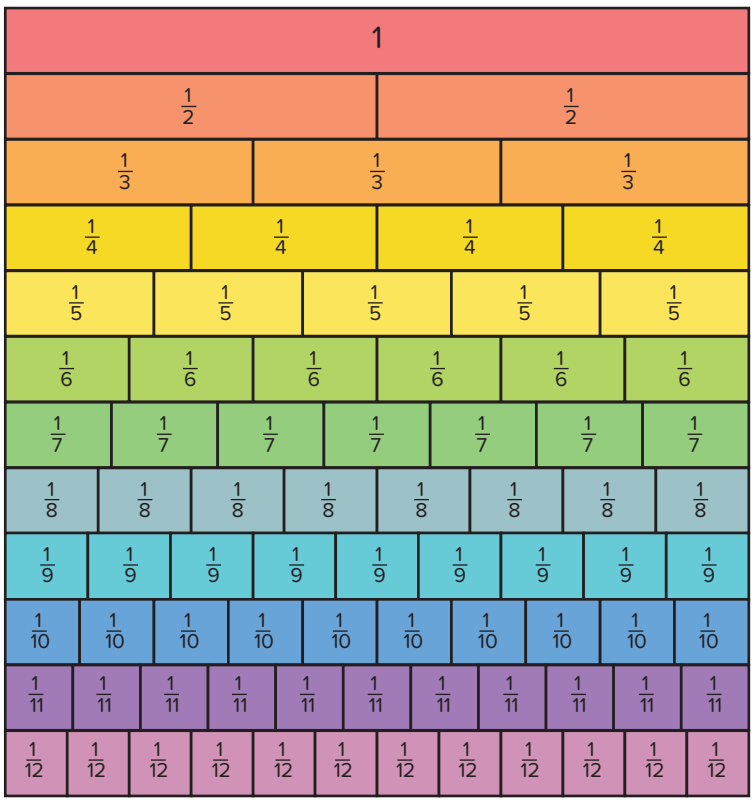
6. $\frac{1}{1} \times \frac{1}{8} =$ _____

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

8. $\frac{5}{6} \times 0 =$ _____

BUILD

From Parts to a Whole Use the fraction wall to answer the questions.



1. How many halves are in 1 whole? Using halves, how would you write 1 whole as a fraction?

2. How many fourths are in 1 whole? Using fourths, how would you write 1 whole as a fraction?

3. How many tenths are in 1 whole? Using tenths, how would you write 1 whole as a fraction?

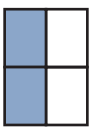
4. Explain the pattern and why each of the fractions you wrote equals 1 whole.

5. Using what you know, how many 25ths are in 1 whole?

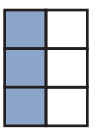
Creating Equivalent Fractions Discuss each model and how to multiply to create equivalent fractions.

The fraction $\frac{1}{2}$ is represented in the model.

When we multiply $\frac{1}{2}$ by $\frac{2}{2}$, the model looks like this. Although the fraction is now $\frac{2}{4}$, it is still $\frac{1}{2}$ of the whole. Fractions can be expressed in many ways and still be equivalent.



If we multiply $\frac{1}{2}$ by $\frac{3}{3}$, the model looks like this. The product has the same value $\frac{1}{2}$, but is now called $\frac{3}{6}$.



This is the power of the Identity Property of Multiplication. It allows us to make equivalent fractions. We can use the Identity Property of Multiplication to create equivalent fractions so we can add and subtract fractions with unlike denominators.

CONNECT

Riddle Me This Use the clues to solve the riddle.

Like all fractions, this is an important fraction with limitless equivalencies. You can use the Identity Property of Multiplication to create new names for it. Two of its equivalent fractions are: $\frac{6}{18}$ and $\frac{10}{30}$. Both the numerator and denominator are less than 5. What fraction is it? Explain how you know.

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 13

Equivalent Fractions Using Multiplication and Division

Learning Target

- I can multiply and divide to create equivalent fractions.

ACCESS

Error Analysis Analyze the student's work and answer. Identify what the student did correctly and incorrectly, and then try to solve the problem correctly.

Diaa was asked to find an equivalent fraction and wrote the following:

$\frac{1}{2} + \frac{3}{3} = \frac{4}{5}$

Therefore, $\frac{4}{5}$ is equivalent to $\frac{1}{2}$.

What did the student do correctly?	What did the student do incorrectly? Why do you think the student made this error?	Try to solve the problem correctly. Explain your thinking.

BUILD

Multiplying to Create Equivalent Fractions Follow your teacher's directions to solve the problems.

1. How many ways can you show 1 (one whole) as a fraction? Write as many as you can in the time allowed.

Generate at least 5 equivalent fractions for each fraction.

2. $\frac{2}{3}$; _____; _____; _____; _____; _____

3. _____; $\frac{2}{4}$; _____; _____; _____; _____

4. $\frac{3}{5}$; _____; _____; _____; _____; _____

5. _____; _____; $\frac{3}{9}$; _____; _____; _____

Dividing to Create Equivalent Fractions Follow your teacher's directions to solve the problems.

1. $\frac{15}{20}$ is equivalent to $\frac{3}{4}$. How can you use division to prove it?

Determine whether each fraction pair is equivalent. If it is, write "true." If it is not, write "false."

2. $\frac{2}{3} = \frac{6}{9}$ _____

3. $\frac{7}{8} = \frac{2}{3}$ _____

4. $\frac{3}{5} = \frac{6}{8}$ _____

5. $\frac{6}{10} = \frac{2}{5}$ _____

6. $\frac{2}{8} = \frac{1}{4}$ _____

7. $\frac{9}{12} = \frac{2}{4}$ _____

8. $\frac{3}{8} = \frac{1}{6}$ _____

9. $\frac{1}{3} = \frac{4}{12}$ _____

CONNECT

Omar's Om Ali Omar made a pan of Om Ali, his favorite dessert. The pan contains 12 equal servings. Omar shares 3 servings with his friend Heba. What is the simplest form of the fraction of the Om Ali Omar gave his friend?

Om Ali

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 14

Finding the missing in Equivalent Fractions

Learning Target

- I can explain the relationship between **multiples** and equivalent fractions.

ACCESS

Which Is Not a Multiple? Circle the number that is not a multiple of the given number.

1.	**3:**	6	9	12	14	15
2.	**2:**	4	7	8	10	12
3.	**4:**	8	12	16	22	24
4.	**5:**	10	17	20	25	
5.	**6:**	12	16	24		

BUILD

What Is the Missing Multiple? Work with a partner to identify the missing numerator or denominator for the equivalent fractions.

1. $\frac{3}{4} = \frac{\square}{12}$ 2. $\frac{5}{15} = \frac{15}{\square}$ 3. $\frac{20}{25} = \frac{\square}{5}$

Find the missing numerator or denominator to make the fractions equivalent. Record what factor you multiplied or divided by. An example is shown.

$$\frac{2}{5} \overset{\times 4}{=} \frac{\quad}{20}$$

4. $\frac{5}{7} = \frac{\square}{21}$ 5. $\frac{2}{9} = \frac{10}{\square}$

6. $\frac{12}{18} = \frac{4}{\square}$

7. $\frac{10}{70} = \frac{\square}{7}$

8. $\frac{7}{13} = \frac{21}{\square}$

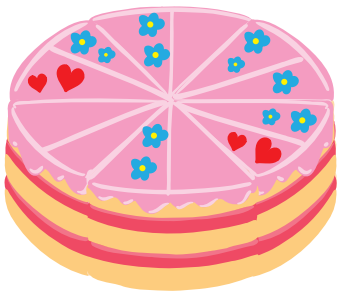
9. Heba had two cakes that were the same size. She cut the first cake into 6 pieces and frosted 2 of the pieces with chocolate. She cut the second cake into 18 pieces. If she wanted to frost the same fraction of the second cake with chocolate, how many pieces should she frost? How do you know? Draw a fraction model if necessary.

Different Kinds of Cookies

10. Nabil had 9 cookies. $\frac{2}{3}$ of them were chocolate chip. How many cookies were chocolate chip? Hint: $\frac{2}{3} = \frac{?}{9}$

CONNECT

Nadia's Cake Nadia owns a bakery. She made a cake and decorated it as shown.



There are 12 equal pieces total: 6 pieces have flowers, 4 are plain with no decorations, and the other 2 have something else.

Answer the questions based on Nadia's cake.

1. Some of the customers want pieces with flowers. What fraction of the cake will they eat? How many pieces?

2. Some of the customers want pieces with no decorations. What fraction of the cake will they eat? How many pieces?

3. What fraction of the cake is left?

4. If Nadia cuts all the pieces that are left into two, what fraction is now left?

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 15

Multiplying by a Whole

Learning Target

- I can multiply a fraction by a whole number.

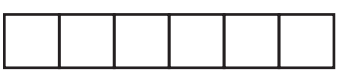
ACCESS

Doggy, Doggy, Where Is Your Bone?
Discuss the story problem that follows with your Shoulder Partner. Work together and use a bar model to solve the problem. Then, write an addition and a multiplication sentence.

Omar has 6 dogs. Each dog chews 2 bones a day. How many bones does Omar need each day to give his dogs?

Pack of Dogs

Bar Model:



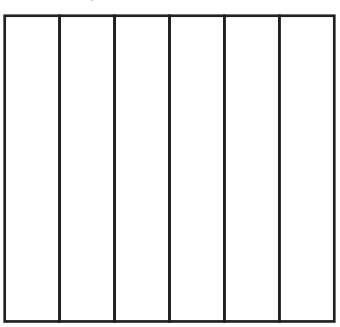
Addition sentence: _____

Multiplication sentence: _____

BUILD

Same Answer, Different Operation Solve the problems. Show your work.

1. Two of Omar's dogs are at the vet. He has 6 bones in his bag for his evening dog walk. Shade the boxes to show how many bones Omar will give to the dogs that are with him.



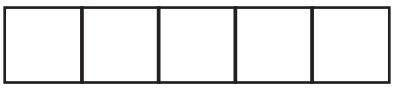
2. Represent your shaded bar model as a fraction.

3. Decompose $\frac{4}{6}$ as the sum of unit fractions.

4. Express $\frac{4}{6}$ using multiplication.

5. Draw a bar model and write an addition and multiplication sentence for $\frac{2}{5}$.

   Bar model:

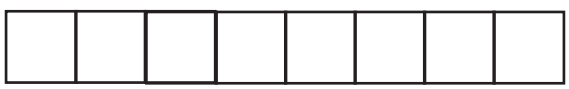


   Addition sentence: _____

   Multiplication sentence: _____

6. Draw a bar model and write an addition and multiplication sentence for $\frac{5}{8}$.

   Bar model:



   Addition sentence: _____

   Multiplication sentence: _____

HANDS-ON ACTIVITY

Puzzle Mania

Your teacher will give you a puzzle card. When your teacher gives the signal, make a completed puzzle by finding classmates with the same fraction representation.

CONNECT

Writing About Math Reflect on your learning and answer the questions. Use examples to support your thinking.

- What do you notice about the factors and product when you multiply a fraction by a whole number?
- How is this different from multiplying a whole number by a whole number?

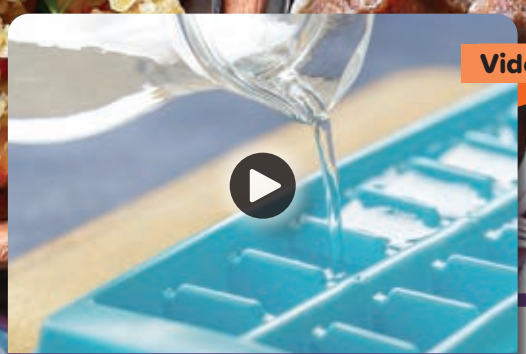
Check Your Understanding
Follow your teacher's instructions to complete this activity.

UNIT

10

Theme 3 | Fractions, Decimals, and Proportional Relationships

Unit 10 Decimals



Decimal Ice Cubes

Unit Video Questions

The video Decimal Ice Cubes uses an ice cube tray to demonstrate parts of a whole and name those parts as decimals and fractions. Explore the world around you to find other part-whole relationships. Identify some examples in your classroom, home, and in your neighborhood.

Quick Code
egm4138

- [ ] Where do you see parts of a whole in the real world around you?
- [ ] How do you describe parts of a whole?
- [ ] How does it change when the whole changes?

Photo Credit: Losangela / Shutterstock.com

LESSON 1

Let's Explore Decimals

Learning Targets

- I can define **decimal fractions**.
- I can create visual models of **Tenths**.

ACCESS

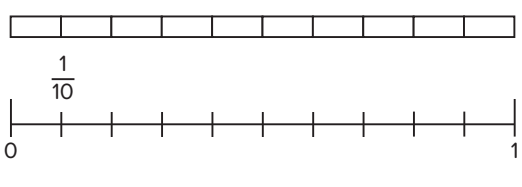
Number Talk Use mental math to solve the problems. Then, check your answers with your Shoulder Partner.

1. 60 ÷ 10 =
2. 90 ÷ 10 =
3. 300 ÷ 10 =
4. 230 ÷ 10 =
5. 720 ÷ 10 =
6. 1,500 ÷ 10 =
7. 6,700 ÷ 10 =
8. 4,820 ÷ 10 =
9. 700 ÷ 100 =
10. 900 ÷ 100 =
11. 3,100 ÷ 100 =
12. 4,600 ÷ 100 =
13. 8,700 ÷ 100 =
14. 9,900 ÷ 100 =
15. 23,400 ÷ 100 =

Photo Credit: Elena Veselova / Shutterstock.com

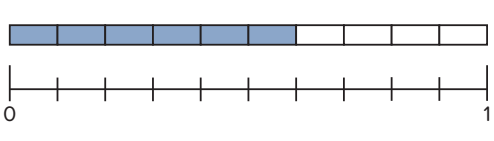
BUILD

Break It Apart Follow along with your teacher to fill in the fractions and decimals on the number line.

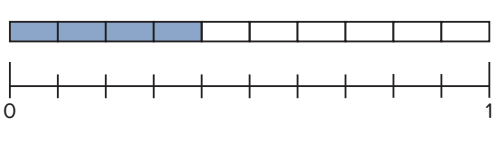


Connect the Parts Record what fraction and decimal are shown.

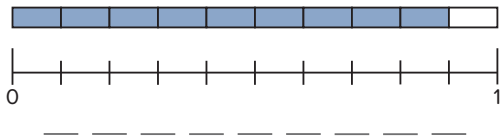
1.



2.

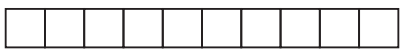


3.

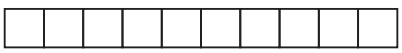


Shade in the model to represent the decimal.

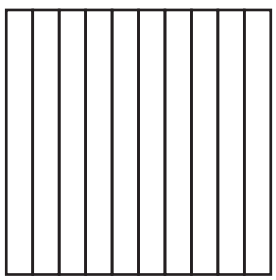
4. 0.7



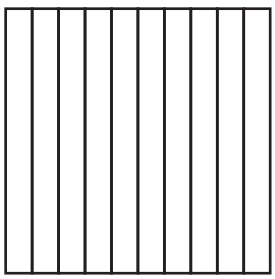
5. 0.5



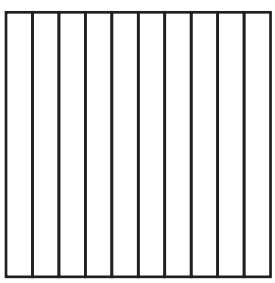
6. 0.6



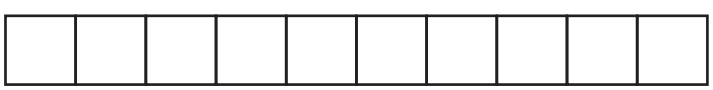
7. 0.2



8. 0.9



9. Hosam had a 1-meter piece of fabric. Of this piece, 0.2 meter had flowers on it, 0.6 meter was plain blue, and the rest had stars. Color in the strip of Hosam's fabric based on the description.



10. What decimal of Hosam's strip had stars? _____

CONNECT

Writing About Math How is 0.1 (one-tenth) similar to 1 divided by 10?

Photo Credit: Elena Veselova / Shutterstock.com

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 2

Hundredths

Learning Target

- I can create visual models of **Hundredths**.

ACCESS

How Much Rice? Read the problem and talk to your Shoulder Partner about who bought the most rice.

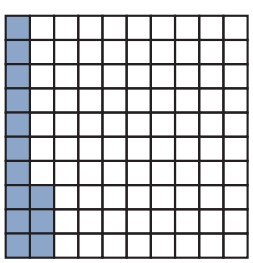
A Bowl of Rice

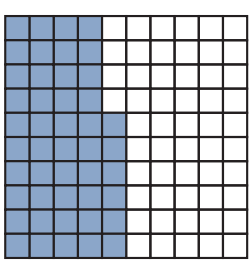
Farid, Hala, and Amir went to the store for their mothers. Each bought some rice. Faria came home and told his mother, "I bought $\frac{8}{10}$ of a **kilogram** for you." Hala came home and said, "When I weighed the rice, the scale said 0.8 kilogram." Amir came home and told his mother, "I bought you 800 grams of rice for dinner."

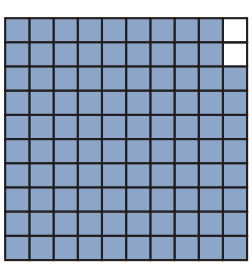
Which child brought home the most rice? How do you know?

BUILD

More Cups of Rice Record what decimal is shown.

1. 

2. 

3. 

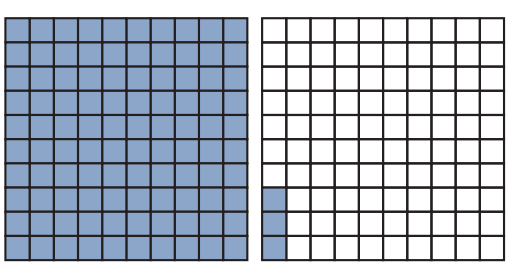
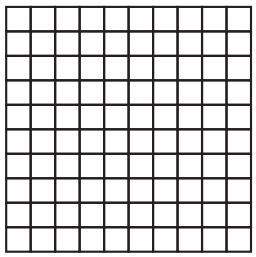
4. 

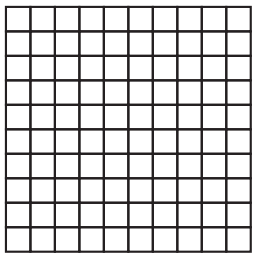
Photo Credit: Elena Veselova / Shutterstock.com

Shade in the grids to show the decimal stated.

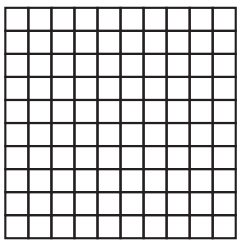
5. 0.46



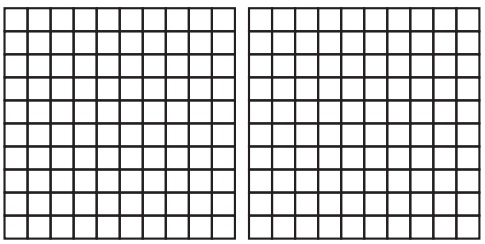
6. 0.72



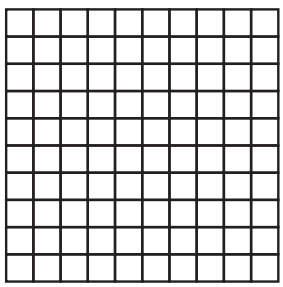
7. 0.06



8. 1.28



9. Basem had a quilt that his mother bought for him. 0.35 of it was colored blue. 0.4 of it was red. The rest was yellow. Color in the quilt to match the decimals described.

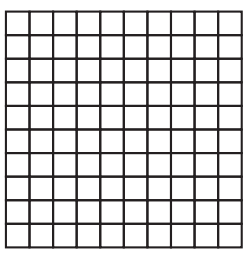


10. What decimal of Basem's quilt was yellow? _____

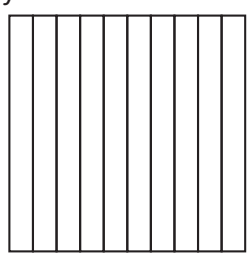
CONNECT

Groups of Hundredths Aisha was coloring in a Hundredths grid. She colored in 30 squares or 0.30. Adel walked by and said, "Oh, I see you colored in 3 Tenths."

Is Adel correct? How do you know? Color in the grid to check your thinking.



Aisha



Adel

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 3

The Place Value

Learning Targets

- I can name the **place value** of decimals to the Hundredths place.
- I can identify the value of a digit to the Hundredths place.

ACCESS

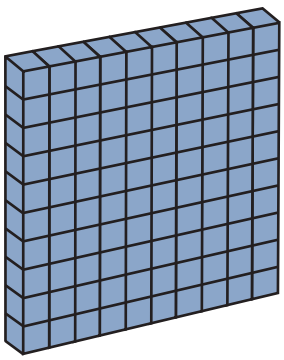
Mystery Number Solve the problems. Show your work.

1. The number has digits up to the Ten Thousands place. The digit in the Hundreds place is less than 6 and greater than 3 and is prime. The digit in the Thousands place is the product of a number multiplied by itself. It is greater than 1 and less than 5. There is a zero in the Ones place. There are 2 Tens. The value of the Ten Thousands is 3 x 10,000. What is the number?

2. The number has three digits. One of the digits is a whole and the other two are a fraction of a number expressed as a decimal. The number in the Hundredths place makes the Identity Property of Multiplication possible. The number in the Ones place is odd and prime. It is a factor of 9 and 12 but less than 4 and greater than 1. The number in the Tenths place is the only even prime number.

BUILD

See and Say Read the numbers in Items 1–4 with your Shoulder Partner. Make sure you agree on how to say each number. Then, listen to the decimal numbers your teacher reads aloud. Record the digits in the place value chart for items 5–9.

	Ones	•	Tenths	Hundredths
		•		
1.	5	•	6	7
2.	4	•	0	9
3.	3	•	1	1
4.	9	•	5	0
5.		•		
6.		•		
7.		•		
8.		•		
9.		•		

10. Shade the Hundredths grid model to show how 5 Tenths is equivalent to 50 Hundredths.

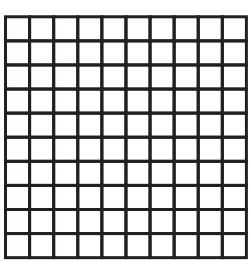


Photo Credit: Elena Veselova / Shutterstock.com

Make and Say

Read the directions for the activity.

1. Put the two decks of digit cards together. Shuffle them and place them face down in a pile.
2. Turn over three cards.
3. Work together to arrange the cards to make and record as many different numbers as you can by writing the digits in the Ones, Tenths, and Hundredths places.
4. Record each number.
5. Practice saying the numbers with your partner.

Example: We turned over a 5, a 6, and a 9. My partner and I make 5.69, 5.96, 6.59, 6.95, 9.56, and 9.65. Then, we practice reading the numbers together.

1. Cards turned:

   Numbers made:

2. Cards turned:

   Numbers made:

3. Cards turned:

   Numbers made:

4. Cards turned:

   Numbers made:

Photo Credit: Elena Veselova / Shutterstock.com

CONNECT

Writing About Math Use the number to answer the questions: **532.89**

1. What is the value of the 3? _____
2. What digit is in the Hundredths place? _____
3. What is the value of the digit in the Hundreds place? _____
4. What digit is in the Tenths place? _____
5. Why is the value of the digit in the Hundredths place worth less than the digit in the Tenths place if Hundreds are greater than Tens?

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 4

Decimals in different Forms

Learning Target

- I can write decimals to the Hundredths place in standard, word, unit, and **expanded form**.

ACCESS

Error Analysis Analyze the student's work and answer in the space provided. Identify what the student did correctly and incorrectly, and then try to correctly solve the problem.

A student was asked to read the following number: 23.05. The student read it as "twenty-three and five-tenths."

What did the student do correctly?	What did the student do incorrectly? Why do you think the student made this error?	Try to solve the problem correctly. Explain your thinking.

BUILD

Naming Decimals Look at the example with your teacher.

Example:

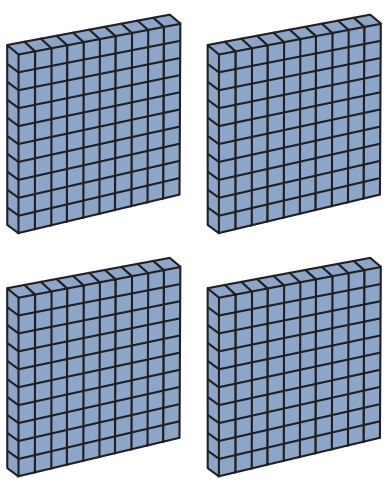
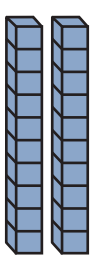
Ones	.	Tenths	Hundredths
	.		
4	.	2	3

Photo Credit: Elena Veselova / Shutterstock.com

Use the example in the chart to help you answer the following problems.

Standard Form	Word Form	Unit Form	Expanded Form
4.23	four and twenty-three hundredths	4 Ones, 2 Tenths, 3 Hundredths	4 + 0.2 + 0.03

Write the numbers in word form.

1. 4.53

2. 0.48

3. 2 + 0.1 + 0.03

Write the numbers in unit form.

4. 4.52

5. seven and thirty-four hundredths

6. sixty-nine hundredths

Write the numbers in expanded form.

7. 2.04

8. two and fifty-Hundredths

9. 5 Ones, 6 Tenths, 8 Hundredths

Write the numbers in standard form.

10. 7 Ones, 9 Hundredths

_____

11. 5 + 0.5 + 0.01

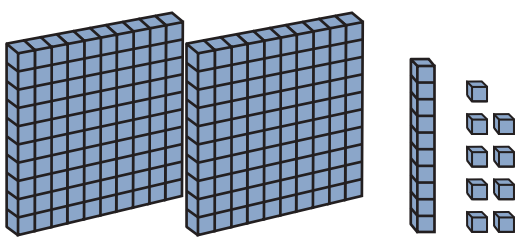
_____

12. nine and forty-three Hundredths

_____

Fill in the blanks to match the decimal models.

Example:

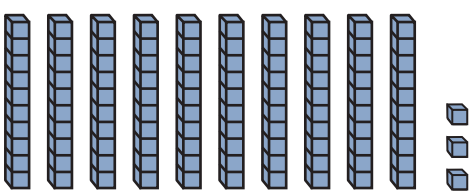


Standard form: 2.19

Word form: two and nineteen hundredths

Unit form: 2 Ones, 1 Tenth, 9 Hundredths

Expanded form: 2 + 0.1 + 0.09

13. 

Standard form: _____

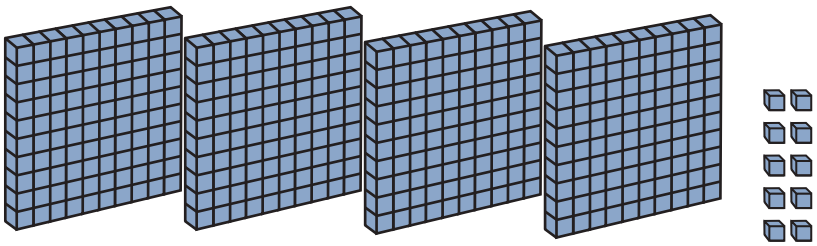
Word form: _____

Unit form: _____

Expanded form: _____

Photo Credit: Elena Veselova / Shutterstock.com

14.



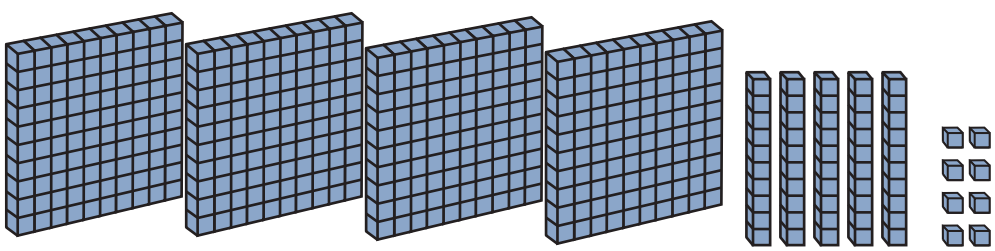
Standard form: _____

Word form: _____

Unit form: _____

Expanded form: _____

15.



Standard form: _____

Word form: _____

Unit form: _____

Expanded form: _____

Photo Credit: Elena Veselova / Shutterstock.com

CONNECT

Writing About Math When does the digit 0 matter? When is the digit 0 not needed? Use words, numbers, and pictures to support your thinking.

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 5

Same Value, Different Ways

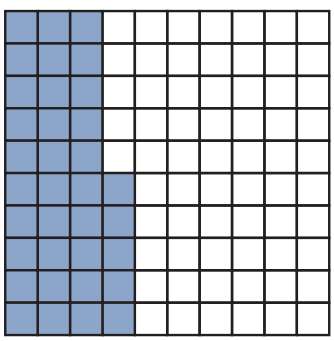
Learning Target

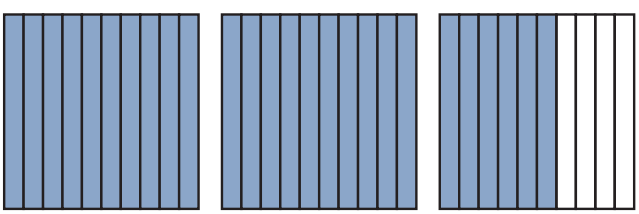
- I can read and write decimals as **fractions**.

ACCESS

Name the Model Express the models in as many different forms as you can.

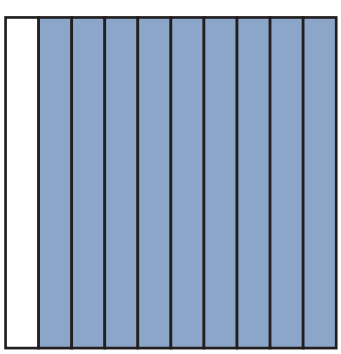
1.

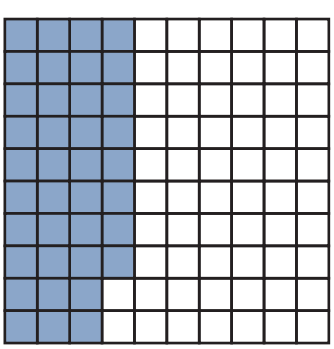
2. 

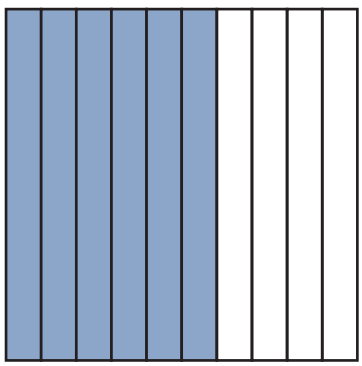
3. 

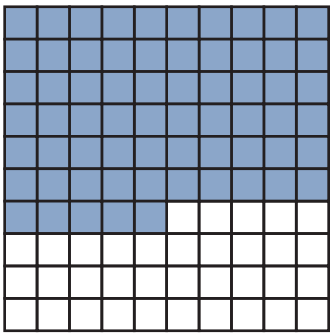
BUILD

A Model Fraction Express each model as a fraction and a decimal.

1. 

2. 

3. 

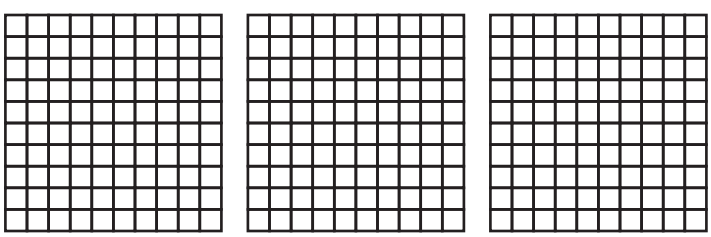
4. 

Decimals as Fractions Express the following decimals as fractions.

1. 0.23
2. 0.3
3. 0.02
4. 0.67

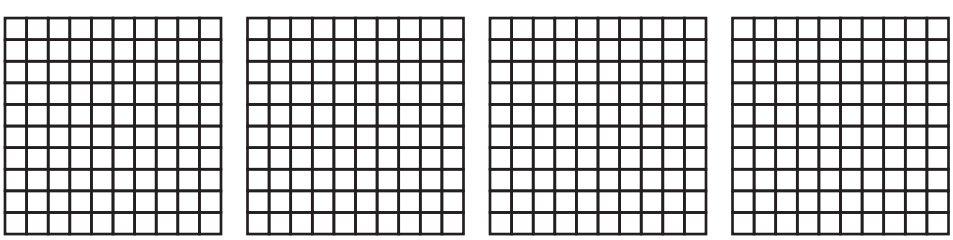
Modeling Decimals Create a model for each decimal and write it as a fraction.

1. 2.93



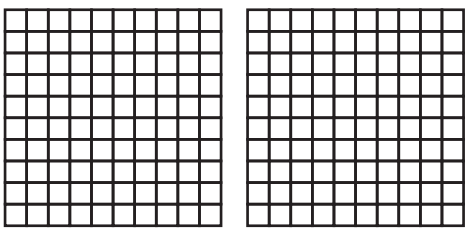
2. Write your answer to the previous item as a fraction. _____

3. 3.04



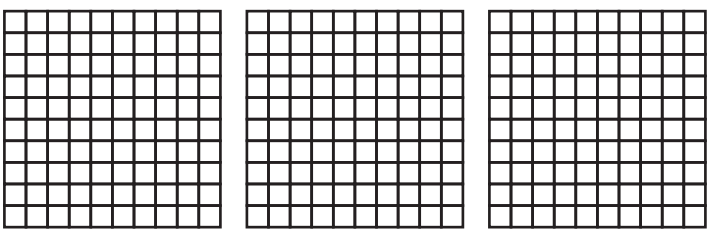
4. Write your answer to the previous item as a fraction in the simplest form .....

5. 1.32



6. Write your answer to the previous item as a fraction in the simplest form .....

7. 2.74



8. Write your answer to the previous item as a fraction in the simplest form .....

More Decimals as Fractions Express the decimals as fractions in simplest form

1. 3.4

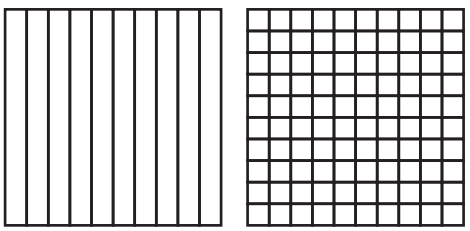
2. 10.05

3. 5.97

4. 4.79

CONNECT

Are They Equivalent? A student thinks that $\frac{3}{10}$ is equivalent to $\frac{30}{100}$. Do you agree or disagree? Use the model to explain your thinking.



Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 6

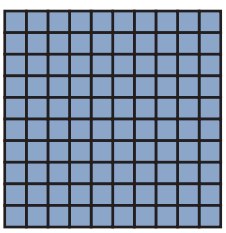
The Whole Breakdown

Learning Targets

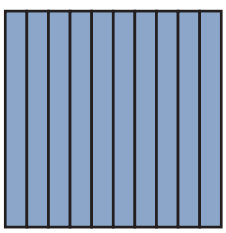
- I can explain the relationship between decimals and fractions.
- I can explain the relationship between decimals or fractions and the whole.

ACCESS

Wholes to Fractions Express both models as fractions, and then answer the question.

1. 

Fraction _____

2. 

Fraction _____

3. Are the two fractions equivalent? How do you know?

_____

_____

BUILD

The Whole Deal Decompose the units to represent each number as Tenths and then write the number as a fraction.

1. 1

Tenth _____

In fraction form _____

2. 3

Tenths _____

In fraction form _____

3. 1.5

   Tenths _____

   In fraction form _____

4. 2.3

   Tenths _____

   In fraction form _____

5. 10.8

   Tenths _____

   In fraction form _____

Decompose the units to represent each number as Hundredths and then write the number as a fraction.

6. 1

   Hundredths _____

   In fraction form _____

7. 3

   Hundredths _____

   In fraction form _____

8. 1.5

   Hundredths _____

   In fraction form _____

9. 2.3

   Hundredths _____

   In fraction form _____

10. 10.8

    Hundredths _____

    In fraction form _____

CONNECT

Writing About Math Summarize what you have learned about decimals so far. Identify any areas where you still need help with decimal skills and concepts.

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 7

All Things Equal

Learning Target

- I can create **equivalent** fractions and decimals to the Hundredths place.

ACCESS

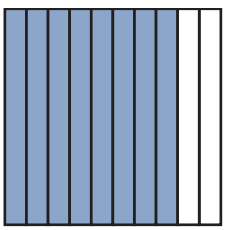
Equivalency Review Circle the equations that show equivalency.

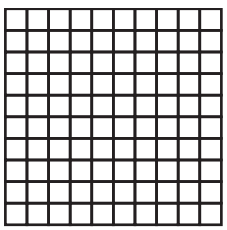
1. $\frac{1}{2} = \frac{3}{6}$
2. $\frac{2}{3} = \frac{2}{6}$
3. $\frac{8}{10} = \frac{4}{10}$
4. $\frac{8}{12} = \frac{4}{6}$
5. $\frac{2}{3} = \frac{6}{9}$
6. $\frac{4}{8} = \frac{0}{4}$
7. $\frac{1}{4} = \frac{5}{8}$
8. $\frac{2}{10} = \frac{4}{20}$
9. $\frac{5}{10} = \frac{1}{2}$

BUILD

Is it the Same? Work with your Shoulder Partner. Create an equivalent model, record its fraction, and write as a decimal fraction.

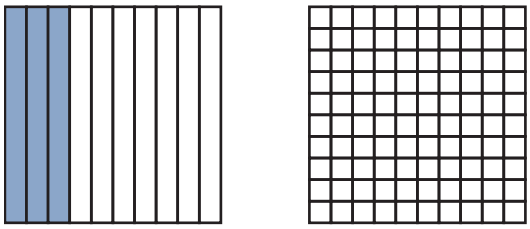
1.





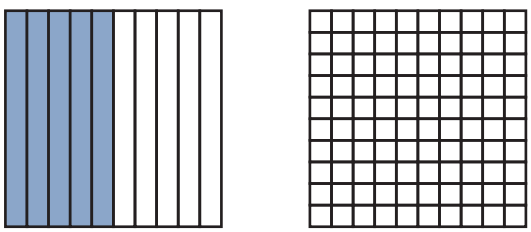
Fraction: $\frac{8}{10}$ =

Decimal: 0.8 =

2. 

Fraction: $\frac{30}{100}$ = _____

Decimal: 0.30 = _____

3. 

Fraction: $\frac{5}{10}$ = _____

Decimal: 0.5 = _____

Create the Same Record an equivalent fraction and decimal for each problem.

Balancing Rocks

1. $\frac{1}{10}$

Fraction: _____

Decimal: _____

2. $\frac{70}{100}$

Fraction: _____

Decimal: _____

3. $\frac{6}{10}$

Fraction: _____

Decimal: _____

4. 0.4

Fraction: _____

Decimal: _____

5. 0.30

Fraction: _____

Decimal: _____

6. 0.9

Fraction: _____

Decimal: _____

7. $\frac{10}{10}$

Fraction: _____

Decimal: _____

8. $1\frac{4}{10}$

Fraction: _____

Decimal: _____

9. 2.1

Fraction: _____

Decimal: _____

Fill in the missing denominator or numerator. Circle the fraction that is more than 1 whole.

10. $\frac{20}{100} = \frac{?}{10}$

_____

11. $\frac{4}{10} = \frac{40}{?}$

_____

12. $\frac{200}{100} = \frac{?}{10}$

_____

CONNECT

Writing About Math What strategies do you use to find equivalent fractions and decimals? Use words, numbers, and pictures to express your thinking.

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 8

Comparing Decimals

Learning Target

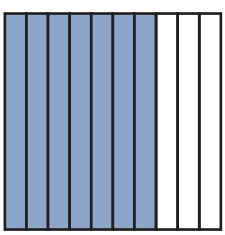
- I can compare decimals that do not have the same number of digits.

ACCESS

Error Analysis Analyze the student's work and answer in the space provided. Identify what the student did correctly and incorrectly, and then try to correctly solve the problem.

Use models to compare the decimals: 0.07 _____ 0.7

Student's Work:



0.07 > 0.7

What did the student do correctly?	What did the student do incorrectly? Why do you think the student made this error?	Try to solve the problem correctly. Explain your thinking.

BUILD

Chart and Compare Rewrite the decimals in the chart. Use the symbols >, <, or = to complete the comparison.

1. 0.34 _____ 0.4

Ones	Decimal	Tenths	Hundredths
0	.	3	4
0	.	4	

Photo Credit: Pineapple Studio / Shutterstock.com

2. 0.45 _____ 0.04

Ones	Decimal	Tenths	Hundredths
	.		
	.		

3. 0.23 _____ 0.3

Ones	Decimal	Tenths	Hundredths
	.		
	.		

4. 0.54 _____ 0.45

Ones	Decimal	Tenths	Hundredths
	.		
	.		

5. 0.62 _____ 0.26

Ones	Decimal	Tenths	Hundredths
	.		
	.		

6. 0.80 _____ 0.09

Ones	Decimal	Tenths	Hundredths
	.		
	.		

7. 0.73 _____ 0.69

Ones	Decimal	Tenths	Hundredths
	.		
	.		

Photo Credit: Pineapple Studio / Shutterstock.com

8. 0.10 _____ 0.1

Ones	Decimal	Tenths	Hundredths
	.		
	.		

9. 0.49 _____ 0.04

Ones	Decimal	Tenths	Hundredths
	.		
	.		

10. 0.27 _____ 0.7

Ones	Decimal	Tenths	Hundredths
	.		
	.		

At the Market Use the table to complete the chart and answer the questions.

Bag of figs 1.3 kg	Mangoes 2.01 kg	Plums 1.21 kg	Pomegranates 2.25 kg

Record the mass of each fruit on the place value chart.

Fruit	Ones	Decimal	Tenths	Hundredths
Figs				
Mangoes				
Plums				
Pomegranates				

Photo Credit: Pineapple Studio / Shutterstock.com

1. Which item weighs the least?

_____

2. Which item weighs the most?

_____

3. Which items weigh more than the plums?

_____

4. Which items weigh less than the mango?

_____

Fill in the blanks to make a true statement.

5. _____ > _____

6. _____ < _____

Photo Credit: Pineapple Studio / Shutterstock.com

CONNECT

Writing About Math Why is it important to be able to compare decimal amounts? Give an example and explain your thinking.

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 9

Comparing Fractions and Decimals

Learning Target

- I can compare decimals with fractions that have 10 or 100 as the **denominator**.

ACCESS

Counting by Tenths Follow the directions your teacher provides for counting aloud.

BUILD

Comparing Different Forms Compare the numbers using <, >, or =.

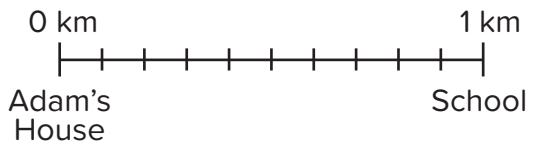
1. $\frac{24}{100}$ _____ 0.6
2. $\frac{6}{10}$ _____ .34
3. 1.04 _____ 98 Tenths
4. $\frac{134}{100}$ _____ 1.03
5. $\frac{9}{10}$ _____ 0.89
6. 7 Tenths _____ 0.7
7. 2.07 _____ 2 Ones and 7 Tenths
8. $\frac{50}{100}$ _____ 5.00
9. 0.23 _____ $\frac{23}{10}$
10. 0.42 _____ $\frac{4}{10}$

Mapping My Route Adam is plotting what he passes on the way to school on the number line. Number the line in tenths using fractions (above the line) and decimals (below the line). Then, plot the following on the number line:

- Omar's house: $\frac{3}{10}$ kilometer
- Corner Store: 0.8 kilometer
- Street light: $\frac{1}{10}$ kilometer

Photo Credit: Pineapple Studio / Shutterstock.com

- Sara's house: 0.6 kilometer
- A brown house: 0.3 kilometer
- A coffee shop: 0.7 kilometer
- A yellow house: $\frac{6}{10}$ kilometer
- A park: 1.0 kilometer



1. Which is further from Adam's house: Sara's house or Omar's?

2. When Adam is walking to school, does he pass the coffee shop or the corner store first?

3. Who lives in the brown house?

4. Who lives in the yellow house?

5. How far is the street light from Omar's house?

Photo Credit: Pineapple Studio / Shutterstock.com

CONNECT

Writing About Math Maisa went to the supermarket and saw two bottles of olive oil. The first one contained $\frac{5}{10}$ liters of olive oil, and the second one contained 0.73 liters of olive oil. Which bottle contained more olive oil? How do you know? Use words, numbers, or pictures your thinking.

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 10

Adding Fractions with denominators 10 and 100 Using Models

Learning Target

- I can use models to add two fractions with related denominators.

ACCESS

Skip Counting by Tenths Listen to the directions your teacher provides. Count aloud with your classmates as directed.

BUILD

Check the Denominators Solve the problems as directed by your teacher.

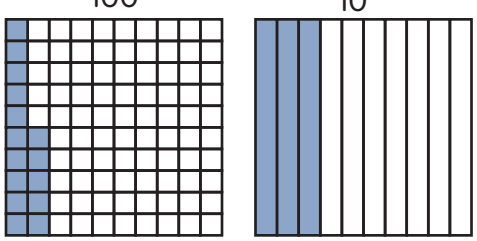
1. $\frac{15}{100} + \frac{46}{100} =$ _____

2. $\frac{2}{10} + \frac{3}{10} + \frac{9}{10} =$ _____

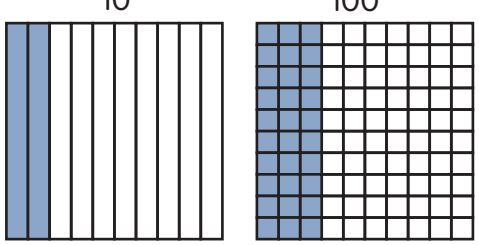
3. Talk to your Shoulder Partner about how you would solve the following: $\frac{15}{100} + \frac{3}{10}$.

Same Units Talk to your Shoulder Partner about how you would solve:

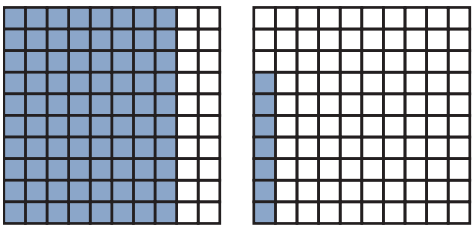
1. $\frac{15}{100} + \frac{3}{10} =$



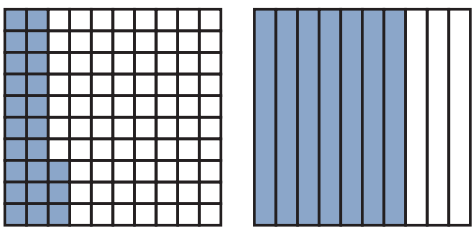
2. $\frac{2}{10} + \frac{30}{100} =$



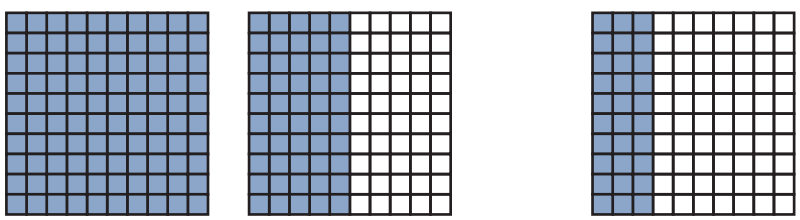
3. $\frac{8}{10} + \frac{7}{100} =$



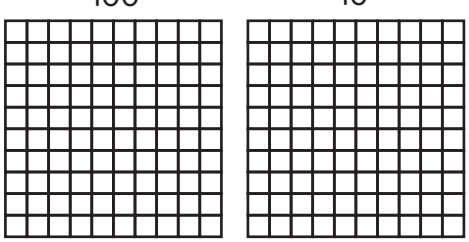
4. $\frac{23}{100} + \frac{7}{10} =$



5. $1\frac{5}{10} + \frac{30}{100} =$



6. $\frac{5}{100} + \frac{7}{10} =$



7. $1\frac{4}{10} + 1\frac{32}{100} =$

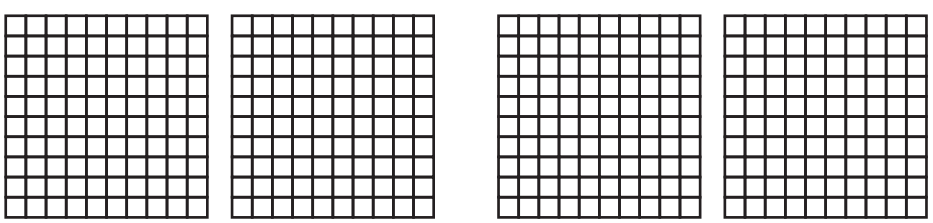
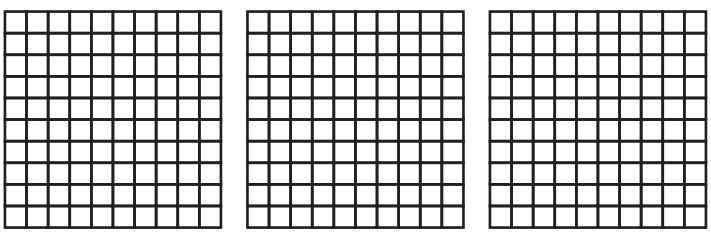


Photo Credit: Pineapple Studio / Shutterstock.com

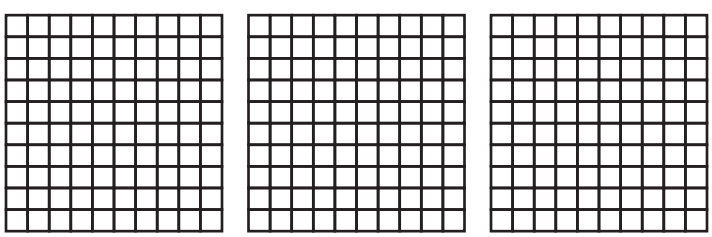
8. Abeer had $\frac{8}{10}$ of a meter of fabric. She went to the store and bought another $\frac{25}{100}$ of a meter. How much fabric did she have in all? Fill in the models to show each fraction and then solve and shade the answer:

Buying Fabric



_____ + _____ = _____

9. Diaa had a water bottle with $\frac{5}{10}$ liter in it. He added it to another bottle that had $\frac{65}{100}$ of a liter. Does he have more than 1 liter? How do you know? Use the models to explain.



CONNECT

Writing About Math How can you use fraction models to find a common denominator? Use words, numbers, and pictures to support your thinking.

Photo Credit: Pineapple Studio / Shutterstock.com

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 11

Adding Two Fractions With Denominators 10 and 100 By Converting into Equivalent Fractions

Learning Target

- I can add two fractions with related denominators.

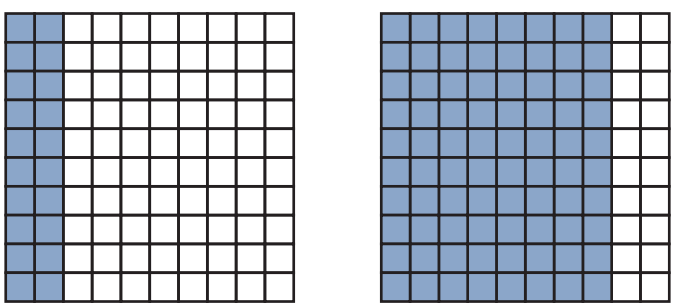
ACCESS

Error Analysis Analyze the student's work and answer in the space provided. Identify what the student did correctly and incorrectly, and then try to correctly solve the problem.

Color in the model for the fractions and find the sum

$$of \frac{2}{10} and \frac{8}{100}.$$

Student's work:



$\frac{2}{10}$ + $\frac{8}{100} = 1$

What did the student do correctly?	What did the student do incorrectly? Why do you think the student made this error?	Try to solve the problem correctly. Explain your thinking.

Photo Credit: Pineapple Studio / Shutterstock.com

BUILD

Model Free Addition Listen to your teacher for directions for the first two problems.

1. $\frac{6}{10} + \frac{23}{100} =$

   $\frac{\quad}{100} + \frac{23}{100} = \frac{\quad}{100}$

2. $\frac{7}{10} + \frac{60}{100} =$

   $\frac{7}{10} + \frac{\quad}{10} = \frac{\quad}{10}$

Making Equivalent Fractions Make equivalent fractions and record how you increased or decreased the numerator and the denominator like the example.

Example: $\frac{6}{10} \overset{\times 10}{=} \frac{60}{100}$ $\qquad$ $\frac{50}{100} \overset{\div 10}{=} \frac{5}{10}$

1. $\frac{30}{100} = \frac{\square}{10}$

2. $\frac{4}{10} = \frac{40}{\square}$

3. $\frac{2}{10} = \frac{\square}{100}$

4. $\frac{90}{100} = \frac{\square}{10}$

5. $\frac{50}{100} = \frac{\square}{10}$

6. $1\frac{70}{100} = 1\frac{7}{\square}$

7. $\frac{100}{100} = \frac{\square}{10}$

8. $\frac{40}{10} = \frac{\square}{100}$

9. $\frac{600}{100} = \frac{60}{\square}$

10. $2\frac{8}{10} = 2\frac{\square}{100}$

Photo Credit: Pineapple Studio / Shutterstock.com

Create your own fraction in Tenths or Hundredths on the left of the equal sign. Then decide on either the numerator or denominator in the equivalent fraction on the right of the equal sign and place a ? for the missing numerator or denominator. Swap with a partner to solve.

11. _____ = _____ 12. _____ = _____ 13. _____ = _____

14. _____ = _____ 15. _____ = _____

Fraction Addition Face-Off

Read the directions and play with a partner until it is time to switch groups.

- Shuffle the cards and give them out to you and your partner, face down, until zero cards remain.
- Each player flips over their top card.
- Players solve the problems on their cards and then compare the sums. The player with the greater sum keeps both the cards. If the sum is greater than 1, record an improper fraction and a mixed number.
- Record your fraction addition problem and the sum for each round in your Student Editions like the example. Circle who had the larger sum.
- The player with the most cards at the end of five rounds is the winner.
- If time permits, play Game 2.

$$\frac{4}{10} + \frac{30}{100} =$$

$$\frac{40}{100} + \frac{30}{100} = \frac{70}{100}$$

Game 1		
Round 1		Largest Sum: Me Partner
Round 2		Largest Sum: Me Partner
Round 3		Largest Sum: Me Partner
Round 4		Largest Sum: Me Partner
Round 5		Largest Sum: Me Partner

Photo Credit: Pineapple Studio / Shutterstock.com

HANDS-ON ACTIVITY

Fraction Addition Face-Off

Game 2			
Round 1		Largest Sum: Me	Partner
Round 2		Largest Sum: Me	Partner
Round 3		Largest Sum: Me	Partner
Round 4		Largest Sum: Me	Partner
Round 5		Largest Sum: Me	Partner

CONNECT

Writing About Math Answer the Essential Question from this unit: What strategies can I use to add fractions with related denominators? Use words, numbers, and pictures to explain your thinking.

Photo Credit: Pineapple Studio / Shutterstock.com

Check Your Understanding
Follow your teacher's instructions to complete this activity.

UNIT 11

Unit 11 Data with Fractions

Plant Life

Unit Opener Questions

The graph in the video shows how a plant grows over time. Think about different types of data you might collect and the graphs you could use to display the information.

Quick Code egm4184

- [ ] What types of data could you collect and graph?
- [ ] Why do you think there are different types of graphs?
- [ ] How does data with fractions change the way you create graphs?

Photo Credit: (a) Dina Saeed / Shutterstock.com; (b) MEE KO DONG / Shutterstock.com

LESSON 1

Different Graphs

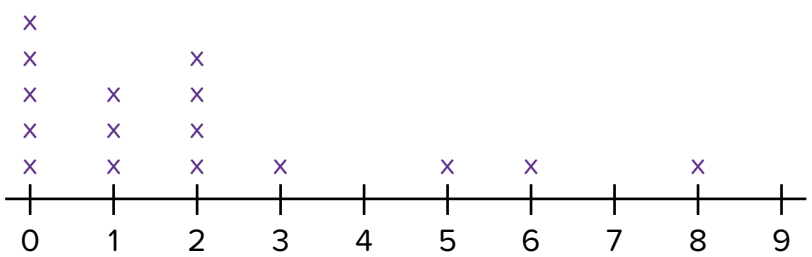
Learning Targets

- I can distinguish between different types of graphs.
- I can explain the difference between bar graphs and double bar graphs.
- I can explain when it is appropriate to use double bar graphs.

ACCESS

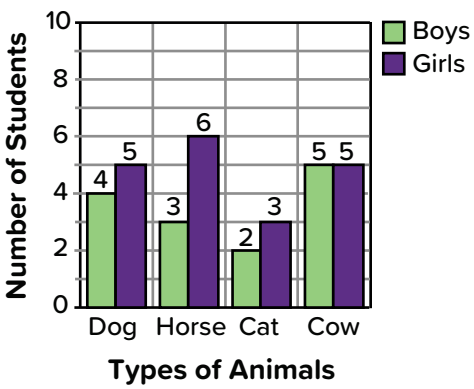
What Does Not Belong? Look at the three graphs. Discuss with a Shoulder Partner which graph does not belong and why. Be prepared to share your reasoning.

Number of Animals at Home



Key
x = 1 student

Favorite Farm Animals



Kinds of Animals We Have at Home

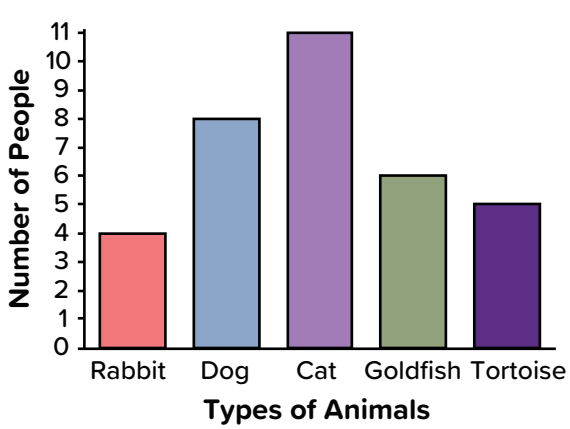
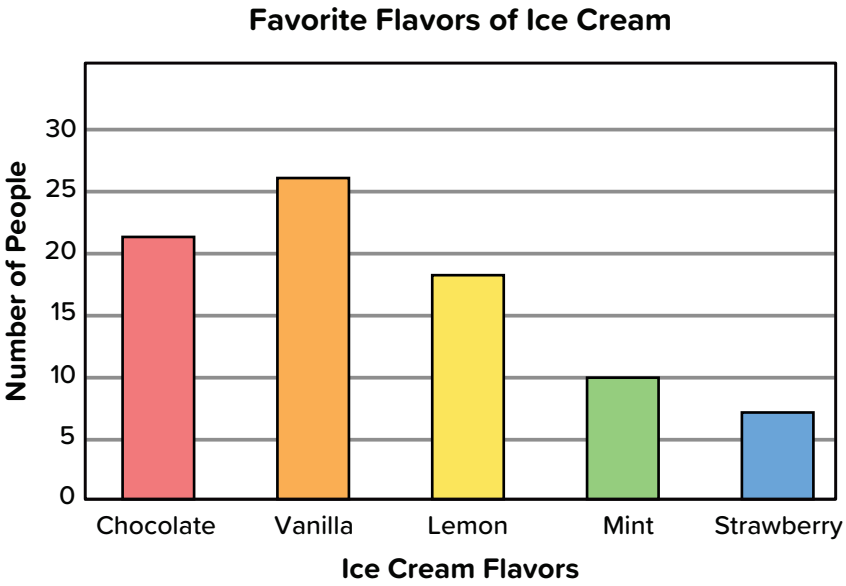


Photo Credit: Nour Tanta / Shutterstock.com

BUILD

Double the Data Review the elements of bar graphs with your teacher. Use the bar graph below to help you.



Record two questions that could be answered by this graph.

Ice Cream

Photo Credit: Nour Tanta / Shutterstock.com

Photo Credit: (a) Nour Tanta / Shutterstock.com, (b) smspsy / Shutterstock.com

Bar graph or double bar graph? Look at each table and the data collected. For each table, decide if the data could be presented in a double bar graph. Record your answer and your reasoning.

Table 1: Minimum and Maximum Monthly Temperatures in Cairo

Month	Minimum	Maximum
January	9	19
February	10	20
March	12	24
April	15	28

1. Could this data be represented in a double bar graph?

Table 2: Favorite Sports

Sport	Number of Students
Soccer	48
Basketball	24
Swimming	32
Gymnastics	12

2. Could this data be represented in a double bar graph?

Table 3: Favorite Foods

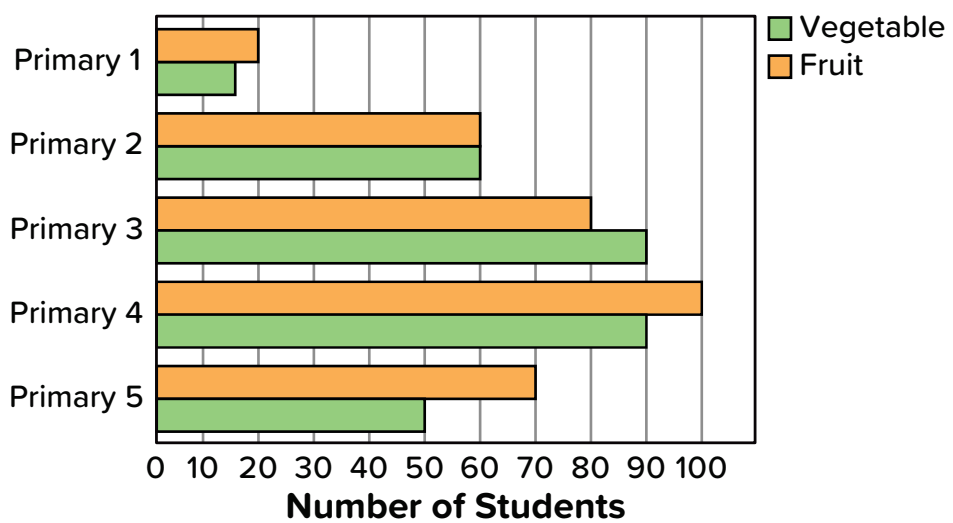
Food	Boys	Girls
Baklava	25	18
Feteer Meshaltet	17	12
Ful Medames	20	26
Tamiya	11	16

3. Could this data be represented in a double bar graph?

Photo Credit: Nour Tanta / Shutterstock.com

Use the double bar graph to answer the questions about what students in each grade prefer.

Table 4: Fruits or Vegetables (Choose only one.)



4. Which grade has the same number of students who like fruit and vegetables?

5. Which grade likes vegetables more than fruit?

6. How many more students in Primary 4 like fruit versus students in Primary 1?

7. How many students like fruit in both Primary 1 and 2?

8. How many more students in Primary 2 and Primary 3 like vegetables than in Primary 4 and Primary 5?

9. How many total students were surveyed?

10. Why is this a good data set to use a double bar graph?

Photo Credit: Nour Tanta / Shutterstock.com

CONNECT

Writing About Math Give an example of a data set that would need a double bar graph instead of a single bar graph. Explain why.

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 2

Plotting Along

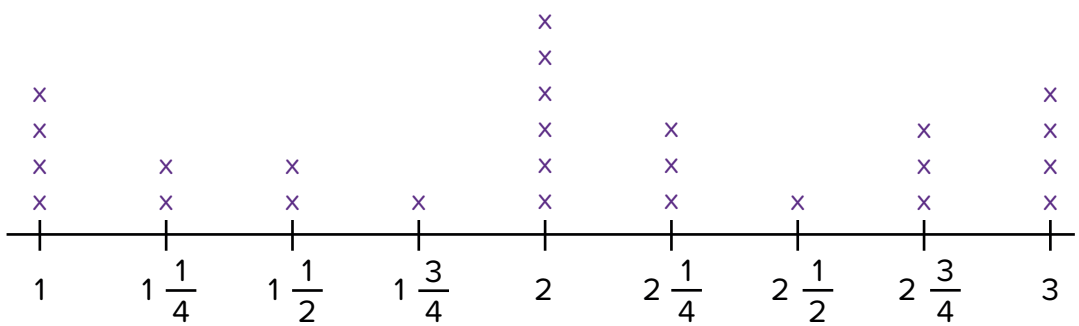
Learning Targets

- I can explain why **data** might include fractions.
- I can construct a line plot using data with fractions.
- I can analyze a line plot using data with fractions.

ACCESS

Similar and Different Compare the two graphs. Fill in the Venn Diagram to explain how the graphs are similar and different.

Graph 1: Hours Spent Reading in a Week



Graph 2: Students' Favorite Book Genres

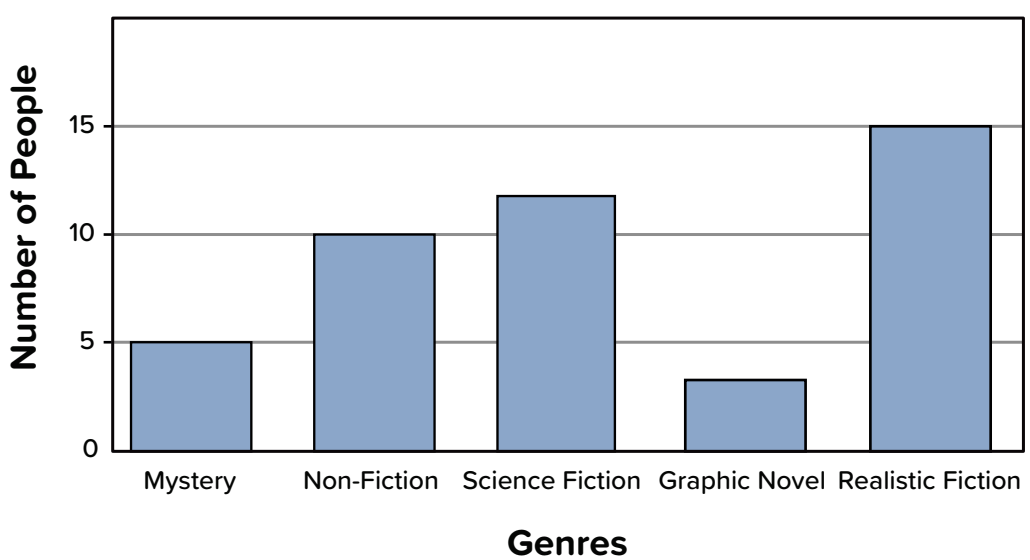
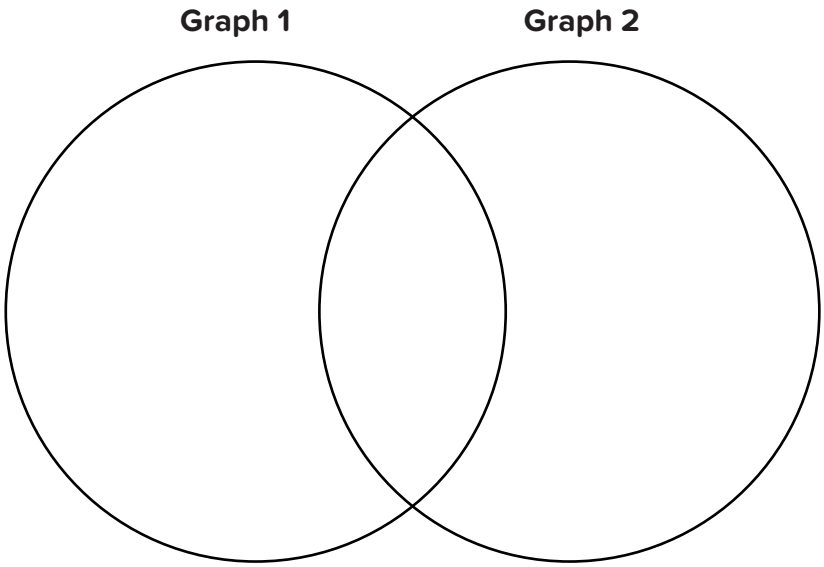


Photo Credit: Nour Tanta / Shutterstock.com



BUILD

Survey Says The titles identify data that could be collected and graphed. Read the titles and answer the questions.

1. Line plots graph frequency of data (how many times each data point appears). Circle the titles that could be plotted on a line plot.

Number of People in Our Families	**Our Heights**
Our Favorite Foods	**Our Shoe Sizes**
Our Favorite Animal	**Distance from Home to School**
Weight of Our School Bags	**Our Favorite Movie**
Minutes Spent Playing Outside	**Our Favorite Free Time Activity**

2. Choose one of the titles you circled in the previous item and draw what the line plot might look like. Use a sheet of paper or graph paper to create your line plot.

Photo Credit: Nour Tanta / Shutterstock.com

Going the Distance These data show the distance from home to school for students. The data are given in kilometers. Create a line plot for the given data. Use your line plot to answer the questions. (Hint: The title is already written. Remember to label your number line and include a key.)

$\frac{3}{5}$ km; $\frac{2}{5}$ km; $\frac{2}{5}$ km; $\frac{5}{5}$ km; $\frac{4}{5}$ km; $\frac{2}{5}$ km; $\frac{4}{5}$ km; $\frac{5}{5}$ km; $\frac{4}{5}$ km; $\frac{4}{5}$ km; $\frac{1}{5}$ km

1. How many students were surveyed? _____
2. What is the shortest distance any student lives from school? _____
3. What is the farthest distance any student lives from school? _____
4. What is the most common distance students live from school? _____
5. What are the least common distances students live from school? _____
6. Write one statement about the data.

CONNECT

Writing About Math Rajaa is graphing the number of students in each grade from Primary 1 through Primary 5. She wants to compare the data. She is uncertain if she should make a bar graph or a line plot. Which do you think would be the best type of graph? Why do you think so?

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 3

Breaking the Bar

Learning Targets

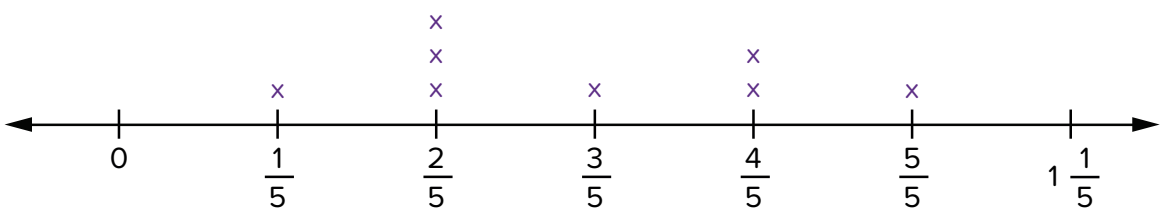
- I can construct a **bar graph** using data with fractions.
- I can analyze a bar graph using data with fractions.
- I can construct a **double bar graph** using data with fractions.
- I can analyze a double bar graph using data with fractions.

ACCESS

Error Analysis Analyze the student's work and answer. Identify what the student did correctly and incorrectly, and then try to correctly solve the problem.

Use the line plot to answer the question, "How many students jumped $\frac{3}{5}$ of a meter or more?"

Standing Broad Jump Distance



Meters

x = 1 student

Student's response: One student jumped $\frac{3}{5}$ meter.

Photo Credit: Nour Tanta / Shutterstock.com

What did the student do correctly?	What did the student do incorrectly? Why do you think the student made this error?	Solve the problem correctly. Explain your thinking.

BUILD

Rolling, Rolling, Rolling Part 1 Omar and Malek conducted an experiment. They wanted to see how far their friends could roll a heavy ball. They drew a starting line in the dirt and asked six friends to roll a 10 kilogram ball as far as they could from the starting line. They measured the distance in meters to the nearest $\frac{1}{4}$ meter and record their data in a table.

Student	Distance for 10 kg Ball (in m)
Rana	$\frac{3}{4}$ m
Salah	$1\frac{1}{2}$ m
Tahani	$1\frac{1}{4}$ m
Ziad	$2\frac{1}{4}$ m
Farouk	$1\frac{3}{4}$ m
Walid	$2\frac{1}{2}$ m

Photo Credit: Nour Tanta / Shutterstock.com

Create a bar graph that shows Omar and Malek's data. Remember to include all the elements of a bar graph.

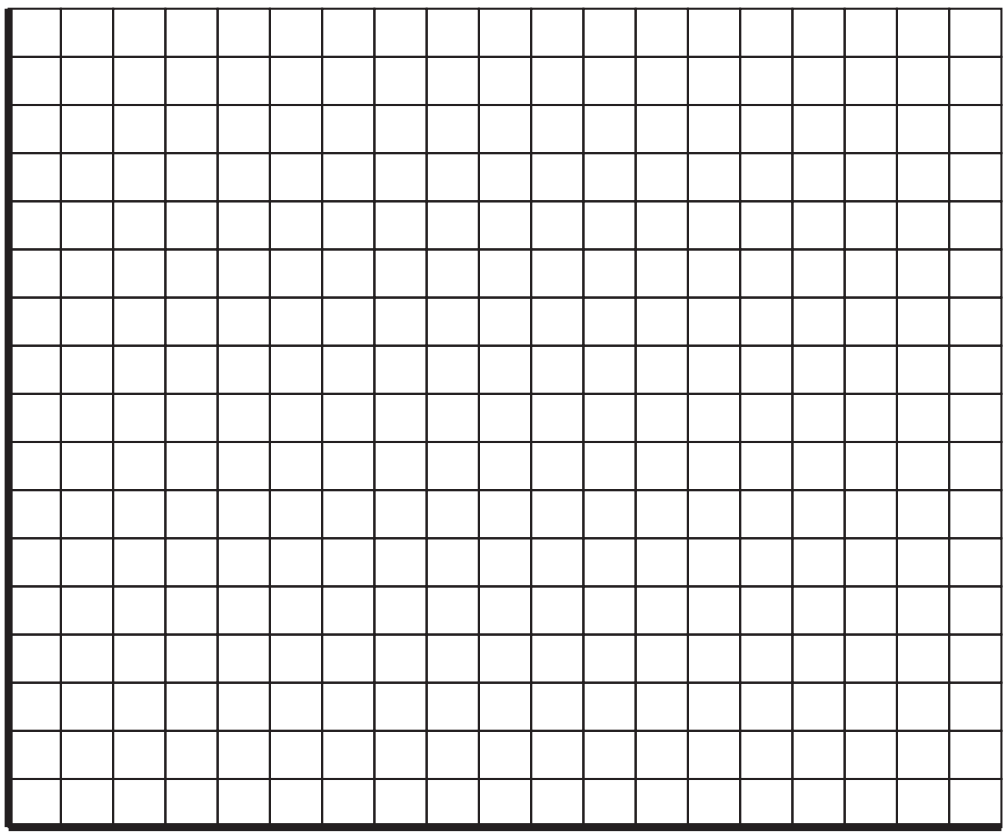


Photo Credit: Nour Tanta / Shutterstock.com

Now, write two questions about the bar graph you created and then answer them.

Question 1:

Question 2:

Rolling, Rolling, Rolling Part 2 Omar and Malek decided to see how far the same students could roll an 8-kilogram ball and compare the data they collect to the data for the 10-kilogram ball.

Student	Distance for 10 kg Ball (in m)	Distance for 8 kg Ball (in m)
Rana	$\frac{3}{4}$ m	$1\frac{1}{4}$ m
Salah	$1\frac{1}{2}$ m	2 m
Tahani	$1\frac{1}{4}$ m	2 m
Ziad	$2\frac{1}{4}$ m	$3\frac{1}{2}$ m
Farouk	$1\frac{3}{4}$ m	$2\frac{1}{2}$ m
Walid	$2\frac{1}{2}$ m	$3\frac{1}{4}$ m

1. Add this new data to your graph from Part 1 so that you can compare each student's two rolls.

When finished, answer the following questions about the double bar graph data.

2. Which students rolled the 8 kilograms ball exact $\frac{1}{2}$ a meter farther than they rolled the 10 kilograms ball?

3. Which student had the biggest difference between their 10 kilograms ball roll and their 8 kilograms ball roll?

4. What is the sum of Ziad and Farouk's 8 kilograms rolls?

Photo Credit: Nour Tanta / Shutterstock.com

5. Looking at the data, what could you infer would happen if the students rolled a 6 kilograms ball. Explain your reasoning.

6. Pick two students and find the total distance of both of their rolls (10 kilograms and 8 kilograms).

CONNECT

Writing About Math Double bar graphs require you to compare two related sets of data. Read the titles of the graphs and think about the data you would collect for each.

- Height of Students
- Favorite Subject in School
- How Many Books You Read Each Month
- Number of Different Types of Cars Sold
- Length of 5 Objects in Your Desk
- Hours Slept Each Night
- Temperatures in Different Cities

1. Circle the titles that could be double bar graphs.
2. For the titles you circled, record the two categories you might use for the different bars.

Photo Credit: Nour Tanta / Shutterstock.com

Check Your Understanding
Follow your teacher's instructions to complete this activity.

UNIT 12

Unit 12 Geometry

Mathematical Gates

Unit Video Questions

Quick Code egm4120

The world around us is composed of lines, angles, and shapes. Look around your classroom to find examples of the different mathematical properties you have learned about.

- ☐ Where do you see lines, angles, and shapes in your home, school, or neighborhood?
- ☐ What attributes and properties do those shapes share? How are they different?
- ☐ What do you see when you hold a mirror to one of the shapes?

LESSON 1

Points, Lines, Line Segments, and Rays

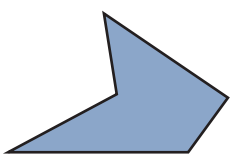
Learning Targets

- I can identify **points**, **lines**, **line segments**, and **rays**.
- I can draw points, lines, line segments, and rays.

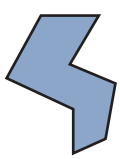
ACCESS

Name the Shapes Use the picture or the description of the attributes to name the shape.

1. What is the name of a polygon with 6 sides? _____
2. What is the name of a polygon with exactly 3 corners? _____
3. What shape is this? _____



4. What shape is this? _____



5. What is the name of a polygon with 4 sides? _____
6. What shape is this? _____

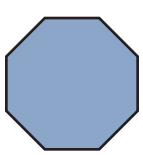


Photo Credit: MarleenS / Shutterstock.com

BUILD

Points, Rays, Line Segments, Lines Your teacher will read a set of directions. Draw what your teacher describes in the directions.

1.	2.
3.	4.

Matching Rays, Line Segments, and Lines Draw a line matching the word, picture, and symbol for each ray, line segment or line.

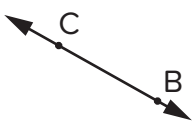
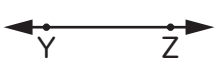
	line YZ	$\overleftrightarrow{YZ}$
	line segment BC	$\overrightarrow{BC}$
	line BC	$\overleftrightarrow{YZ}$
	ray BC	$\overline{BC}$
	line segment YZ	$\overleftrightarrow{BC}$
	ray YZ	$\overline{YZ}$

Photo Credit: MarleenS / Shutterstock.com

House of Rays, Line Segments, and Lines Look at the picture that follows.

- Trace any lines you see in green.
- Trace any rays you see in orange.
- Trace any line segments you see in blue.
- Add additional images to the drawing using at least one ray, one line segment, and one line.

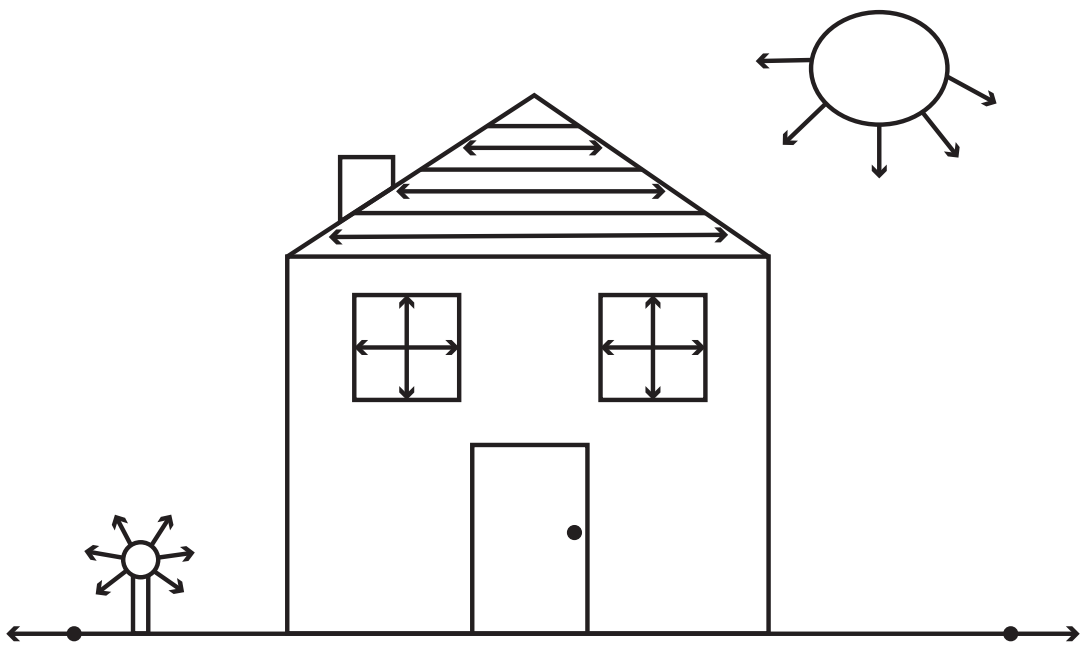


Photo Credit: MarleenS / Shutterstock.com

CONNECT

Writing About Math What will happen if you extend a line segment in one direction? What will happen if you extend a line segment in both directions? Draw pictures to support your thinking.

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 2

The Relation between two lines

Learning Targets

- I can define **intersecting**, **parallel**, and **perpendicular** lines.
- I can draw intersecting, parallel, and perpendicular lines.

ACCESS

Sorting Line Pairs Your teacher will give you cards with lines on them. Work with your group to sort the cards into categories that make sense to you.

BUILD

Pairs of Lines Draw an example of the different types of lines. Remember to include any symbols to help identify them.

Intersecting Lines

Parallel Lines

Perpendicular Lines

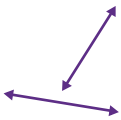
Parallel Lines

Photo Credit: MarleenS / Shutterstock.com

Intersecting or Not? Look at the pairs of lines and rays in the pictures below. For each picture, extend the lines or rays see if the line segments are intersecting or parallel. Hint: Rays can only extend in one direction.

1.

2.

3. 

4.

5.

6.

Photo Credit: MarleenS / Shutterstock.com

Photo Credit: MarleenS / Shutterstock.com

CONNECT

Writing About Math Decide whether each statement is true or false. Explain your reasoning.

1. All intersecting lines are perpendicular.

2. Two lines that never intersect must be parallel.

3. All perpendicular lines are intersecting lines.

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 3

Symmetry

Learning Targets

- I can identify lines of symmetry in two-dimensional figures.
- I can draw lines of symmetry in two-dimensional figures.

ACCESS

Find the Rectangles Look at the rectangles below. Hold up the number of fingers that matches the number of the **rectangle** that answers your teacher's question.

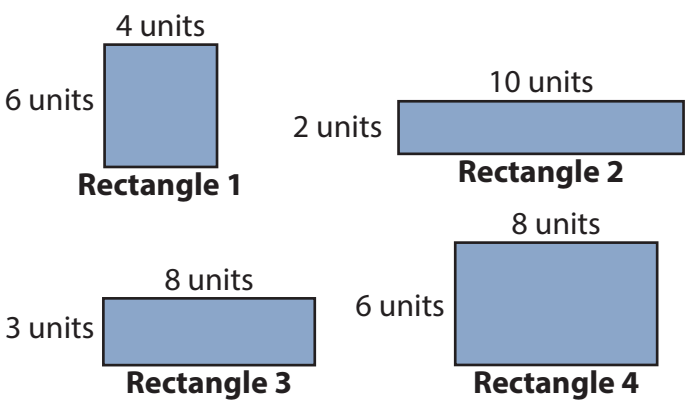


Photo Credit: MarleenS / Shutterstock.com

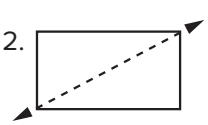
BUILD

Folding Shapes Your teacher will give you a page of shapes. Cut out each of the shapes. Try to fold each shape so that the sides match exactly. Trace the shapes that successfully fold so that the sides match exactly. Then, draw a **line of symmetry** in each shape.

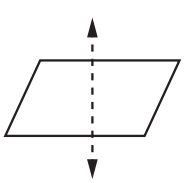
Lines of Symmetry For Problems 1–5, look at each shape. Determine if the line drawn is a line of symmetry. Circle the shapes that show a line of symmetry.

1.

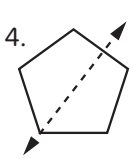
2.



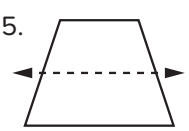
3.



4.



5.

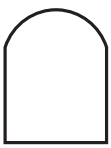


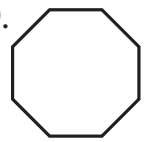
For Problems 6–10, look at each shape. Draw one line of symmetry for each one. (Hint: One shape has more than one line of symmetry.)

6.

7.

8.

9. 

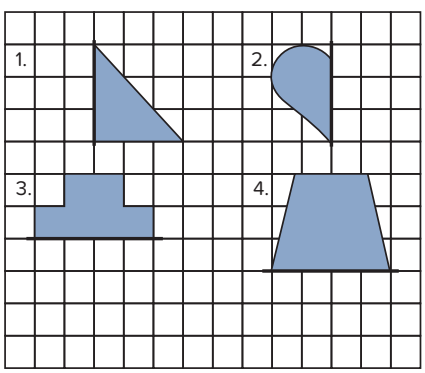
10. 

Symbol Symmetry Look at each symbol. Some of the symbols are symmetrical, but some are not. Draw lines of symmetry in the symmetrical symbols. Some symbols may have more than one line of symmetry.

1. B 2. G 3. A 4. W 5. Z

6. p 7. Y 8. v 9. ! 10. {

Creating Symmetrical Shapes In each picture, you can see half of the shape and the line of symmetry. Use that information to draw the rest of each shape.



CONNECT

Writing About Math How do you determine if a shape or symbol has a line of symmetry? Explain your answer using words and pictures.

Mosque in Egypt

Photo Credit: MarleenS / Shutterstock.com

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 4

Real-World Geometry

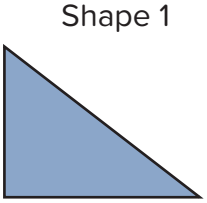
Learning Target

- I can apply geometry concepts to solve real-world problems.

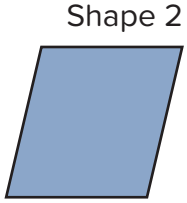
ACCESS

Which One Does Not Belong? Look at the shapes with a partner. Choose which one does not belong. Write down your explanation. (You do not have to agree with your partner.)

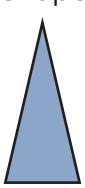
Shape 1



Shape 2



Shape 3



Shape 4

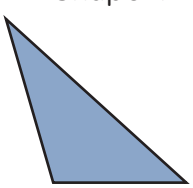


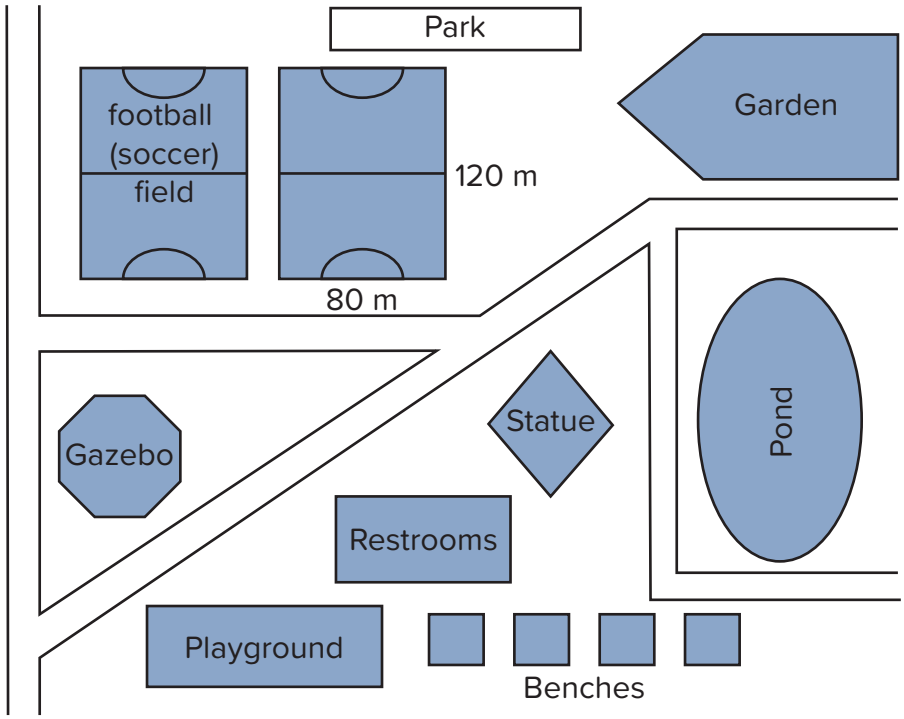
Photo Credit: MarleenS / Shutterstock.com

BUILD

Geometry Park Look at the picture of the park on the following page, and then follow the directions.

1. Color two perpendicular lines blue.
2. What shape are the restrooms?
3. Color two parallel lines green.
4. How many quadrilaterals are in the park?
5. Color two intersecting lines red.
6. Circle and label three different two-dimensional shapes.
7. Find the perimeter and area of one of the football pitches.
8. Draw at least one line of symmetry on the garden, the gazebo, and the statue.

Geometry Park



Design a Park Your teacher will give you graph paper. Follow the guidelines to design, label, and color your own park. Your park must include the following:

- At least two pathways that intersect
- At least two pathways that are parallel
- A play space for children in the shape of a **quadrilateral**
- A garden with a perimeter of 40 meters
- A monument or statue in the shape of a **pentagon**
- A water feature like a lake, a fountain, or a pool that has an area of 32 square meters
- Symmetrical restrooms with more than four sides

CONNECT

Writing About Math Where do you see geometry in the world around you? Where do you see shapes, lines, and symmetry? How does geometry make the world around you more beautiful and interesting?

Aerial View over Cairo

Check Your Understanding
Follow your teacher's instructions to complete this activity.

Photo Credit: MarleenS / Shutterstock.com

LESSON 5

Classifying Angles

Learning Targets

- I can **classify** right **angles** using nonstandard tools.
- I can identify **right angles** in the world around me.
- I can determine whether angles are equal to, greater than, or less than right angles.
- I can classify angles as right, obtuse, or acute.

ACCESS

Describing Attributes Work with a partner to make observations about the attributes of the shapes and types of lines that you see in the photo. Use mathematical vocabulary to record your observations.

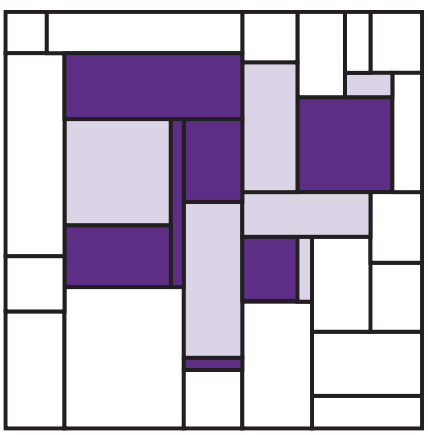
View of Ruins from Above

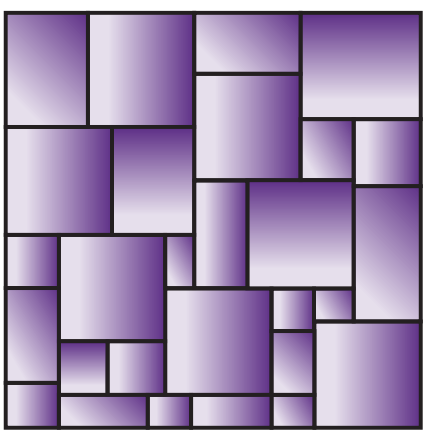
Photo Credit: Hemacahrtwiroon / Shutterstock.com

BUILD

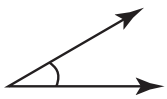
Right Angles around Me Use your index card to help you identify right angles in your classroom. Record your observations.

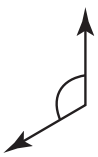
Right Angle Mosaic Look at the mosaics of shapes. Each **mosaic** is made up of shapes with right angles. Your teacher will give you graph paper. Use shapes that contain right angles to create your own mosaic on the graph paper. Include shapes of different sizes and colors to make your design interesting.

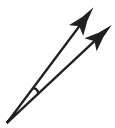




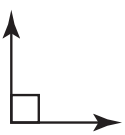
Comparing Angles Look at the angles. Write whether each angle is larger than, smaller than, or equal to a right angle.

1. 

2. 

3. 

4.

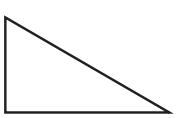
5. 

6.

Types of Angles Color acute angles red, right angles yellow, and obtuse angles blue. Use your index card to prove what type of angle is shown. An example is shown.

Example

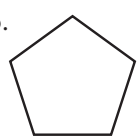
1.

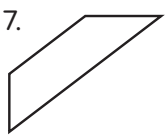
2. 

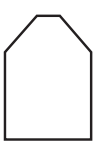
3.

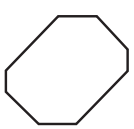
4.

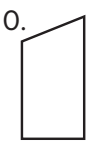
5.

6. 

7. 

8. 

9. 

10. 

CONNECT

Another Look Why do you think there are so many right angles in the world around us? Use words and pictures to support your thinking.

Railway Bridge in Egypt

Photo Credit: Hemacahrtwiroon / Shutterstock.com

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 6

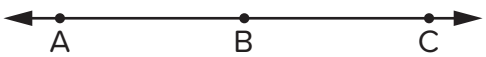
Drawing Angles

Learning Target

- I can draw right, acute, and obtuse angles.

ACCESS

Vocabulary Review Look at the image and name as many lines, line segments, and rays as you can. Remember to use the symbols you have learned.



BUILD

Using Pattern Blocks Combine pattern blocks to create the shapes described. Try to create more than one of each shape. Make a quick sketch of your designs in the space provided. Compare your designs with a partner.

1. A quadrilateral with two acute angles and two obtuse angles.

2. A triangle with three acute angles.

3. A hexagon with all obtuse angles.

Photo Credit: Hemacahrtwiroon / Shutterstock.com

4. Create your own shape using pattern blocks. Ask your Shoulder Partner to identify the different angles in your shape.

Drawing Angles Use a ruler to connect the dots to draw and label the following in the grid.

- 3 acute angles
- 3 right angles
- 3 obtuse angles
- A right angle and an obtuse angle that share an endpoint
- Two acute angles that share an endpoint

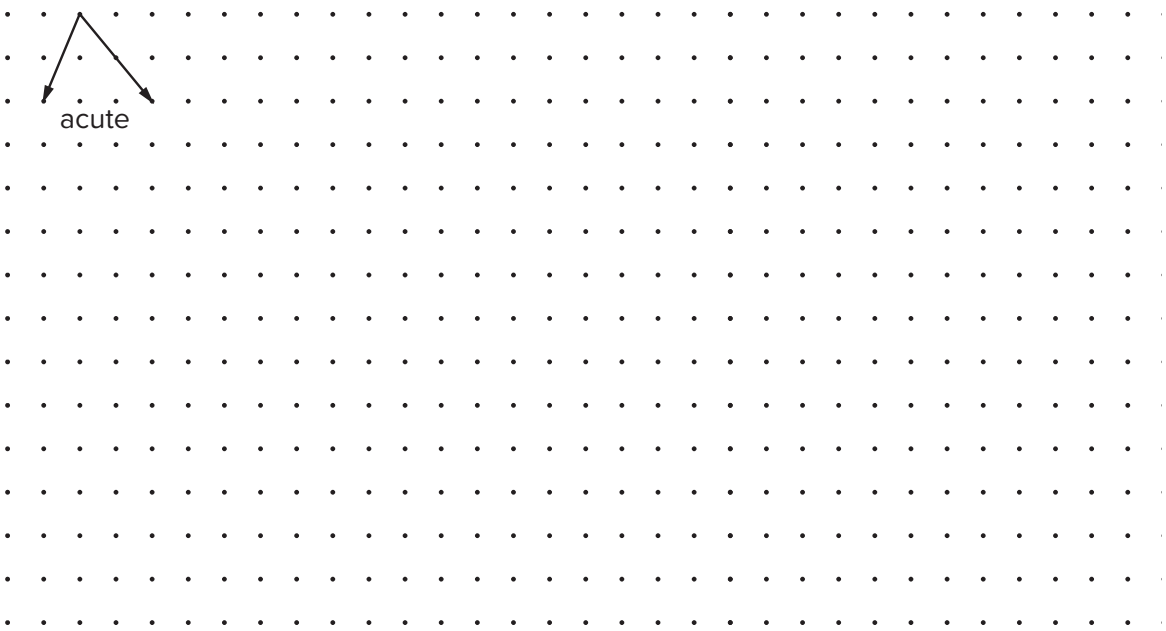


Photo Credit: Hemacahrtwiroon / Shutterstock.com

CONNECT

Writing About Math Read the statement. Rewrite Jana's instructions so they are more clear for Manal.

Jana wanted Manal to draw an **obtuse angle**. She told her that she should draw two rays and make sure they are wide.

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 7

Classifying Triangles

Learning Targets

- I can classify **triangles** by the size of their angles.
- I can classify triangles by the length of their sides.

ACCESS

Triangle Challenge Work with a partner to use a ruler and your index card to draw the triangles described. Is it possible to draw them all?

1. A triangle with three acute angles

2. A triangle with one right angle and two acute angles

3. A triangle with one obtuse angle and two acute angles

4. A triangle with two right angles and one acute angle

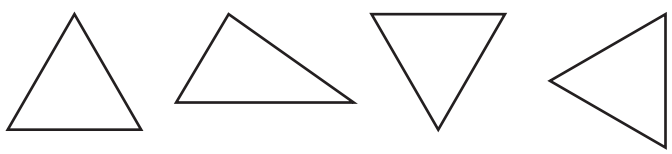
Photo Credit: (a) Hemacahrtwiroon / Shutterstock.com, (b) Markeliz / Shutterstock.com

Painted Steps

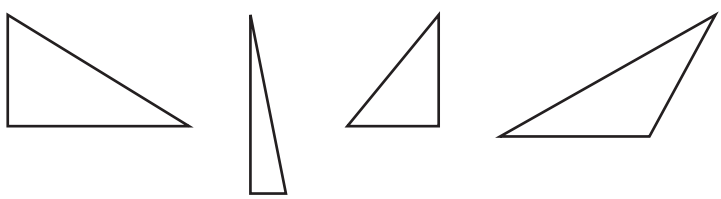
BUILD

Odd One Out Look carefully at the sides and angles in each triangle. Circle the triangle that does not belong in each group. Use mathematical vocabulary to explain your reasoning.

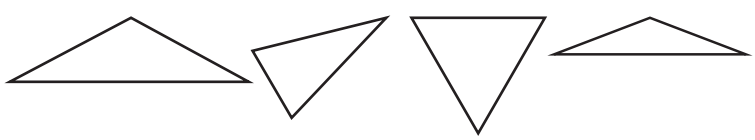
1.



2.



3.



4.

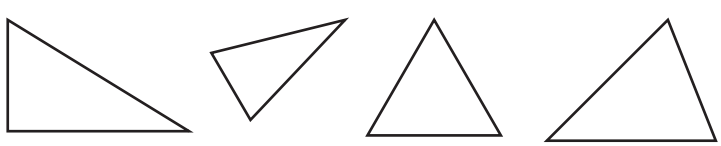


Photo Credit: Hemacahrtwiroon / Shutterstock.com

Classifying Triangles Follow the directions to classify, color, and trace each group of triangles.

- Obtuse triangles have one obtuse angle. Color obtuse angles yellow.
- Right triangles have one right angle. Color right angles red.
- Acute triangles have three acute angles. Color acute angles green.
- Equilateral triangles have three equal sides. Trace equilateral triangles in orange.
- Isosceles triangles have two equal sides. Trace isosceles triangles in purple.
- Scalene triangles have no equal sides. Trace scalene triangles in black.

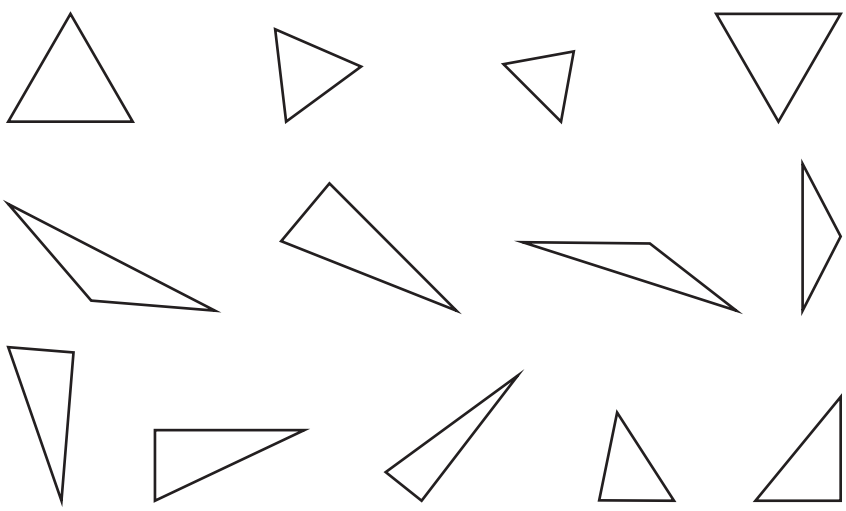
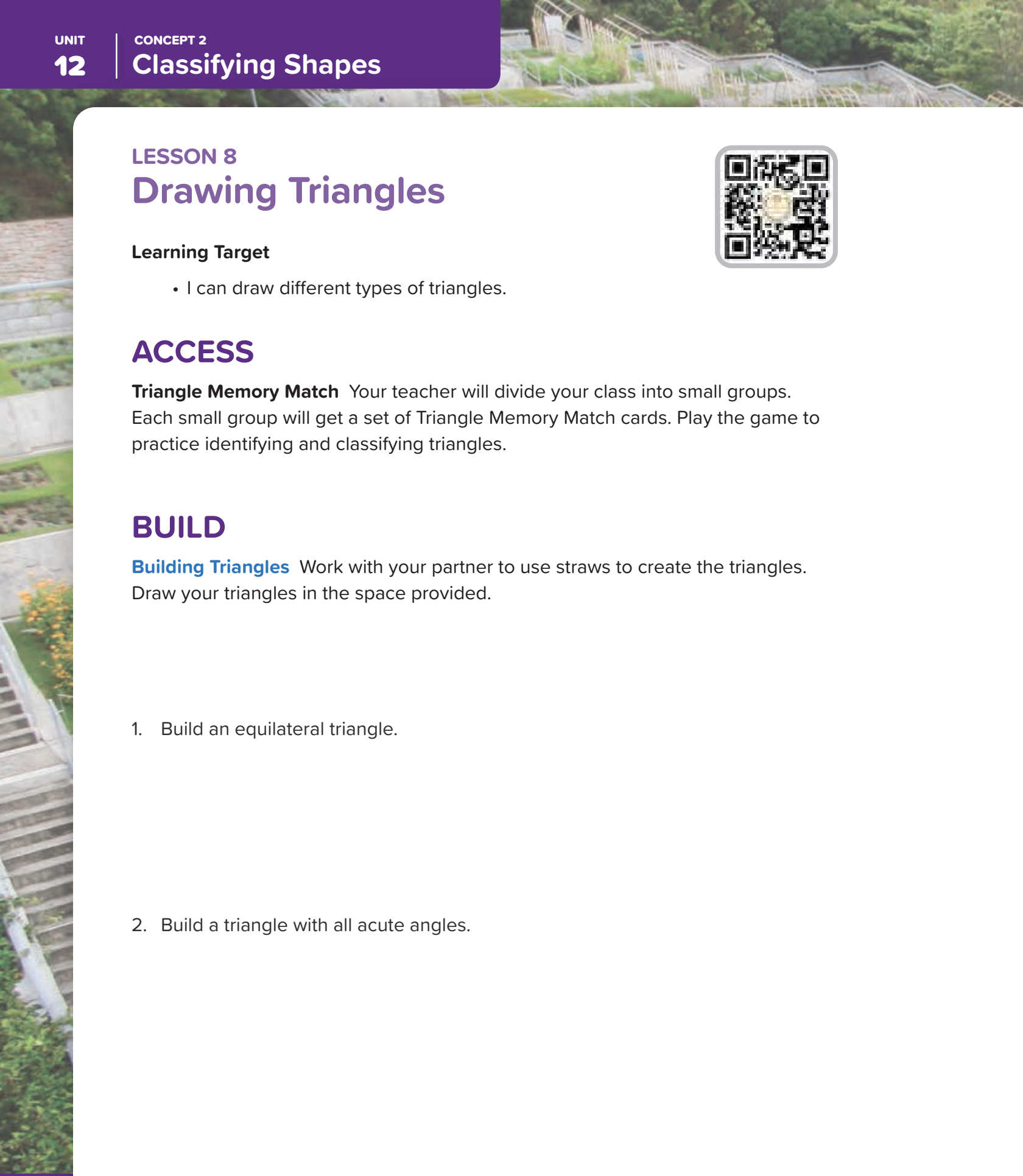


Photo Credit: Hemacahrtwiroon / Shutterstock.com

CONNECT

Writing About Math Think about the triangles you see in the world around you. List at least three examples of triangles in the real world. If possible, classify them as acute, obtuse, or right and as isosceles, scalene, and equilateral. For example, the Great Pyramid has four sides that are triangles. The triangles are acute and equilateral.

Check Your Understanding
Follow your teacher's instructions to complete this activity.



LESSON 8

Drawing Triangles

Learning Target

- I can draw different types of triangles.

ACCESS

Triangle Memory Match Your teacher will divide your class into small groups. Each small group will get a set of Triangle Memory Match cards. Play the game to practice identifying and classifying triangles.

BUILD

Building Triangles Work with your partner to use straws to create the triangles. Draw your triangles in the space provided.

1. Build an equilateral triangle.

2. Build a triangle with all acute angles.

3. Build a triangle with an obtuse angle.

4. Build a scalene triangle.

5. Build a right triangle.

6. Build an isosceles triangle.

7. Build an isosceles triangle with a right angle.

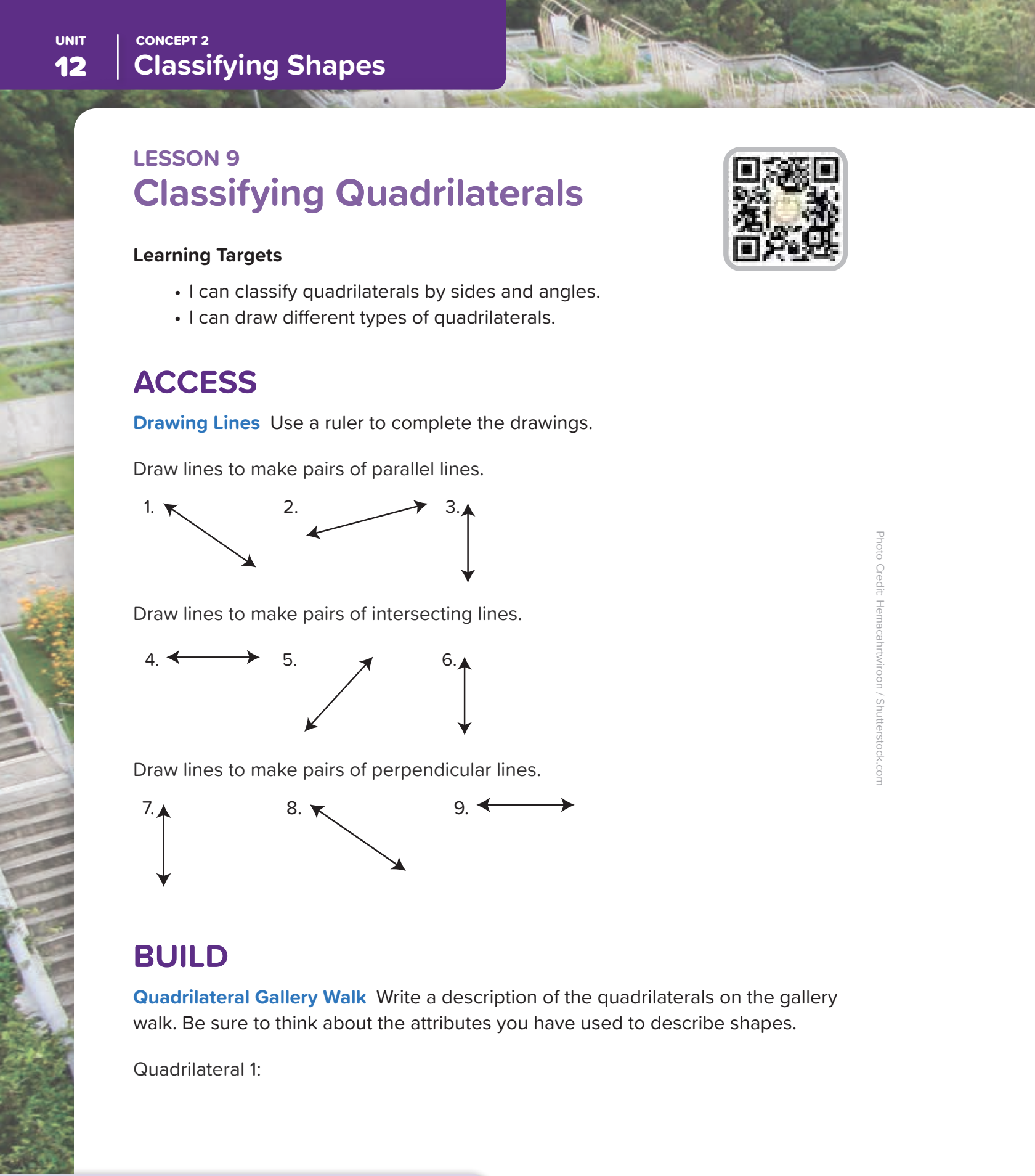
8. Build a scalene triangle with an obtuse angle.

CONNECT

Writing About Math Jana says that a right triangle is always isosceles. Do you agree or disagree with Jana? Explain your thinking with words and pictures.

Photo Credit: Hemacahrtwiroon / Shutterstock.com

Check Your Understanding
Follow your teacher's instructions to complete this activity.



LESSON 9

Classifying Quadrilaterals

Learning Targets

- I can classify quadrilaterals by sides and angles.
- I can draw different types of quadrilaterals.

ACCESS

Drawing Lines Use a ruler to complete the drawings.

Draw lines to make pairs of parallel lines.

1.
2.
3.

Draw lines to make pairs of intersecting lines.

4.
5.
6.

Draw lines to make pairs of perpendicular lines.

7.
8.
9.

BUILD

Quadrilateral Gallery Walk Write a description of the quadrilaterals on the gallery walk. Be sure to think about the attributes you have used to describe shapes.

Quadrilateral 1:

Check Your Understanding
Follow your teacher's instructions to complete this activity.

Photo Credit: Hemacahrtwiroon / Shutterstock.com

Quadrilateral 2:

Quadrilateral 3:

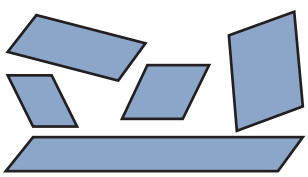
Quadrilateral 4:

Quadrilateral 5:

Photo Credit: (a) Hemacahrtwiroon / Shutterstock.com, (b) txuslolo / Shutterstock.com

Naming Quadrilaterals Write the name of each quadrilateral. Count how many pairs of parallel sides the shape has and classify the angles. Draw at least one example of each quadrilateral using the dot grid.

1.

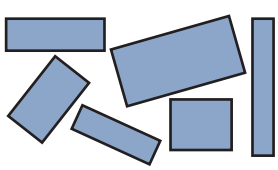


Name: _____

Parallel Sides: _____

Angles: _____

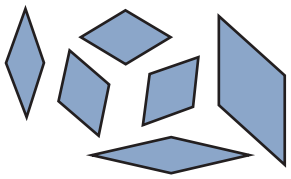
2.



Name: _____

Parallel Sides: _____

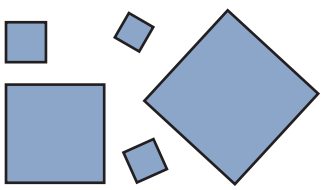
Angles: _____

3. 

Name: _____

Parallel Sides: _____

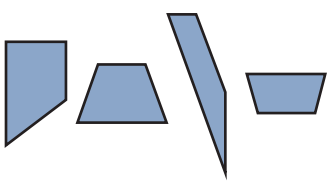
Angles: _____

4. 

Name: _____

Parallel Sides: _____

Angles: _____

5. 

Name: _____

Parallel Sides: _____

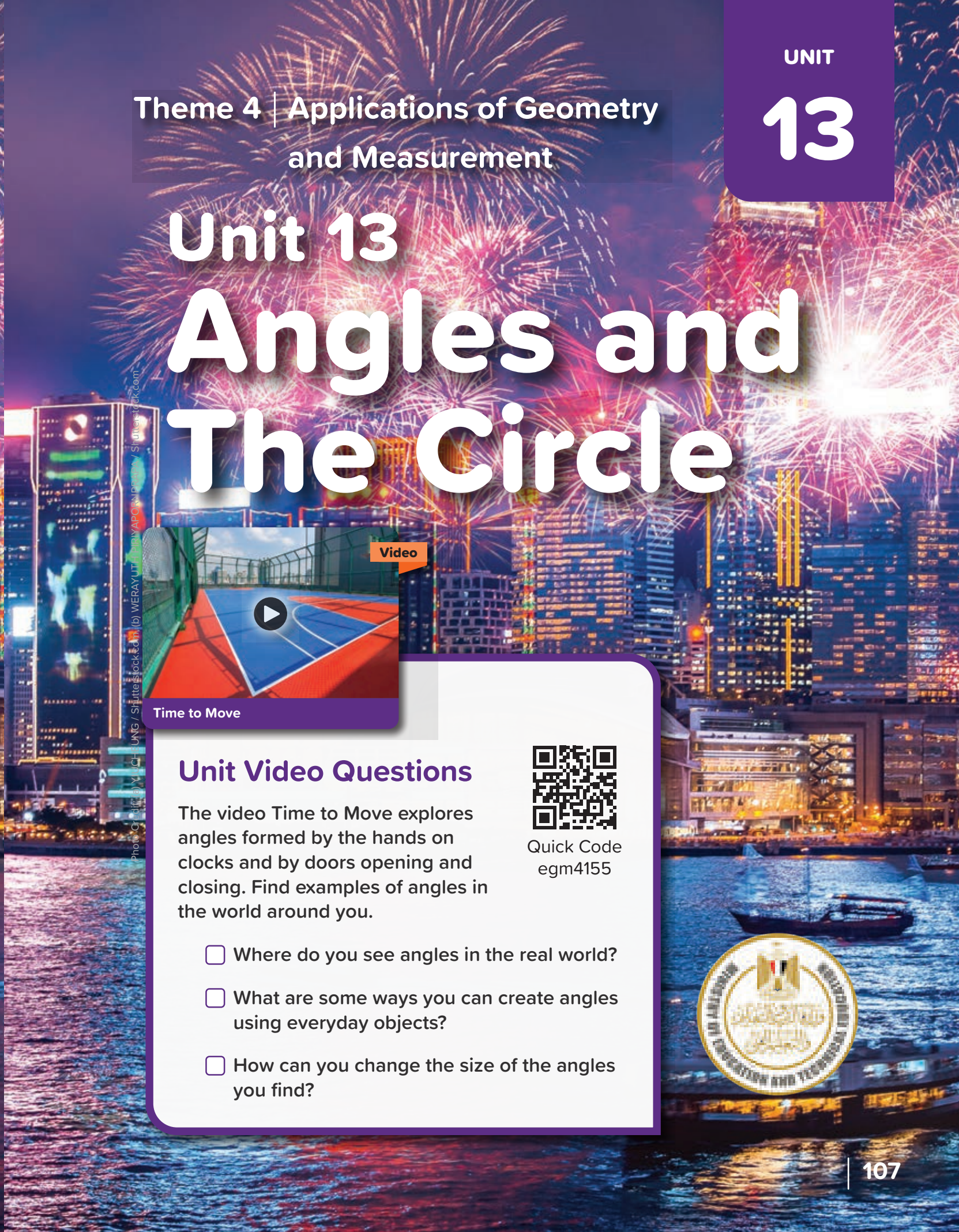
Angles: _____

CONNECT

Writing About Math Why does it matter that you are able to classify lines, angles, and shapes? Why does it matter that you can communicate about geometry shapes and ideas using mathematical language? Explain your thinking.

Photo Credit: Hemacahrtwiroon / Shutterstock.com

Check Your Understanding
Follow your teacher's instructions to complete this activity.



UNIT 13

Theme 4 | Applications of Geometry and Measurement

Unit 13
Angles and The Circle

Video

Time to Move

Unit Video Questions

The video Time to Move explores angles formed by the hands on clocks and by doors opening and closing. Find examples of angles in the world around you.

Quick Code
egm4155

- [ ] Where do you see angles in the real world?
- [ ] What are some ways you can create angles using everyday objects?
- [ ] How can you change the size of the angles you find?

Photo Credit: (a) YUCHEUNG / Shutterstock.com, (b) WERAYUT / PIPIYAPORNPRAB / Shutterstock.com

LESSON 1

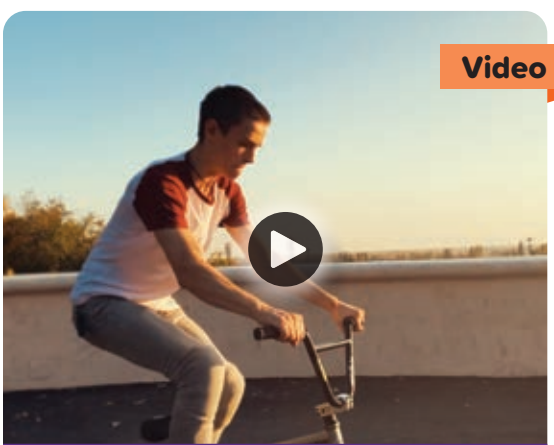
The Circle and The Degrees

Learning Target

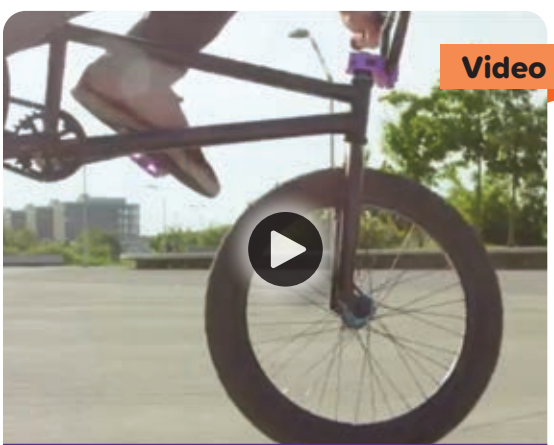
- I can explain the relationship between circles and angle measurement.

ACCESS

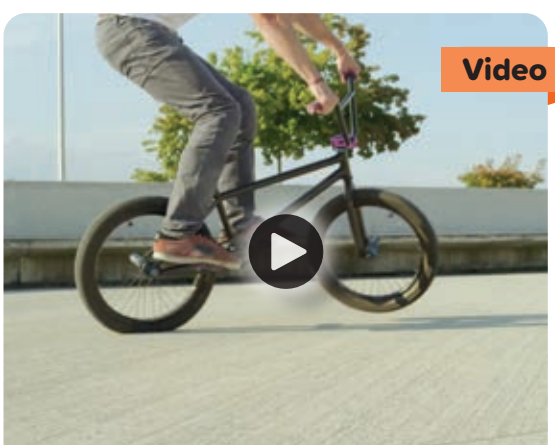
Bicycle Tricks As you watch the videos, look for the bicycle tricks called a "360°" and a "180°." Then, draw a picture of the shape the bike makes when it does a 360° and a picture of the shape the bike makes when it does a 180°. Think about how 360° and 180° might be related.



Bicycle Trick 1



Bicycle Trick 2



Bicycle Trick 3

Photo Credit: Yevhenii Chulovskyi / Shutterstock.com

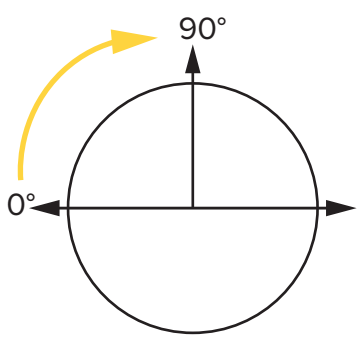
360° Picture	180° Picture

Photo Credit: Yevhenii Chulovskyi / Shutterstock.com

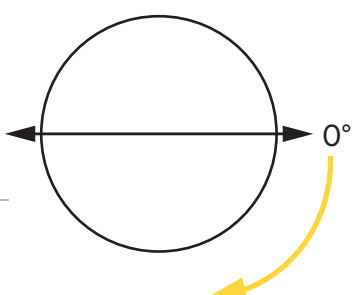
BUILD

Circles and Angles Move from 0° in the given direction and draw a right angle. Then, label 90° and 180° degrees on each circle. Compare your work with your Shoulder Partner's work.

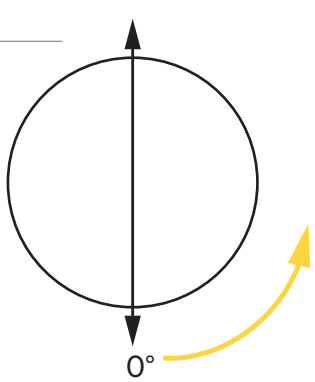
1. Label 180°.



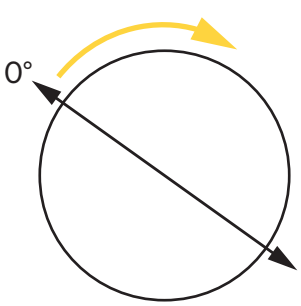
2. Move and follow the direction from 0°.



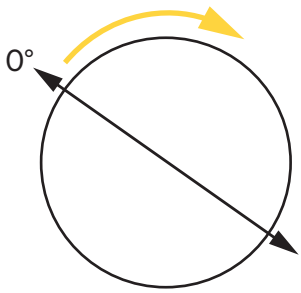
3. Move and follow the direction from 0°.



4. Move and follow the direction from 0°.

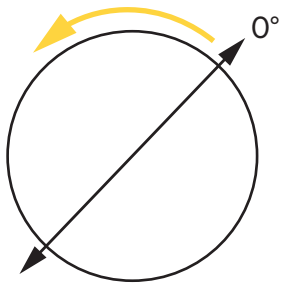


5. Move and follow the direction from 0°.



_____

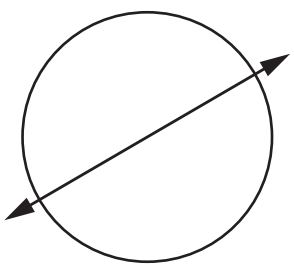
6. Move and follow the direction from 0°.



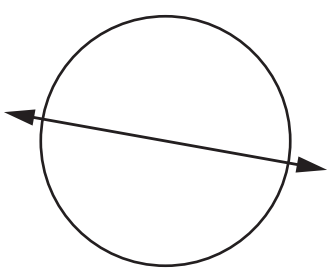
_____

Angles on a Circle Draw the given angles on the circles and label them acute or obtuse. Label 0 and 180 degrees and fill in the blanks. Share your work with your Shoulder Partner.

1. Draw an acute angle. An acute angle measures between _____ and _____ degrees.



2. Draw an acute angle. An obtuse angle measures between _____ and _____ degrees.



CONNECT

Writing About Math Is it possible to have angle measurements between 180° and 360° degrees? Why or why not? Explain your thinking using words and numbers.

Photo Credit: Yevhenii Chulovskyi / Shutterstock.com

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 2

Measuring Angles Using a Circle Model

Learning Targets

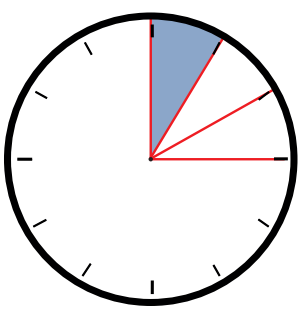
- I can identify angle measurements on a circle model.
- I can relate fractions of a circle to angle measurements.

ACCESS

Angle Reasoning Look at the angle shown. Is the angle closer to 135 or 225 degrees? How do you know? Explain your reasoning.

Photo Credit: Yevhenii Chulovskyi / Shutterstock.com

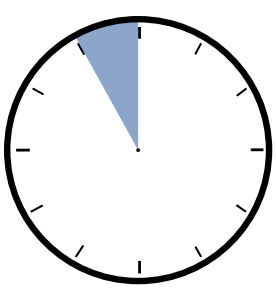
BUILD



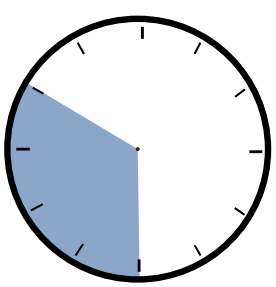
Exploring the angles Listen to the directions your teacher gives you and mark the circle model (the model represents 12 equal parts).

Fractions and Angles Write the fraction of the model shaded and how many degrees that fraction represents.

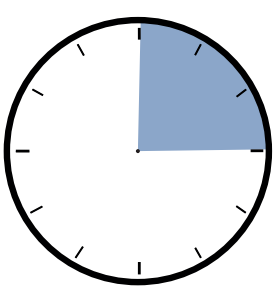
1



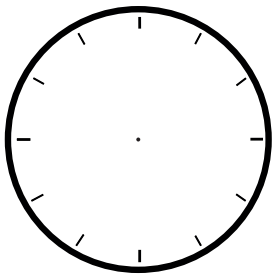
2

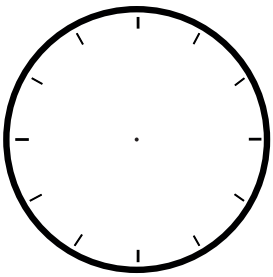


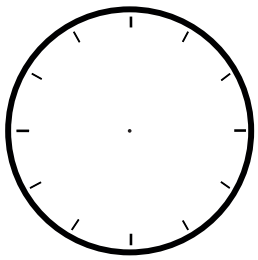
3

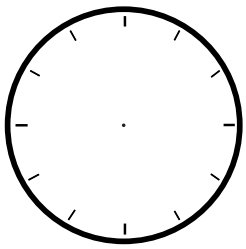


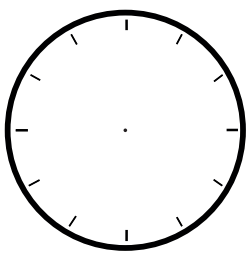
Use the blank following models and what you know about benchmark angles to write the missing angle measurements.

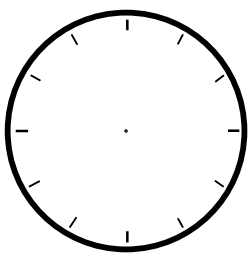
4. $\frac{2}{12} =$ 

5. $\frac{3}{4} =$ 

6. $\frac{2}{3} =$ 

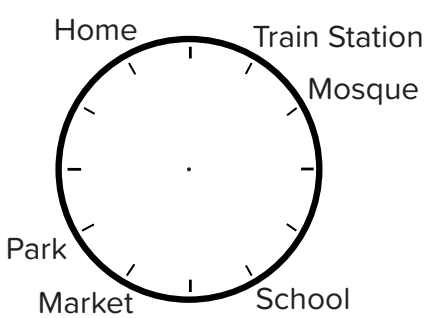
7. $\frac{6}{12} =$ 

8. $\frac{5}{12} =$ 

9. $\frac{11}{12} =$ 

CONNECT

Traveling Around Town For each problem, imagine you are walking from one place, through the center of town, to the second place. Identify the angles traveled between the places in town. (Hint: Each section of the model measures 30 degrees.)



1. Home and school:
2. Park and school:
3. Market and home:
4. Mosque and train station:
5. Mosque and market:
6. School and market:

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 3

Using Protractors

Learning Targets

- I can identify the parts of angles.
- I can name angles.
- I can describe the characteristics of a **protractor**.

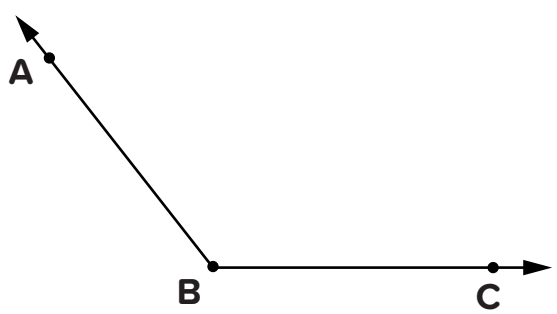
ACCESS

Why and How We Measure Think about something that you have measured in school or at home. How did you measure it? Why did you need to measure it? Discuss with your partner.

Photo Credit: Rasto SK / Shutterstock.com

BUILD

Naming Angles Label the parts of the angle. Then, write three different names for the angle.

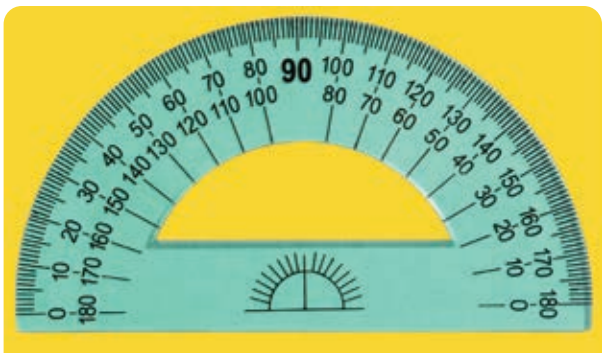


Name 1 _____

Name 2 _____

Name 3 _____

Notice and Wonder Observe your protractor. Write what you notice about it. Then, write what you wonder about it or any questions you have about it.

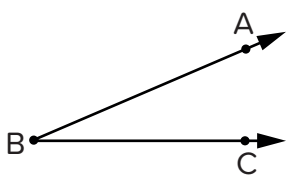


Protractor

What I Notice	What I Wonder

Investigating Protractors Write three different names for each angle. When you are finished, investigate how to use the protractor to measure angles.

1.

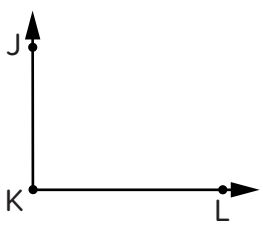


Name 1 _____

Name 2 _____

Name 3 _____

2.

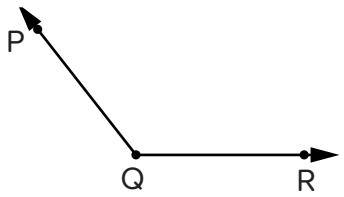


Name 1 _____

Name 2 _____

Name 3 _____

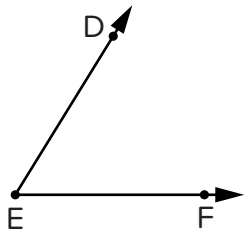
Photo Credit: (a) Rasto SK / Shutterstock.com, (b) Stanislav Khokholkov / Shutterstock.com

3. 

Name 1 _____

Name 2 _____

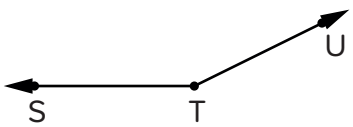
Name 3 _____

4. 

Name 1 _____

Name 2 _____

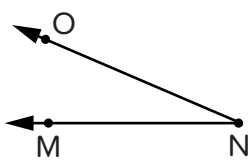
Name 3 _____

5. 

Name 1 _____

Name 2 _____

Name 3 _____

6. 

Name 1 _____

Name 2 _____

Name 3 _____

CONNECT

Writing About Math Summarize what you learned about a protractor. Go back to what you wondered earlier. Can you answer those questions now? Is there anything you are still wondering? Record your thinking.

Photo Credit: Rasto SK / Shutterstock.com

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 4

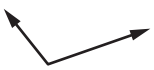
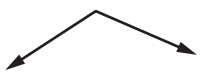
Measuring Angles

Learning Target

- I can use a protractor to measure angles.

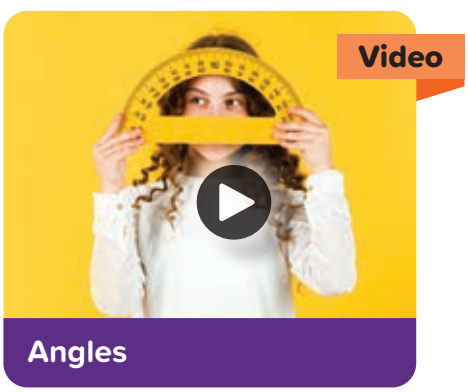
ACCESS

Classifying Angles Classify each angle as acute, obtuse, right, or straight.

1.
2.
3.
4.
5.
6.
7. 
8.
9.
10. 

BUILD

Watch the video. Then, complete the activities that follow.



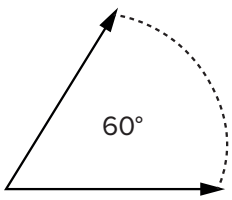
Using a Protractor Fill in the blanks to identify the steps of using a protractor.

1. Line up the center mark with the _____ of the angle.
2. Make sure that the zero line of the protractor is lined up with one of the angle's _____.

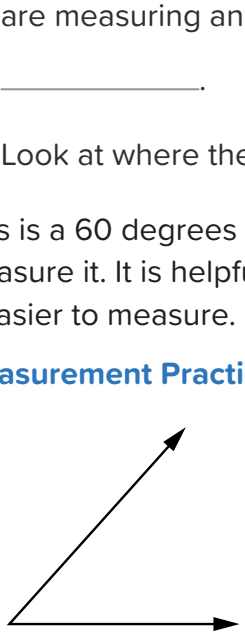
3. Think about what type of angle you are measuring. If you are measuring an acute angle, use the numbers that are less than _____. If you are measuring an obtuse angle, use the numbers that are greater than _____.

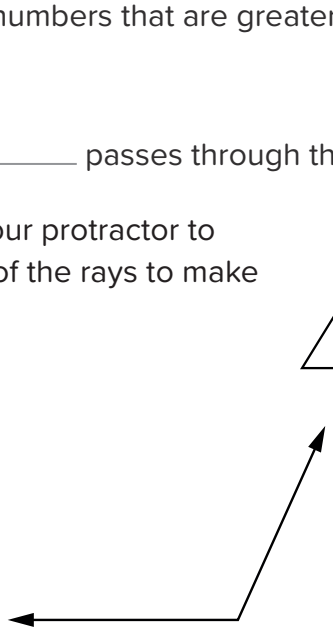
4. Look at where the angle's other _____ passes through the protractor.

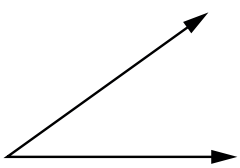
This is a 60 degrees angle. Practice using your protractor to measure it. It is helpful to extend the length of the rays to make it easier to measure.

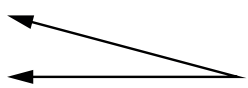


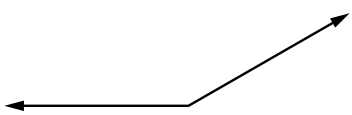
Measurement Practice

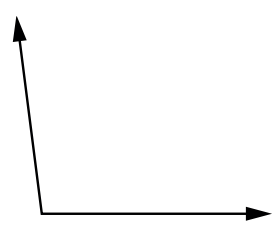
1. 

2. 

3. 

4. 

5. 

6. 

CONNECT

Writing About Math Rami notices that the open book on the table in the library creates an angle. He says the angle is about 60 degrees. Do you agree with his estimation? Use words and numbers or pictures to explain your thinking.

Open Book

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 5

Drawing Angles

Learning Target

- I can use a protractor to draw a given angle between 0 and 180 degrees.

ACCESS

Which Angle Is It? For each angle measurement given, circle the picture of the angle that you think matches that measurement. Use what you know about acute, right, obtuse, and straight angles to help you. After you circle the angles, measure them to confirm your answers.

1. 45°

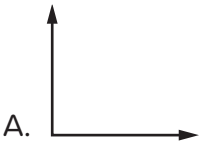
2. 60°

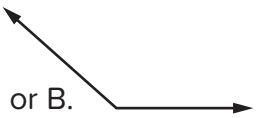
3. 125°

4. 85°

Photo Credit: (a) Rasto SK / Shutterstock.com, (b) Billion Photos / Shutterstock.com

5. 150°

A. 

or B. 

BUILD

Drawing Angle Estimates Use what you know about acute, obtuse, right, and straight angles, along with benchmark angles to draw an estimate of each angle.

1. 40°

2. 20°

3. 80°

4. 150°

5. 120°

6. 170°

7. 100°

8. 70°

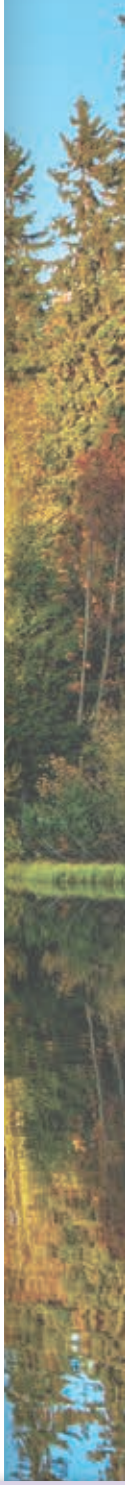


Photo Credit: Rasto SK / Shutterstock.com

Check Your Understanding
Follow your teacher's instructions to complete this activity.

Drawing Angles with a Protractor Use your protractor to draw an angle with the given measurement. Read the following instructions before you begin.

- Draw a point (vertex) and use the straight edge of the protractor to draw a ray starting at the point and extending in one direction.
- Align the point (vertex) with the center mark and line up the ray with the zero line.
- Determine which scale to use. Think about the type of angle being drawn and the direction of the ray.
- Find the angle measurement and draw a small point at that mark.
- Remove the protractor and use the straight edge to connect the vertex and the point you marked.
- Look at the angle you drew and decide if the drawing is reasonable.

1. 55°

2. 30°

3. 90°

4. 145°

5. 110°

6. 165°

7. 100°

8. 70°

Photo Credit: (a) Rasto SK / Shutterstock.com; (b) Khaled ElAdawy / Shutterstock.com

CONNECT

Writing About Math Why is using estimation important when deciding if your angle is reasonable? What strategies do you use to estimate? Explain your thinking using words and numbers or pictures.

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 6

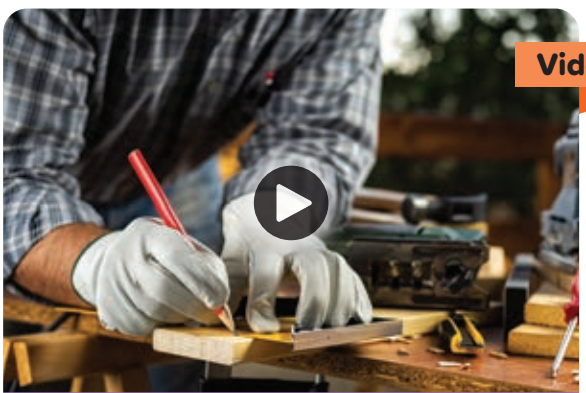
Drawing Angles with a Protractor

Learning Target

- I can use a protractor to draw a given angle between 0 and 180 degrees.

ACCESS

Important Angles Watch the video segment with your class. List some examples of measuring angles in the real world and the tools they use.

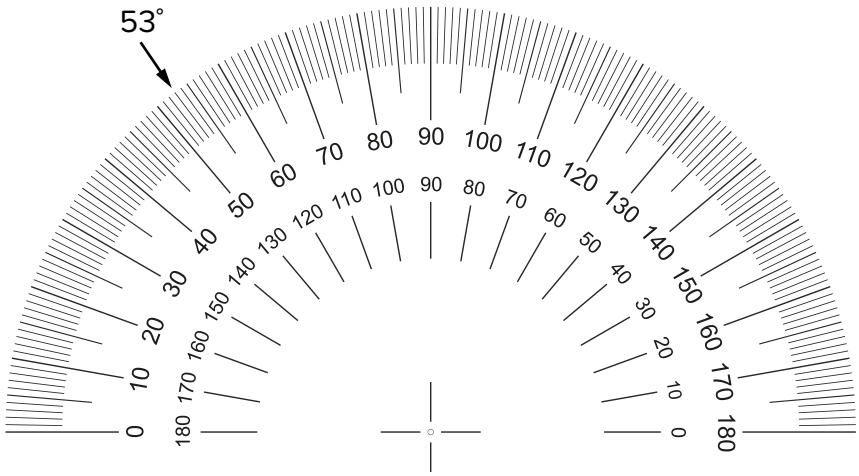


Tools to Measure Angles

Photo Credit: Rasto SK / Shutterstock.com

BUILD

Mark the Angles Mark and label the given angles on the protractor. An example has been done for you.



47°, 102°, 172°

Constructing Angles Use your building materials to create an angle of the measurement provided. Next, use your protractor to measure the angle you created to check your work.

1. 60°
2. 30°
3. 90°
4. 140°
5. 105°
6. 165°
7. 125°
8. 80°

Drawing More Precise Angles Use your protractor to draw each angle. Make sure to notice whether the set of numbers you are using is increasing or decreasing.

1. 58°
2. 27°

Photo Credit: Rasto SK / Shutterstock.com

3. 94°

4. 148°

5. 106°

6. 172°

7. 122°

8. 78°

CONNECT

Angles in Ancient Egypt The Bent Pyramid of Pharaoh Sneferu was built in Dahshur nearly 5,000 years ago. The walls at the base of the pyramid were built at about a 54° angle. At about 47 meters above the ground, the angle changes to 43°.

Use your protractor to draw a 54° angle and a 43° angle. Label each angle with its measurement. Then, name a place where you can see angles in your community.

The Bent Pyramid

Photo Credit: Rasto SK / Shutterstock.com

1. 54°

2. 43°

3. Where do you see angles in your community?

Check Your Understanding
Follow your teacher's instructions to complete this activity.

LESSON 7

Classifying Triangles Using Geometric Tools

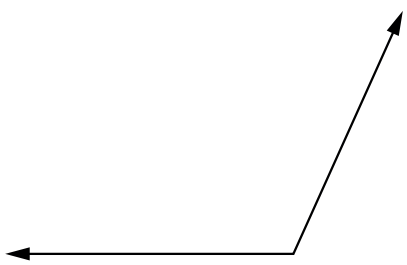
Learning Targets

- I can classify triangles according to the lengths of its sides using the ruler.
- I can classify triangles using the measures of its angles using the protractor.

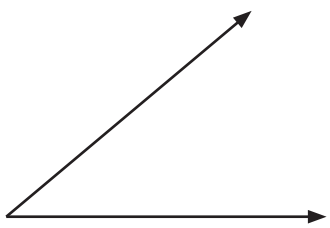
ACCESS

Which Makes Sense? Use a protractor to measure the angle. Record both numbers on the protractor scale. Explain which measurement makes sense for the angle and why.

a.



b.



a. Inside scale measurement _____

Outside scale measurement _____

Which measurement makes sense? Explain.

_____

_____

b. Inside scale measurement _____

Outside scale measurement _____

Which measurement makes sense? Explain.

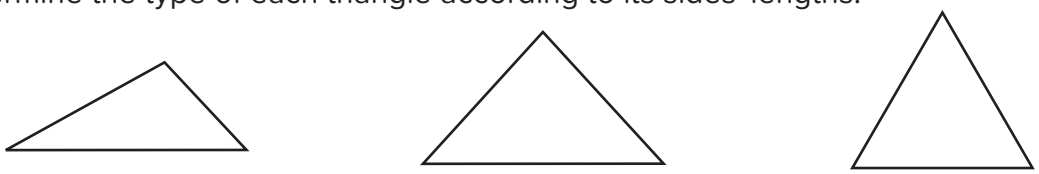
_____

_____

Photo Credit: Rasto SK / Shutterstock.com

BUILD

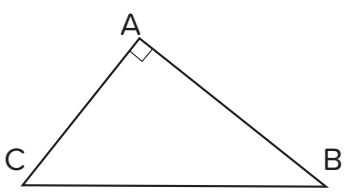
Use the ruler to measure the sides' lengths of each of the following triangles, then determine the type of each triangle according to its sides' lengths.



Using The Protractor Use the protractor to measure each angle of the triangle below, then determine the type of the triangle according to its angles' measures.

c) Notice the following triangles (using the geometric tools):

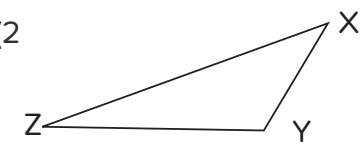
(1



Type of △ ABC according to its sides' lengths _____

Type of △ ABC according to its angles' measures _____

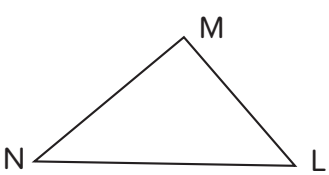
(2



Type of △ XYZ according to its sides' lengths _____

Type of △ XYZ ccording to its angles' measures _____

(3



Type of △ MLN according to its sides' lengths _____

Type of △ MLN ccording to its angles' measures _____

CONNECT

Triangles in sailing ships The Arab used the triangular sail at the front of sailing ships, and this made their ships more capable than others of sailing against the direction of the wind. Find the measures of each angle in the two triangles, then determine the type of each triangle according to the measures of its angles.

triangular sail

Check Your Understanding
Follow your teacher's instructions to complete this activity.

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