



Simply

Good and Beautiful

# MATH



COURSE BOOK



$$30\% \times 10 = 3$$



60°

x°

60°

A=bh

pink : yellow  
3 : 5

$$25\% = 0.25 = \frac{25}{100} = \frac{1}{4}$$

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# ABOUT THE COURSE

## Supplies Needed

- 📖 *Simply Good and Beautiful Math 6 Course Book 1* and *Simply Good and Beautiful Math 6 Course Book 2*
- 📖 *Simply Good and Beautiful Math 6 Answer Key*
- 📖 *Simply Good and Beautiful Math Scratch Pad* or other scratch paper
- 📱 Device to access videos (highly recommended)
- 🖋 Pencils
- ✂ Scissors
- 🎲 2 standard dice
- 🍲 Bowl
- 🖍 Colored pencils
- 📎 Tape or glue
- 📐 Protractor
- 📄 Paper
- 📏 Ruler
- 📏 Tape measure

## Course Overview

Math 6 consists of Books 1 and 2. There are 120 total lessons divided into four units. Each unit ends with a unit review and assessment. The course is designed to be completed by the student independently, but parents/teachers can choose to be as involved in the lessons as they would like to be.

## Lesson Overview

Most lessons are four pages and consist of a warm-up, video lesson, mental math, mini lesson, practice, and review.

**Warm-Up:** An activity that applies to the lesson topic.

**Video Lesson:** Videos provide detailed teaching and interactive guided practice of the lesson topic. Scan the QR code or go to [goodandbeautiful.com/Math6](http://goodandbeautiful.com/Math6) to access the videos. Videos are about 12–15 minutes in length.

**Mental Math Checkup:** A quick review of mental math skills and facts practice.

**Mini Lesson:** A concise written lesson on the topic.

**Practice:** Practice that is dedicated to the lesson topic.

**Review:** Daily review of topics from previous lessons.

## Getting Started

Simply open the first course book. Students may choose to watch the video lesson or just read the mini lesson if they feel confident in the lesson topic. Please note that videos may contain material not included in the written mini lesson. Students may complete the warm-up before or during the video. Mental math may be completed at any point during the lesson. After completing the video and/or mini lesson, the student should complete the lesson practice and review sections. Parents/teachers should check the student's work daily and provide immediate help and feedback. Students who struggle with the lesson practice should be encouraged to review the mini lesson or the video for help. *Note: If printing at home, print pages at actual size.*

**Lesson 503**  
**USING PROPORTIONS TO SOLVE PERCENT PROBLEMS**

**Warm-Up**

Divide.

$$22,800 \div 100 =$$

$$1,650 \div 100 =$$

$$228 \div 100 =$$

**Video Lesson**

Scan the QR code or watch the video lesson on [goodandbeautiful.com/Math6](http://goodandbeautiful.com/Math6).

**Mental Math Checkup**

- Convert each percent or decimal to a fraction.
  - 50% =  $\frac{\quad}{100}$      0.75 =  $\frac{\quad}{100}$
- Convert each improper fraction to a mixed number or whole number.
  - $\frac{15}{4} =$   $\frac{\quad}{\quad}$       $\frac{9}{11} =$   $\frac{\quad}{\quad}$
- Simplify using the order of operations.
  - $34 \cdot 12 \div 8 =$       $25 - 5 \cdot 3 =$

**Mini Lesson**

**Finding the Part**

To find a missing part, write the percent over 100. Use a variable for the numerator and write the known whole as the denominator.

Example: What is 7% of 25?

$$\frac{7}{100} = \frac{\quad}{25}$$

Set up a proportion. Write 7% as  $\frac{7}{100}$ .

$$\frac{100}{7} = \frac{25}{\quad}$$

Solve using cross products.

$$100 \cdot \quad = 7 \cdot 25$$

$$100x = 175$$

$$x = 1.75$$

7% of 25 is 1.75.

**Finding the Whole**

To find a missing whole, write the percent over 100. Use a variable for the denominator and write the known part as the numerator.

Example: 11 is 55% of what number?

$$\frac{11}{\quad} = \frac{55}{100}$$

Set up a proportion. Write 55% as  $\frac{55}{100}$ . The part is 11, and the whole is unknown.

$$\frac{11}{x} = \frac{55}{100}$$

Solve using cross products.

$$\frac{1,100}{55} = \frac{55x}{55}$$

$$20 = x$$

11 is 55% of 20.

**Finding the Percent**

To find a missing percent, write a variable over 100. Write the known part as the numerator and the known whole as the denominator.

Example: 32 is what percent of 80?

$$\frac{\quad}{100} = \frac{32}{80}$$

Set up a proportion. The percent is unknown. The part is 32, and the whole is 80.

$$100 \cdot 32 = x \cdot 80$$

$$\frac{3,200}{80} = \frac{80x}{80}$$

$$40 = x$$

32 is 40% of 80.

Sometimes a calculation must be made before setting up and/or after solving a proportion. See the examples below.

Example 1: 52% of the trees in a park are oak trees. If there are 78 oak trees in the park, how many trees are not oak?

$$\frac{52}{100} = \frac{78}{\quad}$$

Use a proportion to find the whole, which is the total number of trees in the park.

$$x = 150$$

There are 150 trees.

150 - 78 = 72  
72 trees are not oak.

Example 2: 65% of the trees in another park are maple trees. If 42 trees are not maple trees, how many maple trees are in the park?

$$100\% - 65\% = 35\%$$

Subtract 65% from 100% to find the percent of trees that are not maple trees.

$$\frac{42}{\quad} = \frac{35}{100}$$

Then set up and solve a proportion.

$$x = 120$$

There are 120 trees. Subtract 42 non-maple trees from 120. There are 78 maple trees.

**Practice**

- Set up a proportion that would be used to answer each question. You don't need to solve the proportions.
  - What is 10% of 25?
  - What is 30% of 90?
  - 16 is 25% of what number?
  - 36 is 90% of what number?
  - 16 is what percent of 25?
  - 36 is what percent of 90?
- For each question set up and solve a proportion to find the missing part.
  - What is 76% of 50?
  - What is 80% of 35?
  - What is 18% of 60?
  - What is 40% of 65?
- Draw a line from each question on the left to its answer on the right.
  - 19 is 40% of what number? 45
  - 36 is 80% of what number? 47
  - 25.3 is 55% of what number? 47.5
  - 42.3 is 90% of what number? 46
- Match each question with its answer by evaluating the boxes the same color. Use a different color for each match.
 

Find the Percent		Find the Whole	
36 is what percent of 80?	32.5 is what percent of 50?	46%	45%
25%	30%	46%	54 is what percent of 90?
23 is what percent of 50?	23 is what percent of 50?	46 is what percent of 100?	45%
60%	55%	17.3 is what percent of 50?	49.5 is what percent of 90?

**Practice**

- Solve each problem. Locate all the boxes containing the solution on the grid, and shade in the solutions that best according to the design listed next to the problem.
 

42	78	78	40
80	40	42	81
42	81	80	40
80	78	78	81

  - What is 70% of 60?
  - What is 90% of 90?
  - 84 is 80% of what number?
  - What is 50% of what number?
  - 38 is what percent of 95?

**Review**

- You pulled a black sock from the clothes dryer. What is the probability that, without looking, you will pull out another black sock if the dryer now contains 5 black socks, 6 blue socks, and 8 gray socks? [Lesson 5](#)
- In a sewing contest, the ratio of clothing entries to quilt entries was 1:3. If there were 48 entries, how many of them were quilts? [Lesson 5](#)
- Convert the units of capacity. [Lesson 6](#)
  - 4 gal → cups
  - 450,000 mL → liters
  - 4 gal =  $\frac{\quad}{\quad}$  c
  - 450,000 mL =  $\frac{\quad}{\quad}$  L
- Boxes that are 10 in tall are being stacked next to boxes that are 16 in tall. At how many inches will the two stacks first be the same height? [Lesson 7](#)
- Subtract the integers. [Lesson 3](#)
  - $56 - 38 =$       $28 - 56 =$
  - $97 - 43 =$       $43 - 97 =$

A Reference Chart is included at the end of each course book.

# Frequently Asked Questions

## How many lessons should my student do each week?

- There are 120 lessons in the course. If the student completes four lessons per week, he or she will complete the course in a standard school year with typical breaks for vacation or sickness.

## How long do lessons take?

- The average time to complete a lesson is 45–60 minutes. This includes time to watch the video and complete the course book sections.

## What if my child is too slow/fast?

- If your child takes longer than average but is understanding and retaining information, don't worry. You may want to break up the lessons. Watch the video and begin the practice. Then finish the practice and complete the review section at another time.
- To avoid holes in his or her math foundation, we suggest not skipping entire levels if your child works more quickly than average but is learning new concepts. Consider having your child do multiple lessons a day to complete the course faster.
- If your child takes less time than average and seems to already know all the information, consider giving the Unit Assessments to see if he or she can skip any units or move on to the next course.

## Do you include any specific doctrine?

- No, the goal of our curriculum is not to teach doctrines specific to any particular Christian denomination but to teach general principles such as honesty, hard work, and kindness. All Bible references in our curriculum use the King James Version.

## Does my student have to watch the videos?

- The videos contain the bulk of the teaching and are highly recommended. However, if your student feels confident in the topic being taught, he or she can skip the video and read the mini lesson instead. A student who struggles with the lesson practice should be encouraged to go back and watch the video.
- Some families prefer to have the parent/teacher teach the child using the mini lesson rather than have the child watch the video lesson independently.

## Is Math 6 completed independently by the child?

- Yes, Math 6 is designed for your student to complete independently, though at times students may need parent/teacher assistance to understand a concept. Parents/teachers will need to check the child's work and should do so on a daily basis when possible, providing immediate feedback.

## Is Math 6 a spiral or mastery program?

- Math 6 is a spiral course, constantly reviewing concepts your student has learned to ensure understanding and retention of information.

## What if there isn't room to complete the work?

- Students should always keep scratch paper on hand while completing the lessons. The *Simply Good and Beautiful Math Scratch Pad* is available for purchase.

## Is a calculator used in Math 6?

- This course is designed to be completed without the use of a calculator. Lesson 117 is an introduction to calculators. A scientific calculator is helpful in this lesson but isn't necessary. Calculators should not be used for any other lessons.

# UNIT 1 OVERVIEW

## LESSONS 1-30

### Extra Supplies Needed

- 1 standard die
- colored pencils

### New Concepts Taught

- absolute value
- area of a parallelogram
- area of a trapezoid
- distance on a coordinate plane
- division with a three-digit divisor and a six-digit dividend
- expanded notation of decimal numbers through the millionths place
- expanded notation with exponents
- greatest common factor of three-digit numbers
- identity and inverse properties
- negative fractions and decimal numbers on a number line
- nets and surface area of trapezoidal prisms and parallelepipeds
- prime factorization of four-digit numbers
- prime factorization to determine least common multiples
- rational numbers with exponents

### Concepts Reviewed and Expanded Upon

- addition, subtraction, multiplication, and division of decimal numbers
- addition, subtraction, multiplication, and division of fractions
- area of a triangle
- area of irregular figures
- associative, commutative, and distributive properties
- convert between fractions, decimal numbers, and percents
- convert between improper fractions and mixed numbers
- divisibility rules
- equivalent fractions
- fraction comparisons
- fractions in simplest form
- negative numbers
- number patterns and infinite sequences
- order of operations
- triangle classification

Lesson  
1

# OPPOSITES AND ABSOLUTE VALUE

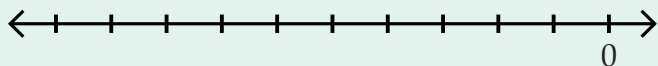
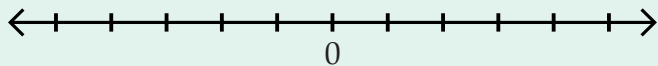
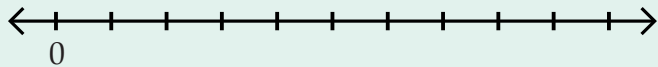
Watch the video lesson and/or read the mini lesson.

## Warm-Up

The warm-up is discussed in the video.

This section can be completed either before or during the video.

Using a scale that counts by one, label the missing numbers on each of the number lines.



## Video Lesson



Scan the QR code or watch the video lesson on [goodandbeautiful.com/Math6](http://goodandbeautiful.com/Math6). This section is completed during the video.


$$|14| \bigcirc |-14|$$

## Mental Math Checkup



Write the answers in the spaces provided. This section is completed independently.

1. Count by 100 from 0 to 1,000.

2. Add 1,000 to each number.

239,719

76,736

3,791

3. What is the third month of the year?

## Mini Lesson

An *integer* is a number with no fractional part.

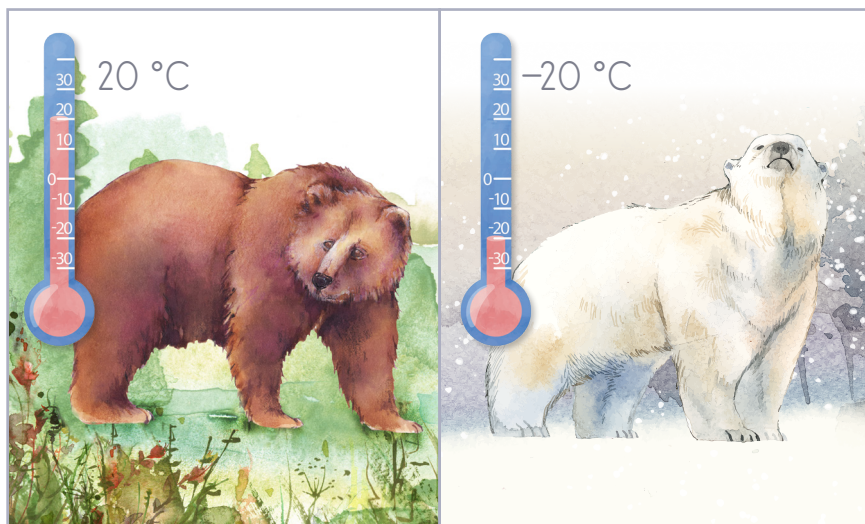
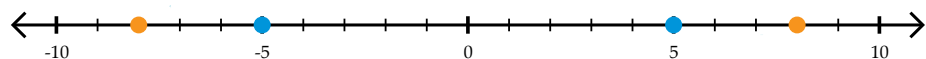
Examples of integers: 34, -2, 0, 15, -55, -102

Examples of non-integers:  $\frac{1}{4}$ , 3.2,  $\frac{7}{8}$ ,  $\pi$ , 4.333...

Integers can be positive or negative. *Negative numbers* are numbers less than zero, and *positive numbers* are numbers greater than zero. Zero is not positive or negative. A negative sign is written in front of negative numbers.

*Opposites* are two numbers that are the same distance from zero but on opposite sides of a number line.

Examples: 5 and -5 are opposites. -8 and 8 are opposites.

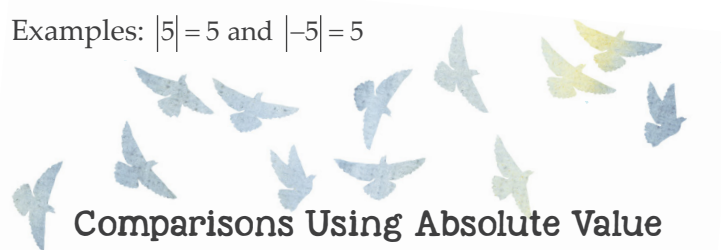


*Absolute value* is the distance a number is from zero on a number line. Distance cannot be negative, so absolute values are never negative. A number and its opposite have the same absolute value.

Examples: The absolute value of 5 is 5. The absolute value of -5 is 5. Both 5 and -5 are five units from zero.

A vertical line on each side of a number indicates absolute value.

Examples:  $|5| = 5$  and  $|-5| = 5$



To compare two absolute values, find the absolute value of each number, then compare using a  $<$ ,  $>$ , or  $=$ .

Compare the absolute value of -45 and the absolute value of 30.

$$\begin{aligned} |-45| &\bigcirc |30| \\ 45 &> 30 \\ |-45| &> |30| \end{aligned}$$

-45 is farther from zero than 30.

Compare the absolute value of 7 and the absolute value of -10.

$$\begin{aligned} |7| &\bigcirc |-10| \\ 7 &< 10 \\ |7| &< |-10| \end{aligned}$$

7 is closer to zero than -10.

The opposite of 0 is 0.  
The absolute value of 0 is 0.

Practice

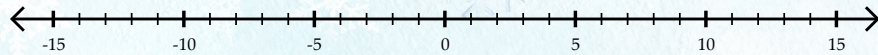
1. If the number is an integer, write "yes" on the line. If not, write "no."

7 \_\_\_\_\_    -40 \_\_\_\_\_    0 \_\_\_\_\_     $\frac{4}{5}$  \_\_\_\_\_  
 5.1 \_\_\_\_\_     $\frac{1}{3}$  \_\_\_\_\_    -21 \_\_\_\_\_    -8.4 \_\_\_\_\_

2. Write each of the expressions as an integer. Some examples are given.

a loss of \$2,000    -2,000    500 ft below sea level \_\_\_\_\_  
 a drop of 15 °F    \_\_\_\_\_    a debt of \$10    \_\_\_\_\_  
 a price increase of \$60    60    a deposit of \$50    \_\_\_\_\_  
 125 ft above sea level    \_\_\_\_\_    a withdrawal of \$50    -50  
 30 degrees below zero    \_\_\_\_\_    a gain of \$45    \_\_\_\_\_

3. Find the opposite of each number. Use the number line for help if necessary.



Number	Opposite	Number	Opposite
4		12	
7		-12	
-2		-5	
-1		8	
0		3	

4. Find the absolute value of each number.

$|450|$      $|-22|$      $|0|$      $|-108|$   
 $|15|$      $|-15|$      $|-3|$      $|18|$

5. Find the change from the first temperature to the second. Write the change as an integer.

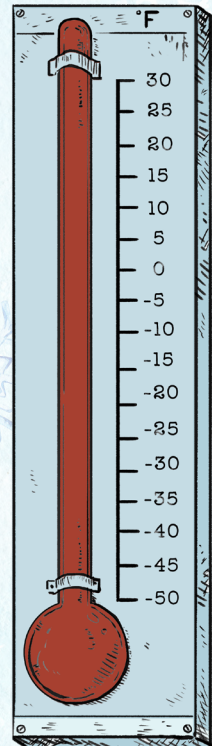
5 °F to 15 °F \_\_\_\_\_    -50 °F to -25 °F \_\_\_\_\_  
 0 °F to -15 °F \_\_\_\_\_    -10 °F to -35 °F \_\_\_\_\_  
 25 °F to 15 °F \_\_\_\_\_    -5 °F to 15 °F \_\_\_\_\_

6. Compare the following using  $<$ ,  $>$ , or  $=$ .

$|0|$  ○  $|-5|$      $7$  ○  $|2|$      $|-4|$  ○  $|4|$   
 $|5|$  ○  $7$      $|-15|$  ○  $|-23|$      $32$  ○  $|-30|$

7. Cross off the incorrect absolute values.

$|-15| = 15$      $|-15| = -15$   
 $|-5| = -5$      $|-5| = 5$   
 $|15| = -15$      $|15| = 15$   
 $|5| = 5$      $|5| = -5$





## Practice

8. Circle the greater value in each row.
- a. the opposite of 3                       $|2|$
  - b.  $|-25|$                                       the opposite of  $-24$
  - c.  $|-14|$                                        $-14$
  - d. the opposite of 4                      the opposite of  $-4$
  - e.  $|10|$                                         ten less than zero
  - f. the opposite of 8                       $-9$

9. Circle the correct word in *italics* to make a true statement.

The absolute value of a positive number is a *positive / negative* number.

The absolute value of a negative number is a *positive / negative* number.

The opposite of a positive number is a *positive / negative* number.

The opposite of a negative number is a *positive / negative* number.

10. Complete the chart below. The first row is given as an example.

Number	Opposite	Absolute Value
$-\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$
3.4		
$-27.482$		
$-\frac{1}{5}$		
$\frac{3}{10}$		
$-50.5$		

## Review

1. Circle the even numbers and cross out the odd numbers.

589,137    1,792,870    84,781,791    901,728,176

2. Compare each pair of numbers using  $<$ ,  $>$ , or  $=$ .

6,371,278  6,372,278

5.810  5.81

431,081  431,801

3. Complete each problem.

$654 \div 3 =$  \_\_\_\_\_     $382,718 + 12,795 =$  \_\_\_\_\_

$5,361 \times 12 =$  \_\_\_\_\_     $265,710 - 12,795 =$  \_\_\_\_\_

4. List the next five multiples of each number.

20, \_\_\_\_\_

50, \_\_\_\_\_

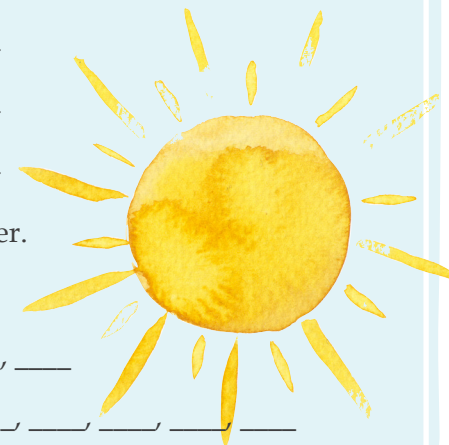
12, \_\_\_\_\_

5. List the factors of each number.

25: \_\_\_\_\_

32: \_\_\_\_\_

100: \_\_\_\_\_



# ADDING, SUBTRACTING, AND MULTIPLYING FRACTIONS AND MIXED NUMBERS

▶ Watch the video lesson and/or read the mini lesson.

## Warm-Up

Complete the problems.



## Video Lesson



Scan the QR code or watch the video lesson on [goodandbeautiful.com/Math6](http://goodandbeautiful.com/Math6).

$$7\frac{3}{4} - 3\frac{1}{4}$$

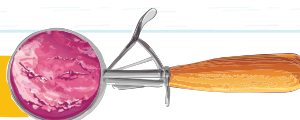
$$\frac{2}{3} \times \frac{5}{9} \times \frac{3}{10}$$



## Mental Math Checkup

- Count by 30 from 0 to 300.
- Multiply each number by 1,000.  
712       42   
1,270
- How many nickels are in \$2.00?

## Mini Lesson



### Adding and Subtracting Fractions

When adding or subtracting fractions with different denominators, first convert the fractions to equivalent fractions with a common denominator. Then add or subtract the numerators. The denominator stays the same.

$$\frac{3}{10} + \frac{7}{8} = \frac{12}{40} + \frac{35}{40} = \frac{47}{40} = 1\frac{7}{40}$$



### Subtracting a Fraction or Mixed Number from a Whole Number

To subtract a fraction or mixed number from a whole number, write the whole number as a mixed number or improper fraction by taking 1 from the whole number and writing it as a fraction equal to 1. Use the same denominator as the fraction being subtracted. Then subtract.

$$1 - \frac{8}{15} =$$

$$\frac{15}{15} - \frac{8}{15} = \frac{7}{15}$$

$$12 - 4\frac{1}{2} =$$

$$11\frac{2}{2} - 4\frac{1}{2} = 7\frac{1}{2}$$

### Adding and Subtracting Mixed Numbers

$$8\frac{4}{9} + 11\frac{7}{9} =$$

Add the whole numbers, and then add the fractions.

$$19\frac{11}{9} =$$

$$19 + 1\frac{2}{9} =$$

$$20\frac{2}{9}$$

Write answers in simplest form.

The same principles apply to subtracting mixed numbers: subtract the whole numbers, and then subtract the fractions.

### Multiplying Fractions by Fractions, Whole Numbers, and Mixed Numbers

To multiply fractions, multiply the numerators, and then multiply the denominators.

$$\frac{6}{7} \times \frac{11}{12} = \frac{66}{84} = \frac{11}{14}$$

To multiply a fraction by a whole number, first convert the whole number to a fraction by writing it with a denominator of 1. Then multiply the fractions.

$$5 \times \frac{4}{15} = \frac{5}{1} \times \frac{4}{15} = \frac{20}{15} = 1\frac{5}{15} = 1\frac{1}{3}$$

To multiply mixed numbers, first convert the mixed numbers to improper fractions. Then multiply the fractions.

$$2\frac{1}{5} \times 3\frac{1}{2} = \frac{11}{5} \times \frac{7}{2} = \frac{77}{10} = 7\frac{7}{10}$$

### Canceling Before Multiplying Fractions

Canceling is a way to simplify fractions before multiplying them. To cancel, find one numerator and one denominator that are divisible by the same factor. Divide both the numerator and the denominator by that factor and write the quotients in place of the canceled numbers.

Then multiply the fractions.

$$\frac{\cancel{2}^1}{7} \times \frac{3}{\cancel{4}_2} = \frac{3}{14}$$

$$\frac{\cancel{2}^1}{3} \times \frac{\cancel{6}^2}{\cancel{25}_5} = \frac{2}{15}$$

$$\frac{\cancel{7}^1}{10} \times \frac{\cancel{2}^1}{\cancel{3}_1} \times \frac{\cancel{3}^3}{\cancel{14}_2} = \frac{3}{5}$$

Cancellations may be performed in any order; just make sure to divide both a numerator and a denominator by the same number.

### MATH TIP!

Canceling first makes multiplying fractions easier. If all common factors are canceled before multiplying, the answer will be in simplest form.

Complete each problem in the ice cream scene. Once you find the answer, use the matching letter to solve the riddle.



**F**

$$\frac{9}{14} + \frac{17}{28} = \square$$

**T**

$$1\frac{6}{11} + \frac{1}{2} = \square$$

**C**

$$8\frac{4}{6} + 5\frac{1}{9} = \square$$

**H**

$$\frac{4}{5} + \frac{9}{10} = \square$$

**E**

$$\frac{11}{15} - \frac{3}{5} = \square$$

**B**

$$\frac{8}{16} + \frac{8}{32} = \square$$

**O**

$$\frac{7}{8} + \frac{3}{5} = \square$$

Why did the ice cream truck break down?

$$\frac{3}{4} \quad \frac{2}{15} \quad 13\frac{7}{9} \quad \frac{6}{11} \quad 13\frac{1}{6} \quad \frac{2}{9} \quad \frac{2}{15} \quad 1\frac{19}{40} \quad 1\frac{1}{4}$$

$$2\frac{1}{22} \quad 1\frac{7}{10} \quad \frac{2}{15} \quad 6\frac{1}{7} \quad 1\frac{19}{40} \quad 13\frac{7}{9} \quad 2\frac{13}{15} \quad 7\frac{2}{11}$$

$$6\frac{1}{7} \quad 1\frac{19}{40} \quad \frac{6}{11} \quad 6\frac{1}{12}$$





**S**  $\frac{5}{9} - \frac{1}{3} =$

**U**  $8\frac{1}{2} + 4\frac{2}{3} =$

**R**  $7 - \frac{6}{7} =$

**A**  $2 - 1\frac{5}{11} =$



**K**  $5 - 2\frac{2}{15} =$

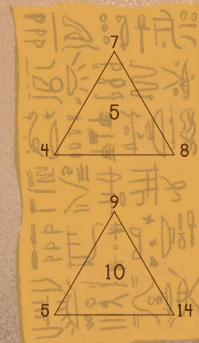
$8 - \frac{9}{11} =$

**Y**

**D**  $13\frac{3}{4} - 7\frac{2}{3} =$







$$\triangle \times \text{goat} \times \text{goat} = 12$$



### PUZZLE 1

Find the value of each image in this multiplication table. The sum of the values for each symbol is the clue for the riddle.

			
3	6	15	12
			
		10	8













 $=$  T


### PUZZLE 2

Some of the answers to the problems listed are lost in the museum. Search the museum for the missing answers and fill them in. Then solve for the unknown symbols. The value of the unknown symbol is the clue for the riddle.


 $+$ 

 $=$  6


 $\times$ 

 $\times$ 

 $=$  \_\_\_\_\_











 $+$ 

 $+$ 

 $=$  \_\_\_\_\_


 $=$  G

### PUZZLE 3

Place each of the digits below in one of the suns. The three numbers connected by lines need to add up to 15. The number found in the yellow sun is the clue for the riddle. Three numbers are already placed for you.

1 2 3 4 5 6 7 8 9

			15
			15
			15
15	15	15	15

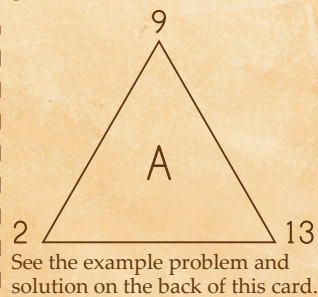
See the example problem and solution on the back of this card.

Pull this page out and cut apart the puzzle cards.

### PUZZLE 4

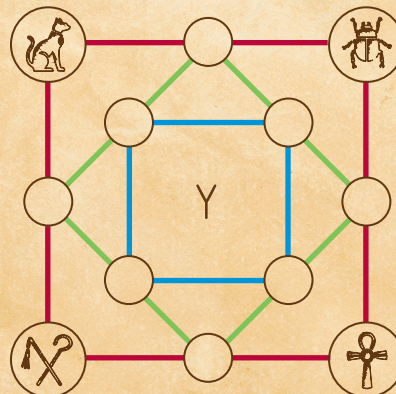
In the museum, find the two pyramids with numbers and copy them on this card. Start at the bottom right vertex. As you travel around to each vertex, figure out which operations must be performed with the numbers to equal the number in the middle. Then use the same operations and travel in the same direction to find the answer to this puzzle. See the example on the back of this card. The value for the letter in the triangle is the clue for the riddle.

Copy pyramids here.



### PUZZLE 5

Find the values for each of the symbols in the illustration. For each side of the red and green squares, write the difference between the corners in the circle on that side. The numbers at the corners of the blue square should be the same. That number is the value for the letter found in the center of the blue square and is the clue for the riddle.






HINT: Subtract the smaller number from the larger number.

See the example problem and solution on the back of this card.

### PUZZLE 6

Find the symbols in the illustration. Then complete each division problem. The number found in the yellow square is the clue for the riddle.

24	$\div$		$=$	
$\div$		$\div$		$\div$
	$\div$		$=$	
$=$		$=$		$=$
	$\div$		$=$	L



# UNIT 1 REVIEW



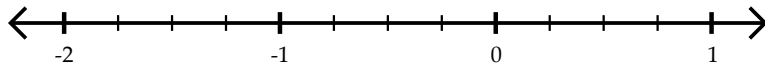
Welcome! My name is Thomas, and this is my sister, Holly. In today's lesson you will visit children from different countries around the world. As you travel to each country, you will practice different math concepts you've learned so far in Unit 1.

I'm Gretchen, and this is Hanz! When you visit each country, you will meet many of our friends wearing traditional clothing from their country. These friends will share something interesting about the country they live in. Enjoy your travels!

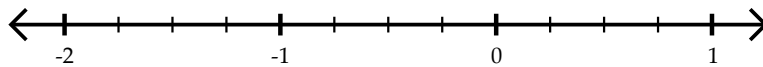


## Fractions, Decimals & Number Lines Lessons 4 & 14

1. Use fractions and mixed numbers to fill in the missing values on the number line.      3. Write the fractions in order from least to greatest in simplest form.



2. Plot these points on the number line. Point A:  $-1.25$     Point B:  $0.75$     Point C:  $-0.5$



$$\frac{9}{13}, \frac{5}{11}, \frac{7}{14}$$

\_\_\_\_\_

### Opposites & Absolute Value Lesson 1

1. Find the opposite of each number.

9 \_\_\_\_\_       $\frac{4}{7}$  \_\_\_\_\_      -1.05 \_\_\_\_\_

2. Find the absolute value of each number.

$|6.8| =$  \_\_\_\_\_       $|-71| =$  \_\_\_\_\_       $|\frac{-1}{3}| =$  \_\_\_\_\_

3. Compare the following using  $<$ ,  $>$ , or  $=$ .

$|-45| \bigcirc |-54|$        $|38| \bigcirc |-38|$



The highest peak in Mexico is a volcano that reaches 18,491 ft (5,636 m) high. It is also one of the highest peaks in North America.

### Prime Factorization, GCF & LCM Lessons 2, 3 & 8

1. Find the prime factorization of each number. Then find the GCF of the numbers.

12: \_\_\_\_\_ GCF: \_\_\_\_\_

32: \_\_\_\_\_

2. List the first few multiples of each number. Then find the LCM of the numbers.

10: \_\_\_\_\_ LCM: \_\_\_\_\_

8: \_\_\_\_\_

The northern region of Russia is a tundra with a snow-covered landscape. Reindeer, also known as caribou, are one type of animal able to survive in the tundra.



### Addition, Subtraction, Multiplication, Division & Rounding Lessons 5, 9, 12, 13, 16, 17 & 25

1. Add or subtract.

$2\frac{1}{2} + \frac{4}{5} =$  \_\_\_\_\_       $4 - \frac{2}{3} =$  \_\_\_\_\_       $6.712 - 4.8 =$  \_\_\_\_\_

2. Multiply or divide. ◆ Hint: You can cancel before multiplying fractions.

$\frac{12}{25} \times \frac{10}{16} =$  \_\_\_\_\_       $\frac{1}{5} \div \frac{3}{7} =$  \_\_\_\_\_

$4.183 \times 3.9 =$  \_\_\_\_\_       $5.75 \div 0.25 =$  \_\_\_\_\_

3. Round 12.870513 to the place values below.

ten thousandths: \_\_\_\_\_

hundred thousandths: \_\_\_\_\_

thousandths: \_\_\_\_\_

Japan has many hot springs called *onsens*, where local snow monkeys go to bathe and keep warm.



### Conversions Between Fractions, Decimals & Percents Lessons 23 & 24

Complete the table.

Fraction	Decimal	Percent
$\frac{2}{5}$		
	0.64	
		90%



Germany has more than 20,000 castles scattered among the mountains and lakes in the countryside.

### Expanded Notation Lessons 11 & 18

1. Write 8.517 in expanded notation using . . .

fractions \_\_\_\_\_

decimals \_\_\_\_\_

2. Write  $(8 \times 10^5) + (7 \times 10^4) + (2 \times 10^2) + (1 \times 10^1) + (8 \times 10^0)$  in standard form.

\_\_\_\_\_



China is home to many endangered animals, including the South China tiger and the giant panda.

### Rational Numbers with Exponents & Order of Operations Lessons 19 & 20

1. Underline the integers. Circle the rational numbers.

5.2      $-\frac{5}{7}$      -12     -2.82     0      $4\frac{1}{3}$

2. Simplify the expressions.

$\left(\frac{3}{5}\right)^2 =$  \_\_\_\_\_      $50 + (7 - 3)^2 \div 2 =$  \_\_\_\_\_      $\frac{9 - 2^2}{4 \cdot 5} =$  \_\_\_\_\_

Brazil is home to the Amazon rainforest—the largest rainforest in the world.



# UNIT ASSESSMENT

## Instructions

Unit assessments give you practice with the math concepts learned in this unit without having you overpractice concepts that you have mastered. These assessments also give you practice working on math problems for an extended period of time. This helps you to extend focus and attention span and to be better prepared for any type of testing you will have to do in the future. Here are some tips: First, always read the instructions carefully. Sometimes you can get answers wrong simply because you did not understand the instructions. Second, do not rush through exercises you think you already know. Instead, do your work carefully. Sometimes you can get answers wrong, even though you understand the concept, just because you rushed. Finally, if you feel you are having trouble focusing, take a quick break to do something else, like ten jumping

jacks, and then come back. There are no videos, mini lessons, or practice problems for Lessons 29–30.

- For Lesson 29, complete all the exercises with purple headers only. You may cover the additional practice sections or fold the page to concentrate only on the purple sections. Have your parent or teacher correct the work. If there are mistakes in a section, your parent or teacher will check the orange “Additional Practice” checkbox for that section.
- For Lesson 30, complete all the orange sections that are checked. If you still make multiple mistakes, review those sections. All the principles will be reviewed again in upcoming units. If you have only a few or no orange sections to practice, you may move on to the next lesson.
- Parents/teachers may determine if the student may use the Reference Chart for the assessment. It is recommended that the student first try the assessment without the Reference Chart and then refer to it if needed.

## Student

### OPPOSITES & ABSOLUTE VALUE (LESSON 1)

Find the opposite of each number.

3 \_\_\_\_\_       $-\frac{4}{5}$  \_\_\_\_\_      6.2 \_\_\_\_\_

Find the absolute value of each number.

$|-8| =$  \_\_\_\_\_       $|7.7| =$  \_\_\_\_\_       $|-14| =$  \_\_\_\_\_

Compare the following using  $<$ ,  $>$ , or  $=$ .

$|-26|$  ○  $|26|$        $|-32|$  ○  $|-36|$

## Additional Practice

### OPPOSITES & ABSOLUTE VALUE

The numbers 5 and  $-5$  are opposites.

Absolute values are never negative.  $|-2| = 2$

Complete the chart.

Number	Opposite	Absolute Value
9		
$-\frac{3}{4}$		
-18.02		
$7\frac{1}{6}$		

**PRIME FACTORIZATION & GREATEST COMMON FACTORS (LESSONS 2 & 3)**

Use a factor tree to find the prime factorization of 150.

$$\begin{array}{c} 150 \\ / \quad \backslash \end{array}$$

\_\_\_\_\_

Find the prime factorization of each number. Then find the GCF of the numbers.

30: \_\_\_\_\_ GCF: \_\_\_\_\_  
 24: \_\_\_\_\_

**FRACTIONS (LESSONS 4 & 5)**

Write the fractions in order from least to greatest in simplest form.

$$\frac{6}{12}, \frac{3}{8}, \frac{8}{15} \quad \underline{\hspace{2cm}}$$

Complete the chart.

Improper Fractions	Mixed or Whole Numbers
$\frac{23}{4}$	
	$5\frac{3}{7}$
$\frac{108}{9}$	

**Additional Practice**

**PRIME FACTORIZATION & GREATEST COMMON FACTORS**

Separate each composite number into a factor pair until every factor is a prime number.

Find the prime factorization of each number. Then find the GCF of the numbers.

27: \_\_\_\_\_ GCF: \_\_\_\_\_  
 45: \_\_\_\_\_

**Additional Practice**

**FRACTIONS**

Simplify a fraction by dividing its numerator and denominator by the same whole number.

Write the fractions in order from least to greatest in simplest form.

$$\frac{5}{7}, \frac{8}{16}, \frac{10}{30} \quad \underline{\hspace{2cm}}$$

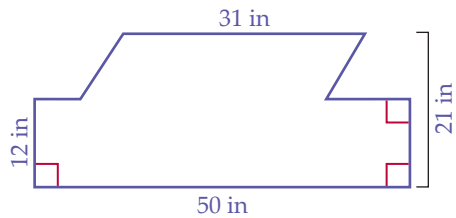
Match the improper fractions and whole or mixed numbers.

$\frac{15}{3}$	$7\frac{1}{11}$
$\frac{24}{5}$	5
$\frac{78}{11}$	$4\frac{4}{5}$
$\frac{12}{5}$	$2\frac{2}{5}$

**TRIANGLES, PARALLELOGRAMS, TRAPEZOIDS, NETS & SURFACE AREA, PERIMETER & AREA OF IRREGULAR FIGURES** (LESSONS 6, 7, 21, 22)

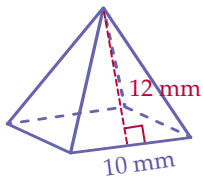
Draw an isosceles right triangle.

Find the area of the figure.



$A = \underline{\hspace{2cm}}$

Find the surface area of the square pyramid.



$SA = \underline{\hspace{2cm}}$

**LEAST COMMON MULTIPLES (LCM)** (LESSON 8)

Find the LCM of the numbers.

6: \_\_\_\_\_

9: \_\_\_\_\_

12: \_\_\_\_\_

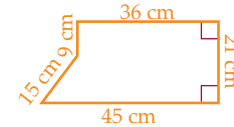
LCM of 6, 9, and 12: \_\_\_\_\_

**Additional Practice**

**TRIANGLES, PARALLELOGRAMS, TRAPEZOIDS, NETS & SURFACE AREA, PERIMETER & AREA OF IRREGULAR FIGURES**

Properties of triangles and area formulas are listed on the Reference Chart.

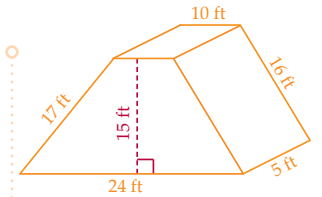
Draw a scalene obtuse triangle.



Find the area and perimeter of the figure.

$A = \underline{\hspace{2cm}}$

$P = \underline{\hspace{2cm}}$



Find the surface area of the trapezoidal prism.

$SA = \underline{\hspace{2cm}}$

**Additional Practice**

**LEAST COMMON MULTIPLES (LCM)**

List multiples of each number or use prime factorization.

Find the LCM of the numbers.

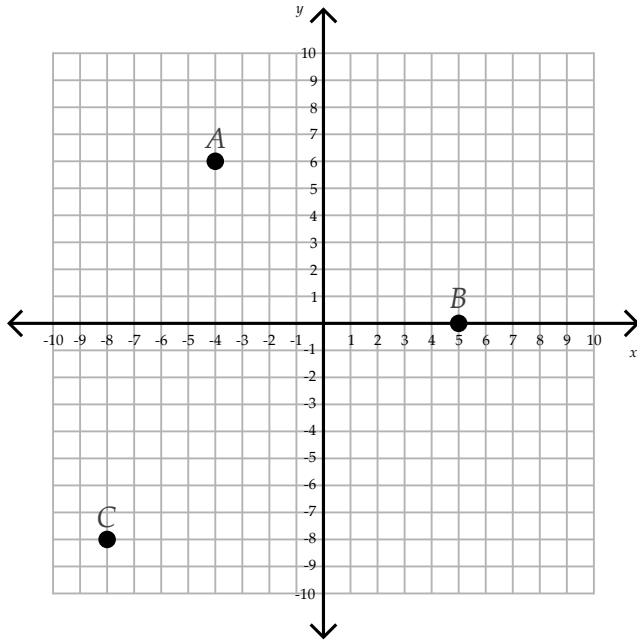
20: \_\_\_\_\_

10: \_\_\_\_\_

15: \_\_\_\_\_

LCM of 20, 10, and 15: \_\_\_\_\_

# COORDINATE PLANES (LESSON 27)



Write the coordinates of each point.

Point A: \_\_\_\_\_ Point B: \_\_\_\_\_ Point C: \_\_\_\_\_

Plot and label each point. Then write the quadrant where that point is located.

Point D:  $(7, -5)$  quadrant \_\_\_\_\_

Point E:  $(-9, 9)$  quadrant \_\_\_\_\_

Point F:  $(-3, -5)$  quadrant \_\_\_\_\_

Point G:  $(7, 6)$  quadrant \_\_\_\_\_

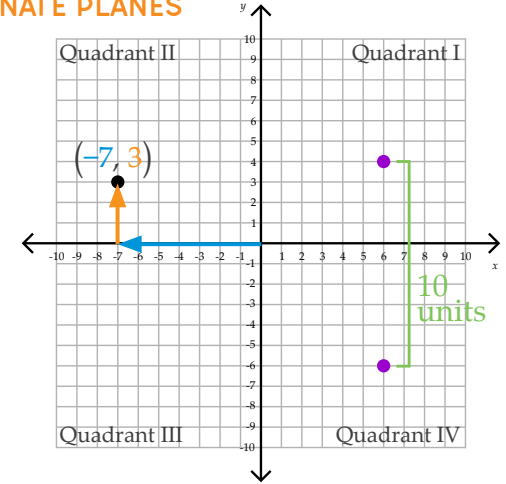
What is the distance between Point D and Point F? \_\_\_\_\_

What is the distance between Point G and Point D? \_\_\_\_\_

## Additional Practice

### COORDINATE PLANES

The first number in an ordered pair gives the **horizontal position**. The second number gives the **vertical position**.



Write the coordinates of each point below.

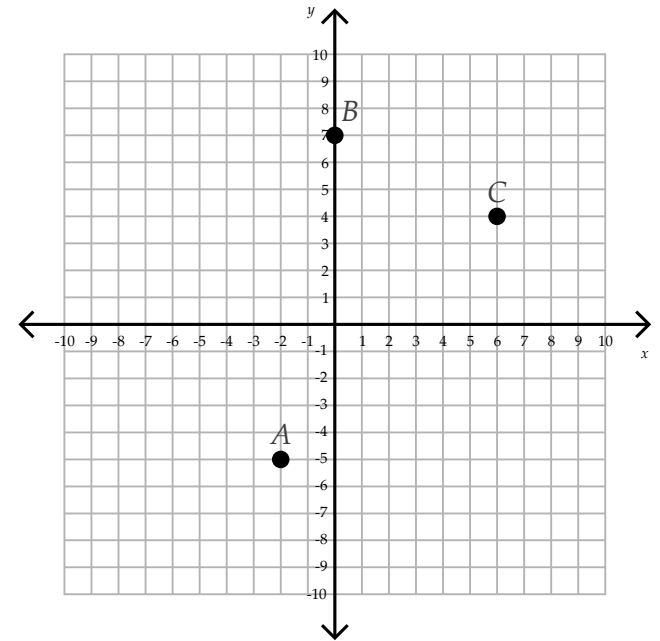
Point A: \_\_\_\_\_ Point B: \_\_\_\_\_ Point C: \_\_\_\_\_

Plot and label each point. Then write the quadrant where that point is located.

Point D:  $(4, -9)$  quadrant \_\_\_\_\_

Point E:  $(-8, -9)$  quadrant \_\_\_\_\_

What is the distance between Point D and Point E? \_\_\_\_\_



# UNIT 2 OVERVIEW

## LESSONS 31-60

### Extra Supplies Needed

- colored pencils
- protractor
- ruler

### New Concepts Taught

- addition and subtraction of integers
- adjacent angles
- area and perimeter of a semicircle
- central angles
- coefficients, constants, terms, and variables in expressions
- complementary and supplementary angles
- complex fractions
- convert between turns and degrees
- cube roots
- decimal percentages
- distance between two points on a coordinate plane
- equations with decimals and fractions
- evaluate expressions with exponents, fractions, and negative numbers
- evaluate expressions with more than one variable
- factor an expression
- find the percent when the whole and a part are known
- find the whole when the percent and a part are known
- identify and combine like terms
- missing angle measures in triangles and quadrilaterals
- multiple transformations on a coordinate plane
- multiplication and division of integers
- names of quadrants on a coordinate plane
- one-step equations with addition and subtraction
- one-step equations with multiplication and division
- parts of a circle: central angles and chords
- percent problems with fractions
- sum of the interior angle measures of a quadrilateral
- sum of the interior angle measures of a triangle

### Concepts Reviewed and Expanded Upon

- angle classification
- area and circumference of a circle
- check solutions
- differences between an equation and an expression
- distributive property
- graph in all four quadrants
- measure and construct angles using a protractor
- name geometric figures with symbols and letters
- percent of a number
- pi
- polygons and other geometric figures
- quadrilateral classification
- radius and diameter
- reflectional, translational, and rotational symmetry
- square roots
- transformations on a coordinate plane
- volume of a cube



MEASURING & CONSTRUCTING  
ANGLES / COMPLEMENTARY  
& SUPPLEMENTARY ANGLES

Supplies  
protractor  
colored pencils

Watch the video lesson and/or read the mini lesson.

Warm-Up

Mark an acute angle with a single arc and an obtuse angle with a double arc.



Video Lesson

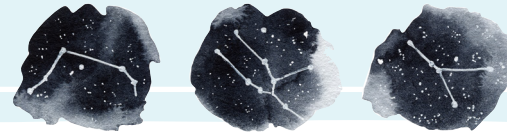


Scan the QR code or watch the video lesson on [goodandbeautiful.com/Math6](http://goodandbeautiful.com/Math6).



$m\angle A = 45^\circ$

$m\angle C = 125^\circ$



Mental Math Checkup

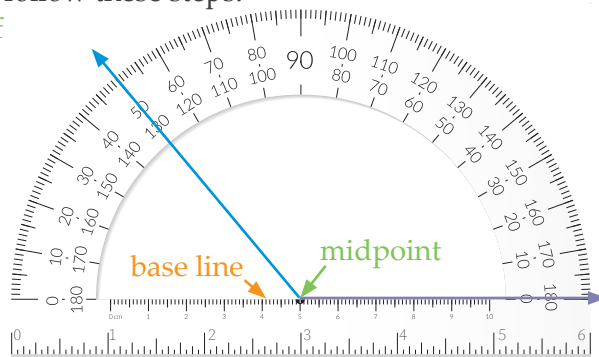
- Evaluate the following.  
 $9^2 + 3^2 =$
- What is  $\frac{1}{5}$  of 10?
- Start at 12. Perform each operation in the following order:  
 $-2, +5, \div 3, \times 10, \div 2$

## Mini Lesson

A **protractor** is a tool for measuring and drawing angles.

To MEASURE an angle, follow these steps:

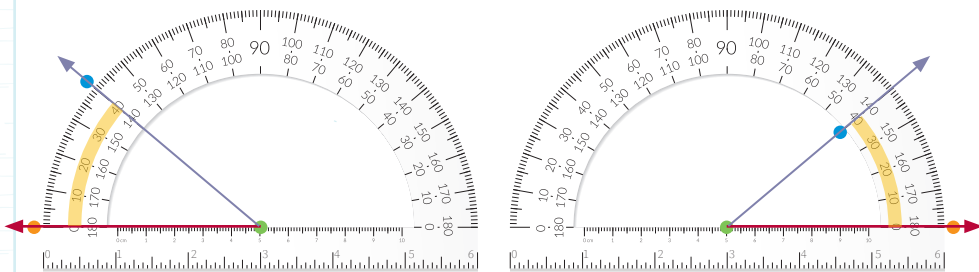
1. Place the midpoint of the protractor on the vertex of the angle.
2. Line up one side of the angle with the base line on the protractor.
3. Read the degrees where the other side of the angle crosses the number scale. Make sure to read the correct scale.



The angle above measures  $130^\circ$ .

To DRAW an angle, follow these steps:

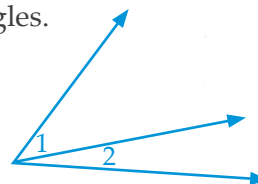
1. Draw a point at the midpoint of the protractor.
2. Draw another point at  $0^\circ$ .
3. Connect the points with a ray.
4. Draw a point to mark the degree of the angle. Make sure to read the correct number scale. This example shows a  $40^\circ$  angle.
5. Draw a ray by connecting the point at the midpoint with the point marking the degrees.



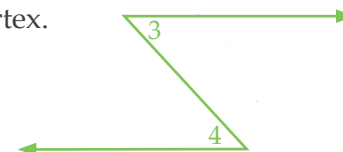
Notice that an angle can be drawn using either scale (highlighted in yellow) on a protractor.

**Adjacent angles** are two angles that have the same vertex and a common side.

Angles 1 and 2 are adjacent angles.

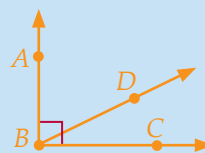


Angles 3 and 4 are not adjacent. They do not have a common vertex.

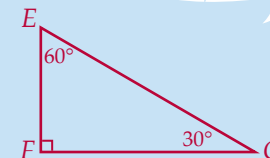


**Complementary angles** are two angles whose sum is  $90^\circ$ . When complementary angles are adjacent, they form a right angle. Angles do not have to be adjacent to be complementary.

Adding angles is really adding the measures of those angles.

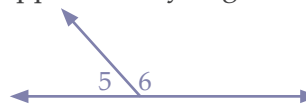


In this figure,  $\angle ABD$  and  $\angle DBC$  are complementary angles because together they form a  $90^\circ$  angle.

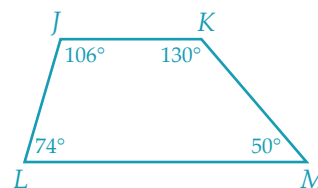


In this figure,  $\angle E$  and  $\angle G$  are complementary angles because  $60^\circ + 30^\circ = 90^\circ$ ;  $\angle E$  is the complement of  $\angle G$ , and  $\angle G$  is the complement of  $\angle E$ .

**Supplementary angles** are two angles whose sum is  $180^\circ$ . When supplementary angles are adjacent, they form a straight line.



In the top figure,  $\angle 5$  and  $\angle 6$  are supplementary angles because together they form a line, which measures  $180^\circ$ .



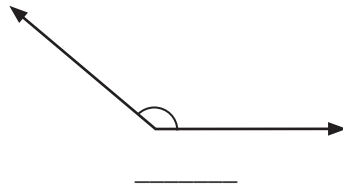
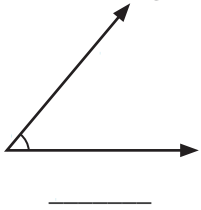
In this trapezoid,  $\angle J$  and  $\angle L$  are supplementary angles. The supplement of  $\angle J$  is  $\angle L$ ; the sum of their angle measures is  $180^\circ$ .  $\angle K$  and  $\angle M$  are also supplementary angles.

Practice

Hint: You can extend a side to make it easier to measure.



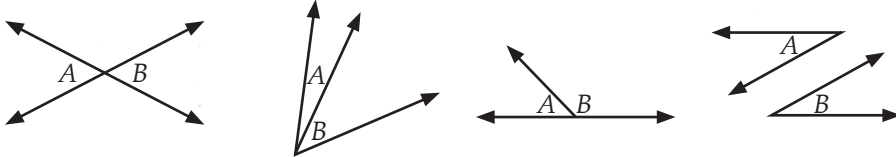
1. Measure each angle.



2. Draw each angle using the measure given.  
35°

100°

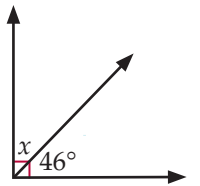
3. Circle each image where  $\angle A$  and  $\angle B$  are adjacent angles.



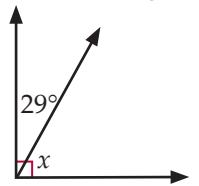
4. Find the complementary angle measures. The first one is given as an example.

40° 50°      30° \_\_\_\_\_      80° \_\_\_\_\_  
72° \_\_\_\_\_      16° \_\_\_\_\_      53° \_\_\_\_\_

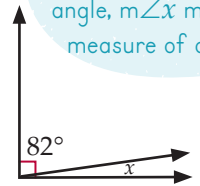
5. Find the measure of  $\angle x$  in each right angle.



$m\angle x =$  \_\_\_\_\_



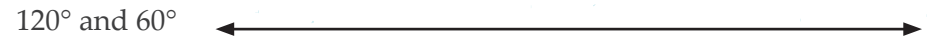
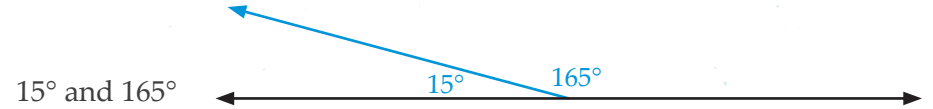
$m\angle x =$  \_\_\_\_\_



$m\angle x =$  \_\_\_\_\_

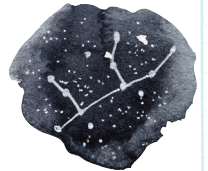
When writing a degree measure for an angle,  $m\angle x$  means "the measure of angle  $x$ ."

6. Draw a ray to create supplementary angles with the measures given. The first one is given as an example.

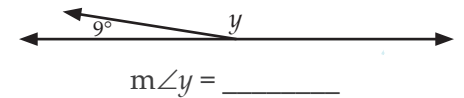
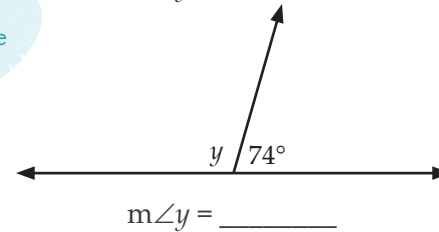
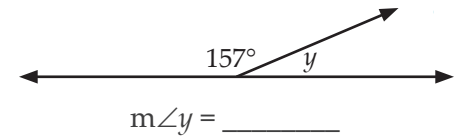
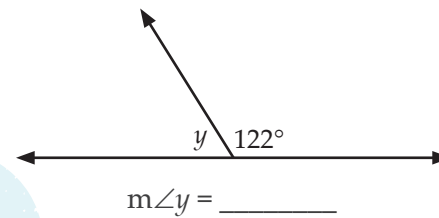


7. Find the supplementary angle measures.

142° \_\_\_\_\_      25° \_\_\_\_\_      105° \_\_\_\_\_  
18° \_\_\_\_\_      167° \_\_\_\_\_      32° \_\_\_\_\_

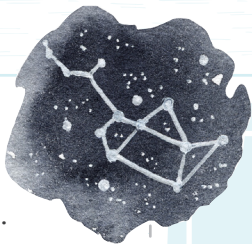


8. Find the measure of  $\angle y$  in each straight angle.

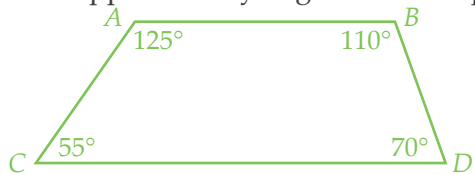




**Practice**



9. Find each pair of supplementary angles in the trapezoid.



\_\_\_\_\_ & \_\_\_\_\_                      \_\_\_\_\_ & \_\_\_\_\_

**10. SEEK AND CIRCLE!**

Angle measures are listed below. Circle **complementary angle measures in green** and **supplementary angle measures in red**. The pairs of angles can be horizontal, vertical, or diagonal. An example is given.

5°	80°	8°	34°
100°	85°	91°	115°
65°	102°	157°	23°
41°	49°	61°	14°
130°	24°	135°	76°
74°	50°	45°	59°
121°	52°	38°	133°
163°	17°	54°	75°
3°	87°	18°	105°

★ Hint: Circle 5 pairs of complementary angles and 5 pairs of supplementary angles.

**Review**

1. Evaluate the expression. [Lesson 20](#)

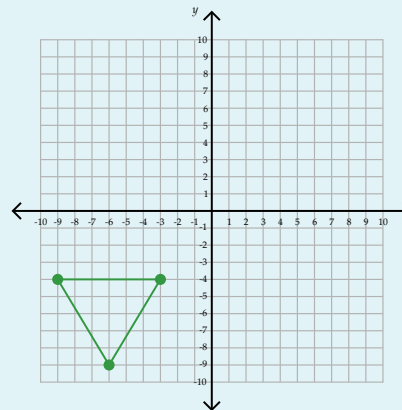
$$200 - 11 \cdot 12 + 6^2 \div 4 + (14 - 9)$$

\_\_\_\_\_

2. Evaluate the expression  $a + b^2 - 3$  when  $a = 2.5$  and  $b = 4$ .  
[Lesson 35](#)

\_\_\_\_\_

3. Reflect the triangle over the  $y$ -axis. Then translate it 3 units up. [Lesson 36](#)



Write the coordinates of the final figure.

\_\_\_\_\_

4. Classify each angle by its degree measure. Write A for acute, R for right, O for obtuse, and S for straight. [Lesson 37](#)

90° \_\_\_\_\_      106° \_\_\_\_\_      180° \_\_\_\_\_      56° \_\_\_\_\_

# ARCHES National Park PUZZLES

There is no video or review for this lesson.

Complete the three puzzles.

Arches National Park is located in southeastern Utah, USA. There are more than 2,000 arches in the park. The exact number changes as new arches are discovered and others fall.

**1** **FOUR FAMILIES** visited Arches National Park, and each family hiked a different trail. Find out which family hiked which trail and the distance they hiked by solving the logic puzzle on the right. Note that these hike distances are actual round-trip distances.

- The Taylor family did not hike to Tower Arch.
- The Wang family hiked the farthest.
- The Garcia family hiked farther than the Taylor family.
- The Hansen family includes a toddler, so they hiked less than one mile.
- The Park Avenue trail is one mile each way.
- The Tower Arch trail is shorter than the Delicate Arch trail but longer than the Park Avenue trail.

		Hike Distance				Trail			
		0.4 miles	2 miles	2.6 miles	3 miles	DELICATE ARCH	SKYLINE ARCH	PARK AVENUE	TOWER ARCH
Family	Taylor								
	Wang								
	Garcia								
	Hansen								
Trail	DELICATE ARCH								
	SKYLINE ARCH								
	PARK AVENUE								
	TOWER ARCH								

Hint: Put an X in a box if it can be ruled out and a ✓ in a box if you are sure of an answer.

**2** FIND THE NUMERIC VALUE of each animal found in Arches National Park. Note that this puzzle may require some guess and check. Use what you know and keep trying different combinations of numbers!

$$\text{Frog} \div \text{Pigeon} = \text{Frog}$$

$$\text{Mouse} + \text{Pigeon} + \text{Mouse} = 33$$

$$\text{Frog} + \text{Deer} = 27$$

$$\text{Deer} - \text{Frog} = 3$$

You will know you are correct if your solutions make the following equation true.

$$\text{Frog} + \text{Pigeon} \cdot \text{Deer} - \sqrt{\text{Mouse}} = 23$$

**3** THE MOHAMED FAMILY is fortunate to live within driving distance of Arches National Park. They have set aside three Saturdays in June for hiking in the park, and their goal is to hike 15 miles that month. Using the numbers 1–4 and 6–9 exactly once, complete the puzzle to find four combinations of three hike lengths that would total 15 miles. In other words, each line of numbers should add up to 15. The center number is given for you.



# SOLVING EQUATIONS WITH DECIMALS & FRACTIONS

▶ Watch the video lesson and/or read the mini lesson.

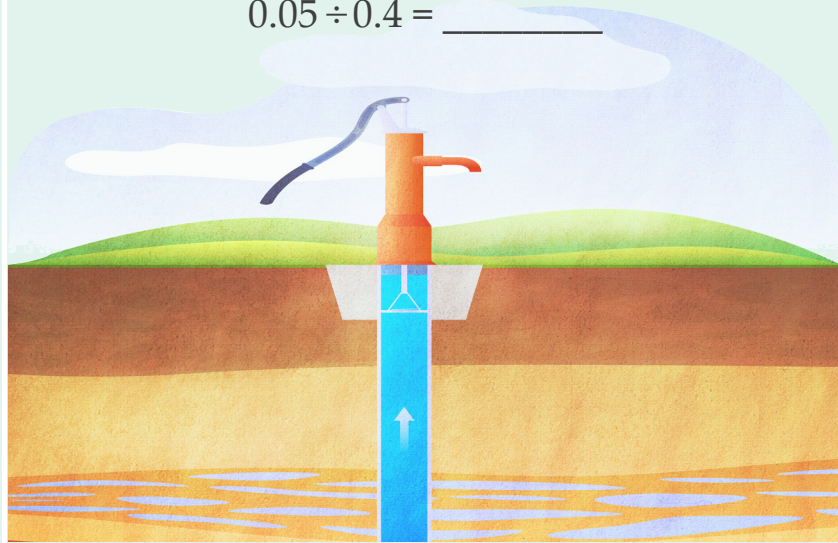
## Warm-Up

Complete the following problems.

$$0.05 + 0.4 = \underline{\hspace{2cm}}$$

$$0.05 \cdot 0.4 = \underline{\hspace{2cm}}$$

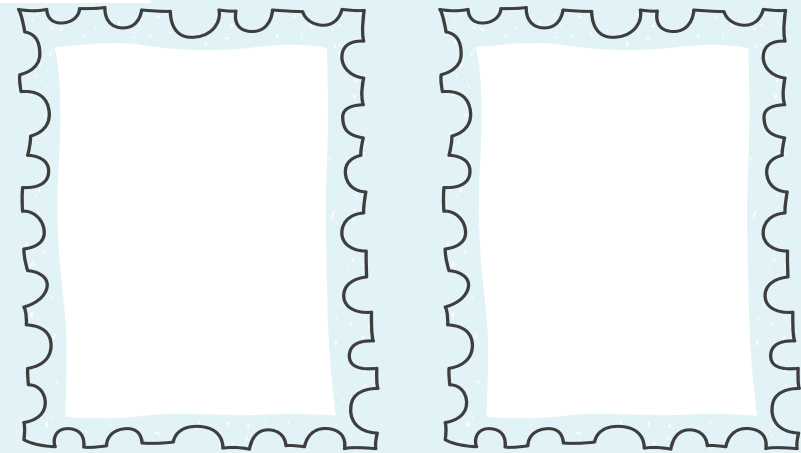
$$0.05 \div 0.4 = \underline{\hspace{2cm}}$$



## Video Lesson



Scan the QR code or watch the video lesson on [goodandbeautiful.com/Math6](http://goodandbeautiful.com/Math6).



## Mental Math Checkup

- Evaluate the following.  
 $\sqrt{81} = \square$        $\sqrt{16} = \square$
- Fill in the missing operations that make the equation true.  
 $3 \square 8 = 6 \square 4$
- Start at 0. Perform each operation in the following order:  
 $\times 12, +9, \times 3, +3, \div 5$        $\square$

## Mini Lesson

### Solving Equations with Decimals

Solving equations with decimals is similar to solving equations with whole numbers. Just remember a few decimal rules:

Add/Subtract line up the decimal points	Multiply multiply, then count decimal places	Divide move the decimal point in the divisor & dividend
---	--	---

$$\begin{array}{r} 0.03 \\ + 0.20 \\ \hline 0.23 \end{array}$$

$$\begin{array}{r} 0.03 \\ \times 0.2 \\ \hline 0.006 \end{array}$$

$$0.2 \overline{)0.03} \rightarrow 2 \overline{)0.30}$$



### Examples of Equations with Decimals

$$x + 4.2 = 5$$

$$\begin{array}{r} x + 4.2 = 5 \\ -4.2 \quad -4.2 \\ \hline x = 0.8 \end{array}$$

$$5.6 + x = 8.72$$

$$\begin{array}{r} 5.6 + x = 8.72 \\ -5.6 \quad -5.6 \\ \hline x = 3.12 \end{array}$$

$$3.2x = 4$$

$$\begin{array}{r} 3.2x = 4 \\ \cancel{3.2} \quad \cancel{3.2} \\ \hline 3.2 \end{array}$$

scratch work

$$\begin{array}{r} 3.2 \overline{)4.0} \\ \underline{32} \phantom{00} \\ 1.25 \\ 32 \overline{)40.00} \end{array}$$

$$x = 1.25$$

$$5x = 4.5$$

$$\begin{array}{r} 5x = 4.5 \\ \cancel{5} \quad \cancel{5} \\ \hline 5 \end{array}$$

scratch work

$$\begin{array}{r} 0.9 \\ 5 \overline{)4.5} \end{array}$$

$$x = 0.9$$

$$\frac{x}{1.2} = 8$$

$$\begin{array}{r} 1.2 \cdot \frac{x}{1.2} = 8 \cdot 1.2 \end{array}$$

scratch work

$$\begin{array}{r} 1 \\ 1.2 \\ \times 8 \\ \hline 9.6 \end{array}$$

$$x = 9.6$$

### Solving Equations with Fractions

When a coefficient is a fraction, multiply the coefficient by its reciprocal to isolate the variable. Then multiply the other side by the same number.

Example:

$$\frac{2}{3}x = 4$$

Multiply by the reciprocal of the coefficient.

$$\frac{3}{2} \cdot \frac{2}{3}x = \frac{3}{1} \cdot \frac{3}{1}$$

Cancel first; then multiply.

$$x = \frac{6}{1}$$

Simplify the fraction.

$$x = 6$$

A number multiplied by its reciprocal is 1.

### Additional Examples of Equations with Fractions

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

$$\begin{array}{r} x + \frac{1}{4} = \frac{2}{3} \\ -\frac{1}{4} \quad -\frac{1}{4} \\ \hline x = \frac{5}{12} \end{array}$$

$$x = \frac{2}{3} - \frac{1}{4}$$

$$x = \frac{8}{12} - \frac{3}{12}$$

$$x = \frac{5}{12}$$

$$x - 6 = \frac{3}{5}$$

$$\begin{array}{r} x - 6 = \frac{3}{5} \\ +6 \quad +6 \\ \hline x = \frac{3}{5} + 6 \end{array}$$

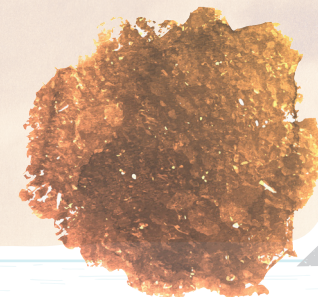
$$x = \frac{3}{5} + 6$$

$$x = 6\frac{3}{5}$$

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

$$\begin{array}{r} \frac{4}{3} \cdot \frac{3}{4}x = \frac{5}{8} \cdot \frac{4}{3} \\ \hline x = \frac{5}{2} \end{array}$$

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





# DE DECIMALS P

Find the value of each variable.

$$h - 1.4 = 3$$

$$h = \underline{\quad}$$

$$3.1 + f = 4.5$$

$$f = \underline{\quad}$$

$$8.02 = g + 7.3$$

$$g = \underline{\quad}$$

$$j - 1.63 = 7$$

$$j = \underline{\quad}$$

$$2c = 5$$

$$c = \underline{\quad}$$

$$4b = 5.28$$

$$b = \underline{\quad}$$

$$20 = 2.5d$$

$$d = \underline{\quad}$$

$$12 = 0.8a$$

$$a = \underline{\quad}$$

$$\frac{p}{5} = 1.4$$

$$p = \underline{\quad}$$

$$10 = \frac{m}{2.2}$$

$$m = \underline{\quad}$$

$$\frac{n}{6} = 3.6$$

$$n = \underline{\quad}$$

$$\frac{q}{4.2} = 2.5$$

$$q = \underline{\quad}$$

$$\frac{3}{4}w = 6$$

$$w = \underline{\quad}$$

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

$$z = \underline{\quad}$$

$$2 = \frac{4}{5}x$$

$$x = \underline{\quad}$$

$$\frac{7}{9}y = \frac{14}{3}$$

$$y = \underline{\quad}$$

$$s - \frac{5}{8} = 9$$

$$s = \underline{\quad}$$

$$u + \frac{1}{3} = \frac{7}{6}$$

$$u = \underline{\quad}$$

$$t - 4 = \frac{2}{9}$$

$$t = \underline{\quad}$$

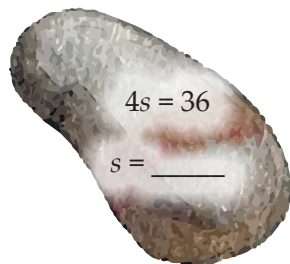
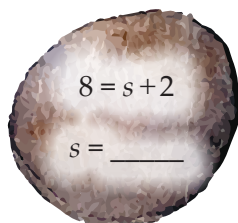
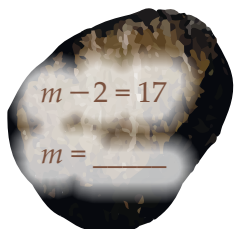
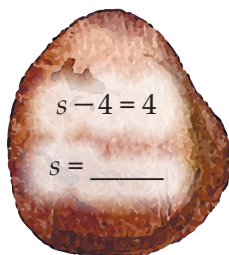
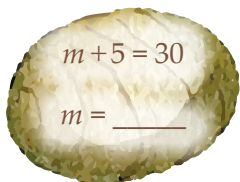
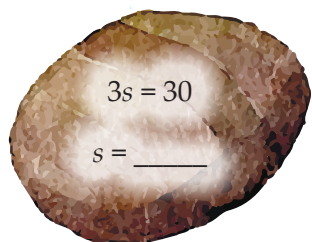
$$\frac{2}{3} + v = \frac{4}{5}$$

$$v = \underline{\quad}$$

# Rock Equations

## Practice

The earth's crust is thickest beneath mountains in the Himalayas and thinnest in the ocean. Solve the equations on the rocks to find the average thickness of the crust below land and below the ocean.



The crust below land is about \_\_\_\_\_ km (\_\_\_\_\_ mi) thick.  
largest value of  $m$     smallest value of  $m$

The crust below the ocean is about \_\_\_\_\_ km (\_\_\_\_\_ mi) thick.  
largest value of  $s$     smallest value of  $s$

## Review

- Nico had 54 baseball trading cards. He was given  $c$  trading cards for Christmas. Write an expression that shows how many trading cards Nico has now. [Lesson 34](#)
- On the first line, substitute the given values in place of the variables. On the second line, evaluate the expression. [Lesson 35](#)  
 $a^2 - 2b + 7$      $a = 5, b = 11$     \_\_\_\_\_  
\_\_\_\_\_
- Factor each expression. [Lesson 48](#)  
 $8 + 12 =$      $10 + 75 =$
- Lola made  $n$  cupcakes for a bake sale. She sold 19 cupcakes and has 16 left to sell. Write and solve an equation to find the number of cupcakes Lola made. [Lesson 49](#)

- Solve each equation. [Lesson 50](#)

$9a = 81$

$11b = 132$

$65 = 5c$

$a = \underline{\hspace{2cm}}$

$b = \underline{\hspace{2cm}}$

$c = \underline{\hspace{2cm}}$

UNIT 2  
REVIEW

Poetry can be a beautiful representation of many parts of life. Robert Frost wrote a poem titled “The Road Not Taken” in 1915. Follow the roads and complete the problems to review the concepts taught in Unit 2. Then enjoy the poem at the end!

PERCENTS Lessons 44, 52–55

Find the percent of each number.

What is 20% of 40? \_\_\_\_\_

What is 125% of 8? \_\_\_\_\_

What is 30% of 7.5? \_\_\_\_\_

What is 60% of  $\frac{3}{4}$ ? \_\_\_\_\_

Find each whole.

30% of what number is 15? \_\_\_\_\_

Find each percent.

What percent of 82 is 41? \_\_\_\_\_

55 is 20% of what number? \_\_\_\_\_

45 is what percent of 150? \_\_\_\_\_

SOLVING EQUATIONS Lessons 43, 49–51

Solve each equation.

$$a - 2.5 = 4.25$$

$$22 = b + 5$$

$$3c = 36$$

$$\frac{2}{5}d = 8$$

See  
Reference  
Chart for rules  
for operations  
with integers.

ADDITION, SUBTRACTION,  
MULTIPLICATION & DIVISION OF INTEGERS

Lessons 31 & 32

Complete each problem.

$$15 - (-3) = \underline{\hspace{2cm}}$$

$$-21 + 7 = \underline{\hspace{2cm}}$$

$$5(-6) = \underline{\hspace{2cm}}$$

$$-72 \div 9 = \underline{\hspace{2cm}}$$

EXPRESSIONS Lesson 35

Evaluate each expression using the values given.

$$a = 3, b = \frac{3}{4}, c = 4.2$$

$$a^2 - 4b + c \underline{\hspace{2cm}}$$

$$3c + a - 8b \underline{\hspace{2cm}}$$

**DISTRIBUTIVE PROPERTY & FACTORING** Lessons 47 & 48

Write the second factor in expanded form, and then use the distributive property to multiply.

$3 \cdot 821 =$

$7 \cdot 1,028 =$

Factor each expression.

$9 + 63 =$

$24 + 18 =$

$75 + 15 =$

**SQUARE ROOTS, CUBE ROOTS & COMBINING LIKE TERMS** Lessons 33 & 46

Complete each problem.

$\sqrt{144} - \sqrt[3]{64} = \underline{\hspace{2cm}}$

$\sqrt[3]{125} + \sqrt{100} = \underline{\hspace{2cm}}$

$\sqrt{121} \cdot \sqrt[3]{8} = \underline{\hspace{2cm}}$

Cross out the statements that are not true.

$3a + 8b + 2a = 5a + 8b$

$4x - y = 3xy$

$2r + 4r^2 = 6r$

$5m + 4n - n = 5m + 3n$

**COMPLEX FRACTIONS** Lesson 56

Simplify the complex fractions.

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

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

$\frac{\frac{1}{4}}{\frac{5}{8}} =$

**COMPLEMENTARY & SUPPLEMENTARY ANGLES** Lesson 38

Find the complementary angle measures.

$63^\circ \underline{\hspace{1cm}}$

$18^\circ \underline{\hspace{1cm}}$

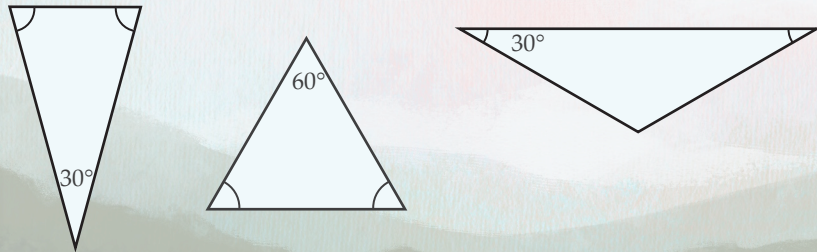
Find the supplementary angle measures.

$20^\circ \underline{\hspace{1cm}}$

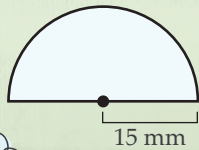
$145^\circ \underline{\hspace{1cm}}$

**SYMMETRY, TRIANGLES & SEMICIRCLES** Lessons 36, 39 & 42

Write the missing angle measures on each triangle. Then circle the triangle(s) that have rotational symmetry.



Find the area and perimeter of the semicircle.



$A \approx$  \_\_\_\_\_

$P \approx$  \_\_\_\_\_

See Reference Chart for area & perimeter formulas.

**ANGLES** Lesson 37

Classify each angle as acute (A), right (R), obtuse (O), or straight (S).

$90^\circ$  \_\_\_\_\_

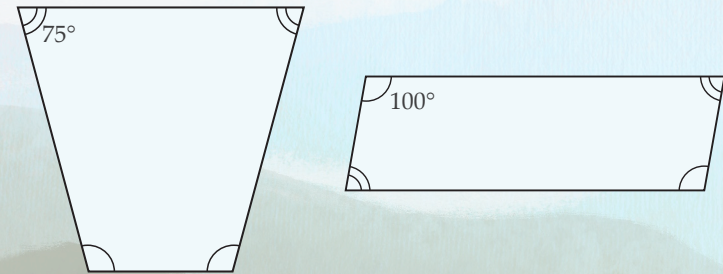
$15^\circ$  \_\_\_\_\_

$173^\circ$  \_\_\_\_\_

$180^\circ$  \_\_\_\_\_

**SYMMETRY & QUADRILATERALS** Lessons 36 & 40

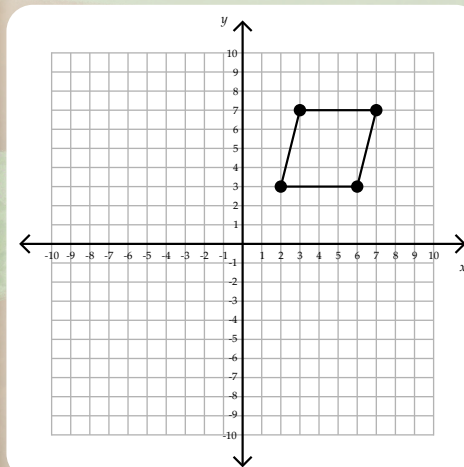
Draw all lines of symmetry on the shapes below. Then write the missing angle measures.



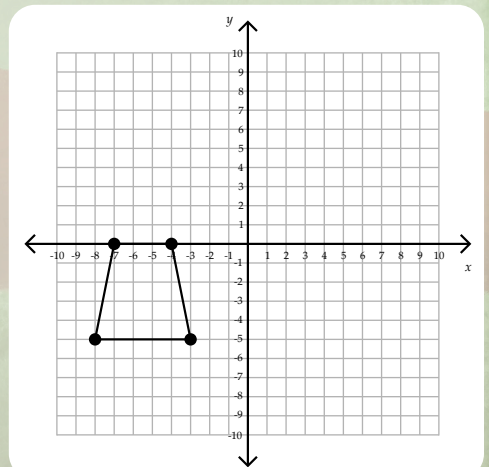
**TRANSFORMATIONS** Lesson 36

Translate each shape according to the information given.

Translate the parallelogram 3 units left and 2 units up. Then reflect it over the  $x$ -axis.

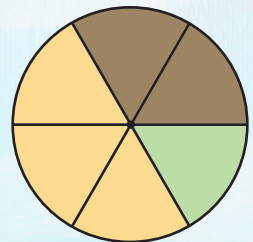


Translate the trapezoid 2 units right and 4 units down. Then reflect it over the  $y$ -axis.



**CIRCLES** Lesson 41

The circle below is divided evenly. Find the measure of the central angle formed by each colored section.



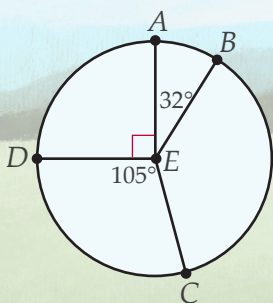
yellow: \_\_\_\_\_

brown: \_\_\_\_\_

green: \_\_\_\_\_

Find the measure of  $\angle BEC$  on  $\odot E$ .

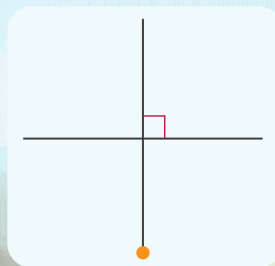
$m\angle BEC =$  \_\_\_\_\_



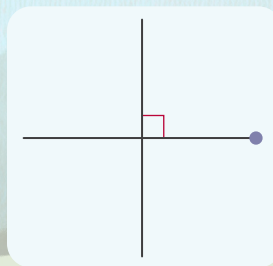
**IDENTIFYING TURNS** Lesson 57

Draw each turn starting at the dot according to the information given.

90° turn  
counterclockwise



270° turn  
clockwise



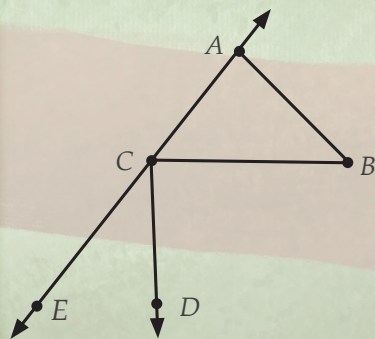
Convert between degrees and turns.

$1\frac{3}{4}$  turns  $\rightarrow$  \_\_\_\_\_

$900^\circ \rightarrow$  \_\_\_\_\_

**GEOMETRIC FIGURES** Lesson 37

Using letters and symbols, write the name of each geometric figure below.



1 line segment:

1 line:

1 ray:

1 triangle:

**THE ROAD NOT TAKEN**

By Robert Frost

Two roads diverged in a yellow wood,  
And sorry I could not travel both  
And be one traveler, long I stood  
And looked down one as far as I could  
To where it bent in the undergrowth;

Then took the other, as just as fair,  
And having perhaps the better claim,  
Because it was grassy and wanted wear;  
Though as for that the passing there  
Had worn them really about the same,

And both that morning equally lay  
In leaves no step had trodden black.  
Oh, I kept the first for another day!  
Yet knowing how way leads on to way,  
I doubted if I should ever come back.

I shall be telling this with a sigh  
Somewhere ages and ages hence:  
Two roads diverged in a wood, and I—  
I took the one less traveled by,  
And that has made all the difference.

Simply

Good and Beautiful

# MATH

# 6

COURSE BOOK

$$\frac{1 \text{ cm}}{12 \text{ ft}} = \frac{4 \text{ cm}}{x \text{ ft}}$$

$h = 2,560 \text{ m}$

68 °F / 20 °C

72°

rate: 3.5 mph

# Book 2 Table of Contents

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# UNIT 3 OVERVIEW

## LESSONS 61–90

### Extra Supplies Needed

- colored pencils
- protractor
- ruler
- 2 standard dice
- coin
- scissors
- bowl

### New Concepts Taught

- angle bisectors
- calculate discount and sale price
- check solutions to inequalities
- compare ratios
- compound interest
- compound probability with multiplication
- cross products with proportions
- dependent and independent variables
- distributive property with variables
- equations with square roots and cube roots
- equations with squared and cubed variables
- estimate square roots
- experimental probability
- factor expressions with variables
- fractions of a group—solve for the part, fraction, or whole
- graph inequalities on number lines
- graph lines on coordinate planes
- independent events with probability
- input/output tables for equations
- percent equation
- perpendicular bisectors
- predict outcomes of probability experiments
- proportions on a graph
- sample space
- simple interest
- solve one-step inequalities
- solve two-step equations
- solve two-step inequalities
- square roots of perfect squares greater than 225
- tax and total cost with tax
- theoretical probability
- total cost of discounted item with tax
- tree diagrams to record probability outcomes
- unit multipliers
- volume of prisms
- write an inequality from a graph

### Concepts Reviewed and Expanded Upon

- add and subtract mass, length, and capacity
- check solutions to equations
- conversions—capacity
- conversions—length
- conversions—mass and weight
- inverse operations
- probability experiments
- probability outcomes
- proportional relationships
- proportions
- ratios
- simple probability
- US customary system and metric system
- volume of cubes, rectangular prisms, and cylinders

# ESTIMATING & FINDING SQUARE ROOTS

Watch the video lesson and/or read the mini lesson.

## Warm-Up

Complete the problems below.

$4 \cdot \underline{\quad} = 400$

$9 \cdot \underline{\quad} = 900$

$\sqrt{4} = \underline{\quad}$

$\sqrt{9} = \underline{\quad}$

$\sqrt{100} = \underline{\quad}$

$\sqrt{100} = \underline{\quad}$

$\sqrt{4} \cdot \sqrt{100} = \underline{\quad}$

$\sqrt{9} \cdot \sqrt{100} = \underline{\quad}$

$20^2 = \underline{\quad}$

$30^2 = \underline{\quad}$

$\sqrt{400} = \underline{\quad}$

$\sqrt{900} = \underline{\quad}$



## Video Lesson



Scan the QR code or watch the video lesson on [goodandbeautiful.com/Math6](http://goodandbeautiful.com/Math6).

$\sqrt{10}$

$\underline{\quad} < \underline{\quad} < \underline{\quad}$

$\underline{\quad} < \underline{\quad} < \underline{\quad}$

$\sqrt{10}$  is a decimal number between  $\underline{\quad}$  and  $\underline{\quad}$ .

## Mental Math Checkup

1. Count by  $\frac{1}{4}$  from 5 to  $7\frac{1}{4}$ .

<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------	----------------------

2. Find each percent.

What is 10% of 250?

What is 10% of 120?

3. Multiply or divide.

$400 \div 8 = \underline{\quad}$

$50 \cdot 11 = \underline{\quad}$



## Mini Lesson

The square root of a perfect square is a whole number. Examples:

$$\begin{array}{cccccc} \sqrt{1} = 1 & \sqrt{16} = 4 & \sqrt{49} = 7 & \sqrt{100} = 10 & \sqrt{169} = 13 & \\ \sqrt{4} = 2 & \sqrt{25} = 5 & \sqrt{64} = 8 & \sqrt{121} = 11 & \sqrt{196} = 14 & \\ \sqrt{9} = 3 & \sqrt{36} = 6 & \sqrt{81} = 9 & \sqrt{144} = 12 & \sqrt{225} = 15 & \end{array}$$

### Estimating Square Roots

The square root of a number that is not a perfect square is not a whole number. Its value can be estimated by finding the two whole numbers that it is between.

Example: Find the approximate value of  $\sqrt{30}$ .

- Find two consecutive square roots of perfect squares that  $\sqrt{30}$  is between.

$$\begin{array}{l} \sqrt{25} = 5 \\ \sqrt{30} = ? \\ \sqrt{36} = 6 \end{array}$$

Consecutive numbers follow each other in order.

$$\begin{array}{l} \sqrt{30} \text{ is between } \sqrt{25} \text{ and } \sqrt{36} \\ \sqrt{25} \text{ is less than } \sqrt{30} \quad \text{AND} \quad \sqrt{30} \text{ is less than } \sqrt{36} \\ \sqrt{25} < \sqrt{30} \qquad \qquad \qquad \sqrt{30} < \sqrt{36} \\ \sqrt{25} < \sqrt{30} < \sqrt{36} \end{array}$$

Notice how those two inequalities can be combined to write a compound inequality.

- The smallest value is on the left.
- The common number is in the middle.
- The largest value is on the right.
- Less than symbols are between the numbers because the first number is less than the middle number, and the middle number is less than the last number.

- Simplify the square roots that are perfect squares.

$$\begin{array}{l} \sqrt{25} < \sqrt{30} < \sqrt{36} \\ 5 < \sqrt{30} < 6 \end{array}$$

The value of  $\sqrt{30}$  is a decimal number between 5 and 6.

### Square Roots of Perfect Squares Greater Than 225

To find the square root of a perfect square greater than 225, use square roots of perfect squares that are multiples of 100 as benchmarks.

Examples:  $\sqrt{100} = 10$     $\sqrt{400} = 20$     $\sqrt{900} = 30$     $\sqrt{1,600} = 40$

Since a perfect square is a number multiplied by itself, the last digit of the perfect square can also be used as a clue.

Example: Simplify  $\sqrt{784}$ .

- Find the first digit of the answer by using square roots that are multiples of 100 as benchmarks.

$$\begin{array}{l} \sqrt{400} = 20 \text{ and } \sqrt{900} = 30 \\ \sqrt{784} \text{ is between } \sqrt{400} \text{ and } \sqrt{900} \\ \sqrt{400} \text{ is less than } \sqrt{784} \quad \text{AND} \quad \sqrt{784} \text{ is less than } \sqrt{900} \\ \sqrt{400} < \sqrt{784} \qquad \qquad \qquad \sqrt{784} < \sqrt{900} \\ 20 < \sqrt{784} < 30 \end{array}$$

The value of  $\sqrt{784}$  is between 20 and 30, so  $\sqrt{784}$  is a number in the 20s. Two is the first digit.

$$\sqrt{784} = 2?$$

- Find the last digit of the answer by thinking of perfect squares. The last digit in 784 is 4. What single-digit number multiplied by itself could equal a number that ends in 4?

$$2^2 = \underline{4} \quad 8^2 = 6\underline{4}$$

The last digit is either 2 or 8.

Since 784 is closer to 900 than 400, the last digit is probably 8.

Does  $\sqrt{784}$  equal 28?

Check to see if  $28^2$  is 784.

$$\sqrt{784} = 28 \checkmark$$

Notice the pattern!  
 $\sqrt{4} = 2$   
 $\sqrt{400} = 20$

scratch work

28
$\times 28$
224
$+ 560$
784



## Practice

1. Write each square root in the blue box below between the consecutive square roots of perfect squares it is between. Then cross it off in the blue box. The first one is given as an example.

<del><math>\sqrt{53}</math></del>	$\sqrt{18}$	$\sqrt{44}$	$\sqrt{3}$	$\sqrt{172}$	$\sqrt{159}$
$\sqrt{6}$	$\sqrt{131}$	$\sqrt{70}$	$\sqrt{99}$	$\sqrt{10}$	$\sqrt{212}$

$\sqrt{1}$  \_\_\_\_\_  $\sqrt{4}$  \_\_\_\_\_  $\sqrt{9}$  \_\_\_\_\_  $\sqrt{16}$  \_\_\_\_\_  $\sqrt{25}$

$\sqrt{36}$  \_\_\_\_\_  $\sqrt{49}$   $\sqrt{53}$   $\sqrt{64}$  \_\_\_\_\_  $\sqrt{81}$  \_\_\_\_\_  $\sqrt{100}$

$\sqrt{121}$  \_\_\_\_\_  $\sqrt{144}$  \_\_\_\_\_  $\sqrt{169}$  \_\_\_\_\_  $\sqrt{196}$  \_\_\_\_\_  $\sqrt{225}$

2. Find the consecutive square roots of perfect squares that each square root listed is between. Then fill in the inequality symbols to write a compound inequality. The first one is given as an example.

$\sqrt{36} < \sqrt{45} < \sqrt{49}$  \_\_\_\_\_  $\sqrt{59}$  \_\_\_\_\_

\_\_\_\_\_  $\sqrt{28}$  \_\_\_\_\_ \_\_\_\_\_  $\sqrt{2}$  \_\_\_\_\_

\_\_\_\_\_  $\sqrt{183}$  \_\_\_\_\_ \_\_\_\_\_  $\sqrt{134}$  \_\_\_\_\_

\_\_\_\_\_  $\sqrt{109}$  \_\_\_\_\_ \_\_\_\_\_  $\sqrt{200}$  \_\_\_\_\_

\_\_\_\_\_  $\sqrt{11}$  \_\_\_\_\_ \_\_\_\_\_  $\sqrt{48}$  \_\_\_\_\_

3. Using the information in the first column in Problem 2, fill in the blanks. The first one is given as an example.

$\sqrt{45}$  is a decimal number between 6 and 7.

$\sqrt{28}$  is a decimal number between \_\_\_\_\_ and \_\_\_\_\_.

$\sqrt{183}$  is a decimal number between \_\_\_\_\_ and \_\_\_\_\_.

$\sqrt{109}$  is a decimal number between \_\_\_\_\_ and \_\_\_\_\_.

$\sqrt{11}$  is a decimal number between \_\_\_\_\_ and \_\_\_\_\_.

4. Find the two whole numbers each square root is between. The first one is given as an example.

$\sqrt{93}$   $\sqrt{54}$   
 $\sqrt{81} < \sqrt{93} < \sqrt{100}$   
 $9 < \sqrt{93} < 10$

$\sqrt{93}$  is between 9 and 10.  $\sqrt{54}$  is between \_\_\_\_\_ and \_\_\_\_\_.

$\sqrt{205}$   $\sqrt{70}$

$\sqrt{205}$  is between \_\_\_\_\_ and \_\_\_\_\_.  $\sqrt{70}$  is between \_\_\_\_\_ and \_\_\_\_\_.

$\sqrt{129}$   $\sqrt{8}$

$\sqrt{129}$  is between \_\_\_\_\_ and \_\_\_\_\_.  $\sqrt{8}$  is between \_\_\_\_\_ and \_\_\_\_\_.

## Practice

5. The numbers under the square root symbols below are perfect squares. Simplify each square root. The first one is given as an example.

$$\sqrt{676}$$

$$\sqrt{400} < \sqrt{676} < \sqrt{900}$$

$$20 < \sqrt{676} < 30$$

$$\sqrt{676} = 2 \underline{\quad} ?$$

Try 4 or 6 for the second digit.

$$24^2 = 576$$

$$26^2 = 676 \checkmark$$

$$\sqrt{676} = 26$$

$$\sqrt{625}$$

$$\sqrt{441}$$

$$\sqrt{289}$$



## Review

1. Find all solutions to the equations. *Lessons 61 & 62*

$$x^3 = -343$$

$$x^3 = 216$$

$$x^2 = 225$$

$$\sqrt{x} = 11$$

2. Write and solve an equation for each scenario. *Lessons 54 & 55*

A restaurant's seats are currently 40% full. There are 56 customers already seated. How many seats are in the restaurant?

There are 8 receivers on an American football team with 50 players. What percent of the team are receivers?

3. Evaluate each expression. *Lessons 19 & 20*

$$4.43 + \left(\frac{1}{2}\right)^3 \cdot 4^2 \underline{\hspace{2cm}}$$

$$\frac{(-1.2)^2}{3} + 5^3 \underline{\hspace{2cm}}$$





**Fall**

Find the numerical value of each of the four fall items: leaf, apple, pumpkin, and scarecrow.

★ Hint: Don't try to solve the equations in order. Only one equation can be solved first, and the solution to that equation will help you solve another equation.



$$8.3 = \text{apple} + \text{apple}$$



$$\text{leaf} - \text{apple} = 1.3$$

- leaf =
- apple =
- pumpkin =
- scarecrow =

**Winter**

Four different families have planned a family ski trip to four different countries during four different winter months. Use the clues to figure out which family is going to which country during which month.

★ Hint: Once you know an answer, put a ✓ in that box and fill in the rest of the row and column of that 4 x 4 box with Xs. You may need to go through the clues more than once. You may use a map if needed.

		Month				Country			
		December	January	February	March	Switzerland	United States	France	Canada
Family	Schmidt								
	Noor								
	Chen								
	Lopez								
Country	Switzerland								
	United States								
	France								
	Canada								



- The Chen family is not going to Europe.
- The family who is traveling to France will go during the week of Christmas.
- The Noor family is not traveling to North America.
- The Schmidt family will travel three weeks after the family who is going to France and will visit the country north of the United States.
- The Chen family will be traveling one month after the Schmidt family and one month before the Noor family.

Lesson  
78

# PROBABILITY EXPERIMENTS



There is no video or review for this lesson.

**Theoretical probability** is the expected probability of an event occurring.

$$\frac{\text{number of desired outcomes}}{\text{number of possible outcomes}}$$

**Experimental probability** is the probability of an event occurring based on the results of an experiment.

$$\frac{\text{number of times an event happened in an experiment}}{\text{number of possible outcomes}}$$

The set of all possible outcomes of a probability experiment is called the **sample space**. A tree diagram or chart can be used to show the sample space.

## Dice Experiments

Complete the first chart to show the sample space for rolling two dice. Examples are given.

	1, 1	1, 2	1, 3			
	2, 1			2, 4		

Complete the chart to show the sample space for the **sum** of the numbers shown on the dice. Examples are given.

	2	3	4			
	3			6		

Write the number of possible outcomes for rolling two dice and getting the sums below.

- 1 \_\_\_\_ 2 \_\_\_\_ 3 \_\_\_\_ 4 \_\_\_\_ 5 \_\_\_\_ 6 \_\_\_\_  
 7 \_\_\_\_ 8 \_\_\_\_ 9 \_\_\_\_ 10 \_\_\_\_ 11 \_\_\_\_ 12 \_\_\_\_

Write the theoretical probability of rolling each sum. Examples are given.

- 1 0 2 \_\_\_\_ 3  $\frac{1}{18}$  4 \_\_\_\_ 5 \_\_\_\_ 6 \_\_\_\_  
 7 \_\_\_\_ 8 \_\_\_\_ 9 \_\_\_\_ 10 \_\_\_\_ 11 \_\_\_\_ 12 \_\_\_\_

When rolling two dice, which sum is most likely to be rolled? (Write the sum that has the highest theoretical probability.) \_\_\_\_

What is the theoretical probability of rolling doubles (the same number on both dice)? \_\_\_\_





Roll two standard dice and use tally marks to record the outcomes. Repeat for a total of 36 dice rolls. Then write the frequency (the number of tally marks) for each outcome.

Sum of Numbers on Dice	Tally Marks	Frequency	Frequency Expected
2			1
3			2
4			3
5			4
6			5
7			6
8			5
9			4
10			3
11			2
12			1

Which outcome(s) occurred the most? \_\_\_\_\_

Which outcome(s) occurred the least? \_\_\_\_\_

How do the results compare to the expected frequencies? \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Why do you think the results are different from the expected frequencies?

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Based on your results, what is the experimental probability of rolling each sum?

1 \_\_\_\_ 2 \_\_\_\_ 3 \_\_\_\_ 4 \_\_\_\_ 5 \_\_\_\_ 6 \_\_\_\_

7 \_\_\_\_ 8 \_\_\_\_ 9 \_\_\_\_ 10 \_\_\_\_ 11 \_\_\_\_ 12 \_\_\_\_

This space is intentionally left blank for double-sided printing purposes.

### Drawing Names Experiment

A homeschool co-op was performing probability experiments. Students' names were written on tickets and put in a bowl. Some names were written more than once. The tickets are shown below. Answer the questions below first. Next, cut the tickets out, fold each one in half to hide the name, and put the tickets in a bowl. Then follow the instructions on the right side of this page.

How many tickets were in the bowl? \_\_\_\_\_

Which name has the highest theoretical probability of being drawn?  
\_\_\_\_\_

What is the theoretical probability of drawing that name? \_\_\_\_\_

Which two names have the second-highest probability of being drawn? \_\_\_\_\_ and \_\_\_\_\_

Octavio	Octavio	Merrill
Merrill	Merrill	Natalia
Keith	Keith	Angelica
Angelica	James	Fredrik
Fredrik	Krista	Krista
Krista	Krista	Krista
Emilia	Emilia	Ryan
Ryan	Drake	Arthur
Arthur	Arthur	Adrian
Jamie	Jamie	Preston

Draw one ticket from the bowl. Which name did you draw?  
\_\_\_\_\_

Put the ticket back in the bowl and mix them up. Draw another ticket. Which name did you draw? \_\_\_\_\_

Because Krista's name is on  $\frac{1}{6}$  of the tickets, she would theoretically have her name drawn 1 time out of every 6 draws. Draw a ticket 6 times, returning the drawn ticket and mixing up the tickets each time. How many times did you draw Krista's name? \_\_\_\_\_

Return all tickets to the bowl and mix them up. Draw a ticket 10 times, putting the ticket back in the bowl after each draw, and record the results (names) below.

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

Based on your experiment, what is the experimental probability of drawing . . .

Merrill's name? \_\_\_\_\_

Krista's name? \_\_\_\_\_

Keith's name? \_\_\_\_\_

Arthur's name? \_\_\_\_\_

Drake's name? \_\_\_\_\_

Who has the highest experimental probability of winning the drawing? \_\_\_\_\_

How could Drake increase the theoretical probability of his name being drawn? \_\_\_\_\_



### Coin Experiments

What is the theoretical probability of flipping heads on a coin? \_\_\_\_\_

What is the theoretical probability of flipping tails on a coin? \_\_\_\_\_

If you flip a coin 10 times, how many times do you expect it to land on heads? \_\_\_\_\_ tails? \_\_\_\_\_

Now flip a coin 10 times. Each time write a tally mark on the chart to record the outcome. Then write the frequency for each outcome.

Heads	Tails
Frequency of heads:	Frequency of tails:

Did you get exactly 5 heads and 5 tails? \_\_\_\_\_

In 50 tosses, how many times would you expect the coin to land on heads? \_\_\_\_\_ tails? \_\_\_\_\_



Now toss the coin 50 times. Record the results on the chart below.

Heads	Tails
Frequency of heads:	Frequency of tails:

What is the theoretical probability of getting heads in 50 coin tosses? \_\_\_\_\_ tails? \_\_\_\_\_

Based on the results of 50 tosses, what is the experimental probability of tossing heads? \_\_\_\_\_ tails? \_\_\_\_\_

Are the results closer to the theoretical probability of  $\frac{1}{2}$  heads and  $\frac{1}{2}$  tails with 10 tosses or 50 tosses? \_\_\_\_\_

Using a computer-generated program, a coin was tossed 50,000 times. The results were 25,025 heads and 24,975 tails. Then a coin was tossed 100,000 times, and there were 50,007 heads and 49,993 tails. What do you notice happens as the number of tosses increases?

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*The more experiments that are performed, the closer the experimental probability gets to the theoretical probability!*

# GRAPHING LINES

Watch the video lesson and/or read the mini lesson.

## Warm-Up

Substitute each  $x$ -value in the equation above the table to find the missing  $y$ -values.

$$y = -5x$$

$x$	$y$
-1	
0	
1	
100	

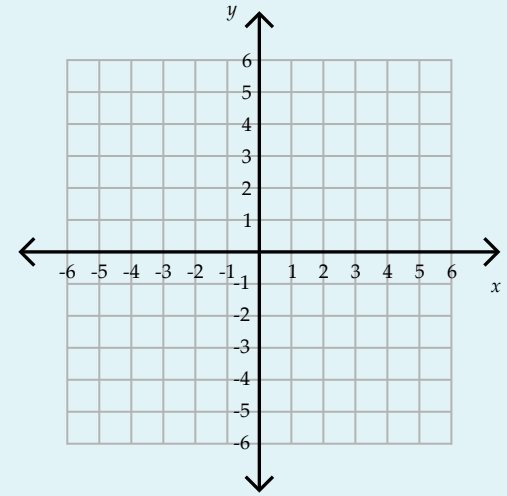
$$y = x + 27$$

$x$	$y$
0	
1	
2	
100	

## Video Lesson



Scan the QR code or watch the video lesson on [goodandbeautiful.com/Math6](http://goodandbeautiful.com/Math6).



$x$	$y$
-1	
0	
1	
2	

ordered pairs:

\_\_\_\_\_

\_\_\_\_\_

## Mental Math Checkup

- Count down by  $\frac{1}{4}$  from  $8\frac{1}{4}$  to 6.

,  ,  ,  ,  ,  ,  ,  ,  ,  ,

- Find each percent.

What is 300% of 5?

What is 300% of 50?

- Multiply or divide.

$1,000 \div 50 =$

$2,100 \cdot 4 =$

## Mini Lesson



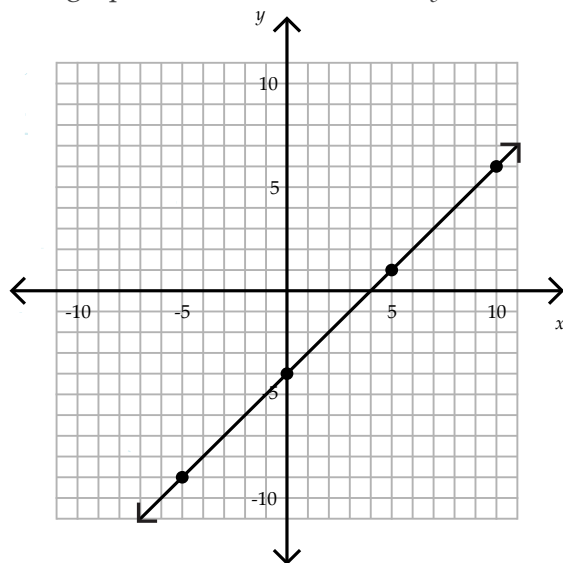
Tables and graphs can be used to show the relationship between independent and dependent variables.

In an equation, table, ordered pair, or graph, the independent variable is the  $x$ -value, and the dependent variable is the  $y$ -value. On the right is an equation and input-output table from Mini Lesson 82.

$$y = x - 4$$

$x$	$y$
-5	-9
0	-4
5	1
10	6

Each row of the table represents an ordered pair:  $(-5, -9)$ ,  $(0, -4)$ ,  $(5, 1)$ ,  $(10, 6)$ . The ordered pairs can be plotted on a coordinate plane and connected to form a line. The line is a visual representation of the equation. The graph below shows the line  $y = x - 4$ .



Note: Arrows are drawn at the ends of the line to show that the relationship continues.

## Graphing Equations

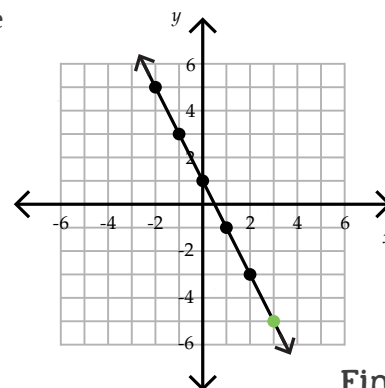
To graph an equation, make a table of values by substituting each  $x$ -value into the equation and finding the corresponding  $y$ -value. Then create ordered pairs from the table. Plot and connect the ordered pairs to form a line.

Example: Graph the equation  $y = -2x + 1$ .

Substitute the given  $x$ -values into the equation to find the  $y$ -values.

Create ordered pairs from the table.  
 $(-2, 5)$ ,  $(-1, 3)$ ,  $(0, 1)$ ,  $(1, -1)$ ,  $(2, -3)$

$x$	$y$
-2	$-2(-2) + 1 = 5$
-1	$-2(-1) + 1 = 3$
0	$-2(0) + 1 = 1$
1	$-2(1) + 1 = -1$
2	$-2(2) + 1 = -3$



Plot the ordered pairs. Connect the points with a line.

This graph shows the line  $y = -2x + 1$ .

## Finding Missing Values

Missing values can be found using an equation or a graph. To use the equation, substitute the value of the independent variable,  $x$ , in the equation to find the missing value for the dependent variable,  $y$ . To use the graph, go across to the  $x$ -value and find the  $y$ -value on the line.

Example: For the equation  $y = -2x + 1$  graphed above, find the  $y$ -value when  $x$  is 3.

- In the equation, substitute 3 in place of  $x$ .  $y = -2(3) + 1 = -5$
- On the graph, go over 3, and then go down to the line (green point above). The  $y$ -value at that point is  $-5$ . When  $x$  is 3,  $y$  is  $-5$ .

Practice

1. Complete each input-output table. Then list the ordered pairs from each table on the lines below the table.

$y = x - 4$

x	y
-1	
0	
1	
2	

\_\_\_\_\_

\_\_\_\_\_

$y = 3x$

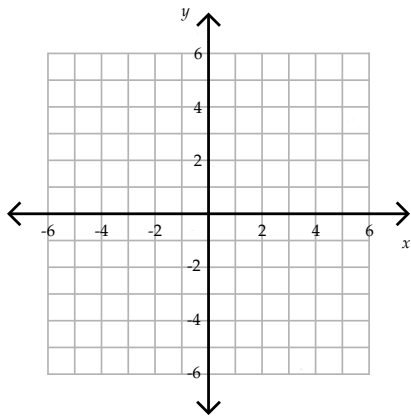
x	y
-1	
0	
1	
2	

\_\_\_\_\_

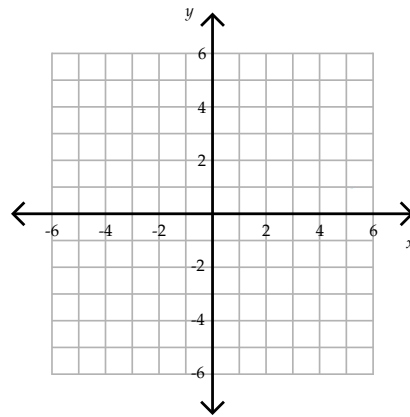
\_\_\_\_\_

2. Graph the equations from Problem 1 on the coordinate planes below.

$y = x - 4$



$y = 3x$



3. Use the equation  $y = -3x - 5$  to answer the questions.

What is the  $y$ -value when  $x$  is 8? \_\_\_\_\_

What is the  $y$ -value when  $x$  is  $-3$ ? \_\_\_\_\_



4. Complete each input-output table. For each table, plot the ordered pairs on the graph on the next page and connect the points from the table to form a line. Use a ruler to extend each line to the edge of the graph. Each line will go through one of the triangles, which represent the tallest mountain summit on each continent in the world. Using the key at the bottom, write the name of the mountain on the line under each table. Once the names are written in the blanks, the mountains will be in order from tallest to shortest.

1. $y = 5x - 37$	2. $y = -4x + 21$	3. $y = x$	4. $y = 0.5x + 4$																																
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# UNIT ASSESSMENT

## Instructions

Unit assessments give you practice with the math concepts learned in this unit without having you overpractice concepts that you have mastered. These assessments also give you practice working on math problems for an extended period of time. This helps you to extend focus and attention span and to be better prepared for any type of testing you will have to do in the future. Here are some tips: First, always read the instructions carefully. Sometimes you can get answers wrong simply because you did not understand the instructions. Second, do not rush through exercises you think you already know. Instead, do your work carefully. Sometimes you can get answers wrong, even though you understand the concept, just because you rushed. Finally, if you feel you are having trouble focusing, take a quick break to do something else, like ten jumping

jacks, and then come back. There are no videos, mini lessons, or practice problems for Lessons 89–90.

- For Lesson 89, complete all the exercises with purple headers only. You may cover the additional practice sections or fold the page to concentrate only on the purple sections. Have your parent or teacher correct the work. If there are mistakes in a section, your parent or teacher will check the orange “Additional Practice” checkbox for that section.
- For Lesson 90, complete all the orange sections that are checked. If you still make multiple mistakes, review those sections. All the principles will be reviewed again in upcoming units. If you have only a few or no orange sections to practice, you may move on to the next lesson.
- Parents/teachers may determine if the student may use the Reference Chart for the assessment. It is recommended that the student first try the assessment without the Reference Chart and then refer to it if needed.

## Student

### SOLVING EQUATIONS WITH ROOTS AND SQUARED & CUBED VARIABLES (LESSONS 61 & 62)

Solve each equation.

$$\sqrt{x} = 7 \quad \underline{\hspace{2cm}}$$

$$\sqrt[3]{x} = -4 \quad \underline{\hspace{2cm}}$$

$$x^2 = 64 \quad \underline{\hspace{2cm}}$$

$$x^3 = -125 \quad \underline{\hspace{2cm}}$$

### ESTIMATING SQUARE ROOTS (LESSON 63)

Find the two whole numbers each square root is between.

$$\sqrt{60} \text{ is between } \underline{\hspace{1cm}} \text{ and } \underline{\hspace{1cm}}.$$

$$\sqrt{141} \text{ is between } \underline{\hspace{1cm}} \text{ and } \underline{\hspace{1cm}}.$$

## Additional Practice

### SOLVING EQUATIONS WITH ROOTS AND SQUARED & CUBED VARIABLES

variable under a square/cube root sign: square/cube both sides  
squared/cubed variable: take the square/cube root of both sides  
An equation with a squared variable has two solutions.

$$\sqrt{x} = 9 \quad \underline{\hspace{2cm}}$$

$$\sqrt[3]{x} = 3 \quad \underline{\hspace{2cm}}$$

$$x^2 = 49 \quad \underline{\hspace{2cm}}$$

$$x^3 = -216 \quad \underline{\hspace{2cm}}$$

## Additional Practice

### ESTIMATING SQUARE ROOTS

Find and simplify the consecutive roots of perfect squares the given square root is between.

$$\sqrt{75} \text{ is between } \underline{\hspace{1cm}} \text{ and } \underline{\hspace{1cm}}.$$

$$\sqrt{157} \text{ is between } \underline{\hspace{1cm}} \text{ and } \underline{\hspace{1cm}}.$$

## DISTRIBUTIVE PROPERTY & FACTORING WITH VARIABLES (LESSON 71)

Use the distributive property to simplify each expression.

$$7(2 + 4a - 3) = \underline{\hspace{2cm}}$$

$$\frac{1}{4}(12c + 48) = \underline{\hspace{2cm}}$$

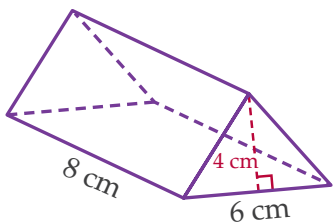
Factor each expression.

$$16 + 40t = \underline{\hspace{2cm}}$$

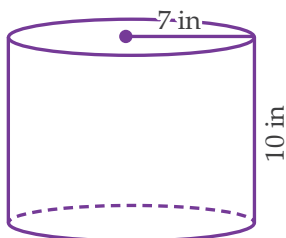
$$35b + 15 = \underline{\hspace{2cm}}$$

## VOLUME OF PRISMS & CYLINDERS (LESSON 73)

Find the volume of each solid.



$$V = \underline{\hspace{2cm}}$$



$$V \approx \underline{\hspace{2cm}}$$

## Additional Practice

### DISTRIBUTIVE PROPERTY & FACTORING WITH VARIABLES

Distribute the value outside the parentheses to each value inside the parentheses. Use the distributive property to simplify each expression.

$$4(5d + 12 - 3d) = \underline{\hspace{2cm}}$$

$$\frac{1}{3}(9f - 24) = \underline{\hspace{2cm}}$$

Use the template  $\underline{\hspace{1cm}}(\underline{\hspace{1cm}} + \underline{\hspace{1cm}})$  to factor an addition expression with two terms. The GCF gets written on the first blank. Factor each expression.

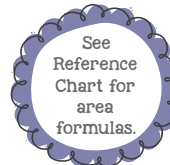
$$14 + 49n = \underline{\hspace{2cm}}$$

$$144s + 60 = \underline{\hspace{2cm}}$$

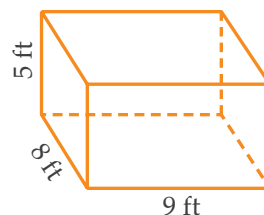
## Additional Practice

### VOLUME OF PRISMS & CYLINDERS

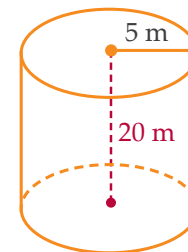
To find the volume of a prism or cylinder, multiply the area of the base by the height.  $V = \text{area of base} \cdot \text{height}$



Find the volume of each solid.



$$V = \underline{\hspace{2cm}}$$

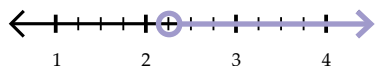
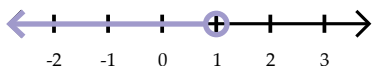


$$V \approx \underline{\hspace{2cm}}$$



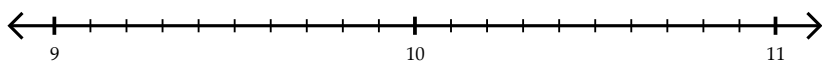
## GRAPHING INEQUALITIES ON NUMBER LINES (LESSON 79)

Write the inequality represented by each graph.



\_\_\_\_\_

Graph the inequality  $x \geq 10.6$ .



## SOLVING ONE-STEP INEQUALITIES (LESSON 80)

Solve each inequality.

$5 + j > -2$  \_\_\_\_\_

$\frac{k}{3} \leq 4$  \_\_\_\_\_

$72 \geq 12m$  \_\_\_\_\_

## SOLVING TWO-STEP INEQUALITIES (LESSON 81)

Solve each inequality.

$11n - 4 < 73$  \_\_\_\_\_

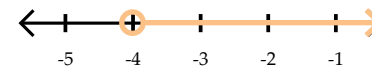
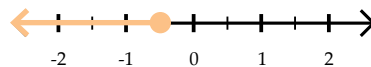
$-3 \leq \frac{p}{5} - 13$  \_\_\_\_\_

## Additional Practice

### GRAPHING INEQUALITIES ON NUMBER LINES

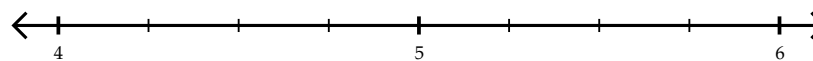
< less than (open circle)      ≤ less than or equal to (closed circle)  
 > greater than (open circle)      ≥ greater than or equal to (closed circle)

Write the inequality represented by each graph.



\_\_\_\_\_

Graph the inequality  $x < 5.25$ .



## Additional Practice

### SOLVING ONE-STEP INEQUALITIES

Rules for Solving Inequalities

- The variable must be isolated on one side.
- Inverse operations are used to isolate the variable.
- Whatever is done to one side must be done to the other.
- When a variable is moved from one side of an inequality to the other, the direction of the inequality sign must be reversed.

Solve each inequality.

$q - 8 < 6$  \_\_\_\_\_

$7r > 42$  \_\_\_\_\_

$-10 \leq \frac{s}{2}$  \_\_\_\_\_

## Additional Practice

### SOLVING TWO-STEP INEQUALITIES

Steps to Solve a Two-Step Inequality

- Add or subtract on both sides of the inequality to isolate the term with the variable.
- Multiply or divide on both sides of the inequality to isolate the variable.

Solve each inequality.

$67 > 9t + 4$  \_\_\_\_\_

$\frac{v}{8} - 1 \leq 3$  \_\_\_\_\_

## DEPENDENT & INDEPENDENT VARIABLES (LESSON 82)

Write I for the independent variable and D for the dependent variable.

days since the lawn was mowed \_\_\_\_\_ length of grass \_\_\_\_\_

Complete the input-output table using the equation given.

$$b = \frac{a}{7}$$

$a$	$b$
7	
3	
49	
-14	

Fill in the missing values in the table and write the equation.

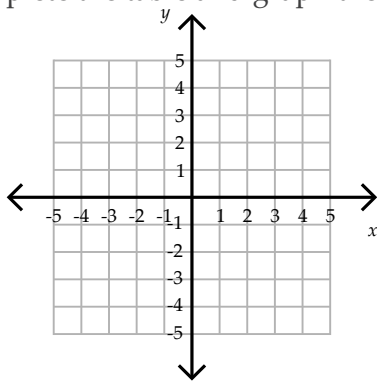
$c$	$d$
0	-5
15	10
-3	
5	

\_\_\_\_\_ (equation)

## GRAPHING LINES (LESSON 83)

Use the equation  $y = 2x - 1$  to complete the table and graph the line.

$x$	$y$
-2	
-1	
1	
2	



When  $x$  is 0, what is  $y$ ? \_\_\_\_\_

## Additional Practice

### DEPENDENT & INDEPENDENT VARIABLES

A change in the independent variable (input) causes a change in the dependent variable (output).

Write I for the independent variable and D for the dependent variable.

time to bake a cake \_\_\_\_\_ temperature of the oven \_\_\_\_\_

Complete the input-output table using the equation given.

$$g = 8f$$

$f$	$g$
1	
-6	
11	
-2	

Determine the rule and fill in the missing values. Use the variables and the rule to write the equation.

equation: \_\_\_\_\_

$j$	$k$
-4	2
2	8
20	
6	

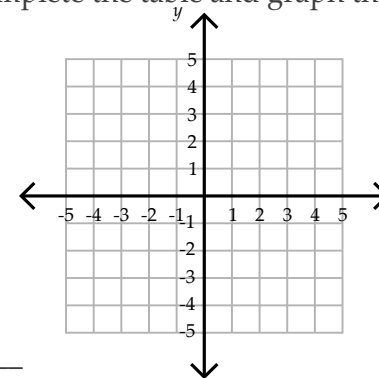
## Additional Practice

### GRAPHING LINES

Substitute each  $x$ -value into the equation and find the corresponding  $y$ -value. Each row is an ordered pair. Plot and connect the ordered pairs. Substitute an  $x$ -value in the equation or find the  $x$ -value on the graph to find a missing  $y$ -value.

Use the equation  $y = -x + 3$  to complete the table and graph the line.

$x$	$y$
-1	
0	
1	
3	



When  $x$  is 2, what is  $y$ ? \_\_\_\_\_

# UNIT 4 OVERVIEW

## LESSONS 91-120

### Extra Supplies Needed

- colored pencils
- ruler
- scissors
- glue or tape
- protractor
- paper
- tape measure

### New Concepts Taught

- solve proportions given part to whole ratios
- solve proportions given part to part ratios
- percent problems with proportions
- unit rates
- corresponding parts of congruent and similar figures
- missing side lengths in similar figures
- parallel lines cut by a transversal
- corresponding angles, alternate interior angles, alternate exterior angles
- polyhedrons and Platonic solids
- statistical questions and surveys
- qualitative and quantitative data
- create circle graphs
- create and interpret line plots with decimal values
- convert square units of area
- conversions using multiple unit multipliers
- calculate measures of central tendency
- interpret and choose measures of central tendency
- create and interpret box plots
- identify first, second, and third quartiles in box plots
- interpret and analyze data displayed graphically
- base 2
- scientific notation
- understand calculator displays and errors on calculators

### Concepts Reviewed and Expanded Upon

- scale drawings and map scales
- congruent figures
- similar figures
- regular and irregular polygons
- data, population, sample
- closed-ended and open-ended questions
- bias in statistics
- pictographs
- create and interpret bar graphs
- create and interpret line graphs
- interpret circle graphs
- converting between Fahrenheit and Celsius
- create and interpret histograms
- create and interpret stem and leaf plots
- convert between Fahrenheit and Celsius
- strategies for solving word problems

# SIMILAR & CONGRUENT FIGURES

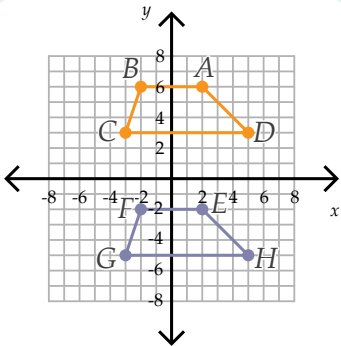
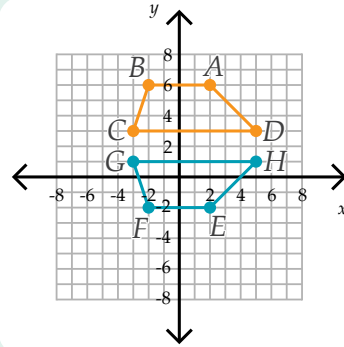
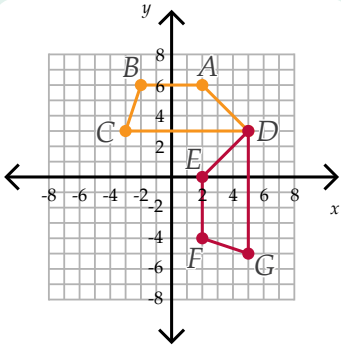
Supplies

8 different colored pencils

Watch the video lesson and/or read the mini lesson.

## Warm-Up

Identify each type of transformation shown below. Write the transformation name on the lines. Then write the lengths of the segments.



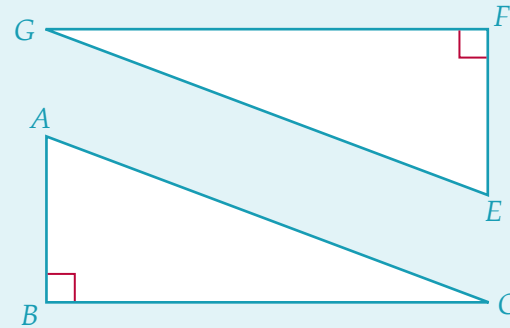
$\overline{AB} = \underline{\hspace{1cm}}$  units

$\overline{EF} = \underline{\hspace{1cm}}$  units

## Video Lesson



Scan the QR code or watch the video lesson on [goodandbeautiful.com/Math6](http://goodandbeautiful.com/Math6).



$\triangle ABC \cong \underline{\hspace{1cm}}$

$\overline{GF} \cong \underline{\hspace{1cm}}$

$\angle ACB \cong \underline{\hspace{1cm}}$

## Mental Math Checkup

- Convert each percent or decimal to a fraction.

61% =       0.625 =        $0.\overline{33} = \frac{\hspace{1cm}}{\hspace{1cm}}$

- Convert each improper fraction to a mixed number or whole number.

$\frac{32}{9} = \frac{\hspace{1cm}}{\hspace{1cm}}$        $\frac{300}{10} = \frac{\hspace{1cm}}{\hspace{1cm}}$        $\frac{90}{11} = \frac{\hspace{1cm}}{\hspace{1cm}}$

- Simplify using the order of operations.

$26 + 4 - 15 = \underline{\hspace{1cm}}$        $15 \cdot 3 \div 9 = \underline{\hspace{1cm}}$

## Mini Lesson

**Congruent** figures have the exact same shape and size. **Similar** figures have the exact same shape but not necessarily the same size; similar figures are proportional.

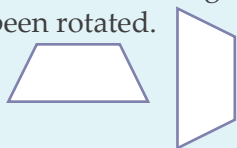
Congruent Figures



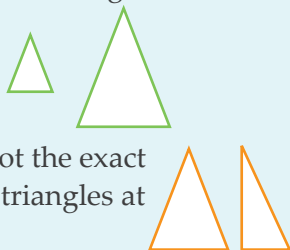
Figures that are the same type of shape but not the exact same shape are not similar. For example, the triangles at the right are not similar.

Figures can be transformed and still be similar or congruent.

These trapezoids are still congruent even though one has been rotated.



Similar Figures

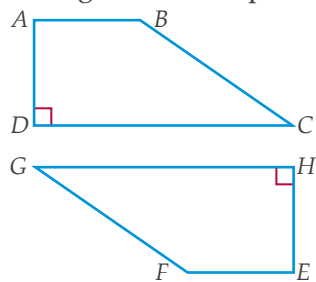


These parallelograms are still similar even though one has been reflected.



### Identifying & Naming Corresponding Parts of Congruent Figures

Congruent figures have corresponding sides and angles. To determine corresponding sides/angles in congruent figures, picture the figures lined up on top of each other.



*Corresponding vertices for the trapezoids:*  
A corresponds to E, B corresponds to F,  
C corresponds to G, D corresponds to H

Corresponding figures, sides, and angles must be named in order of corresponding vertices. The symbol  $\cong$  is used to show congruence.

$$\text{trapezoid } ABCD \cong \text{trapezoid } EFGH$$

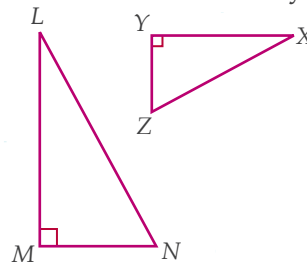
Note: It is incorrect to say trapezoid  $ABCD$  is congruent to trapezoid  $GHEF$  because the order of the vertices does not correspond.

Corresponding parts of congruent figures are congruent. The corresponding sides have the same length. The corresponding angles have the same degree measure.

$$\begin{array}{llll} \overline{AB} \cong \overline{EF} & \overline{CD} \cong \overline{GH} & \angle DAB \cong \angle HEF & \angle BCD \cong \angle FGH \\ \overline{BC} \cong \overline{FG} & \overline{DA} \cong \overline{HE} & \angle ABC \cong \angle EFG & \angle CDA \cong \angle GHE \end{array}$$

### Identifying & Naming Corresponding Parts of Similar Figures

Similar figures have corresponding sides and angles. To determine corresponding sides/angles in similar figures, picture the figures oriented the same way.



*Corresponding vertices for the triangles:*  
L corresponds to X, M corresponds to Y, N corresponds to Z

The symbol  $\sim$  is used to show similarity.  
 $\triangle LMN \sim \triangle XYZ$

Corresponding angles of similar figures are congruent.

$$\angle LMN \cong \angle XYZ \quad \angle MNL \cong \angle YZX \quad \angle NLM \cong \angle ZXY$$

Corresponding sides of similar figures are not congruent if the figures are different sizes.

### Finding Corresponding Parts Without a Picture

When a picture is not given, identify corresponding vertices based on their position in the given name. For example, if  $\triangle RST$  and  $\triangle UVW$  are congruent, then R corresponds to U, S corresponds to V, and T corresponds to W.

$$\begin{array}{l} \overline{RS} \cong \overline{UV}, \overline{ST} \cong \overline{VW}, \overline{TR} \cong \overline{WU} \\ \angle RST \cong \angle UVW, \angle STR \cong \angle VWU, \angle TRS \cong \angle WUV \end{array}$$

Missing angle measures and side lengths can also be found.

Example: If  $m\angle RST$  is  $45^\circ$ , what is  $m\angle UVW$ ?

Since  $\angle RST \cong \angle UVW$ ,  $m\angle UVW = m\angle RST$ , so  $m\angle UVW$  is  $45^\circ$ .

## Practice

1. Determine whether each statement is always, sometimes, or never true and put a check mark in that box. An example is given.

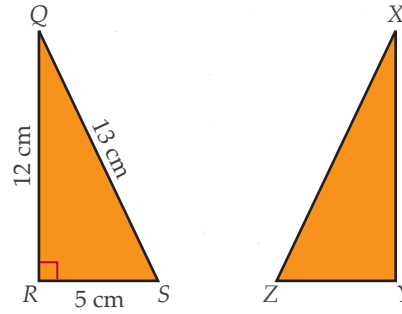
	always true	sometimes true	never true
Two squares are congruent.		✓	
Two squares are similar.			
Two rectangles are similar.			
Two similar triangles are congruent.			
Two congruent triangles are similar.			
Two similar triangles will have congruent angles.			
An equilateral triangle and a square are similar.			
An acute triangle and a right triangle are similar.			
Two right triangles are similar.			

2. The triangles below are congruent. Complete the congruence statements.



$\triangle GHI \cong$  \_\_\_\_\_       $\overline{JK} \cong$  \_\_\_\_\_       $\angle GIH \cong$  \_\_\_\_\_

3. The triangles below are congruent. Complete the congruence statements and write the measurements.



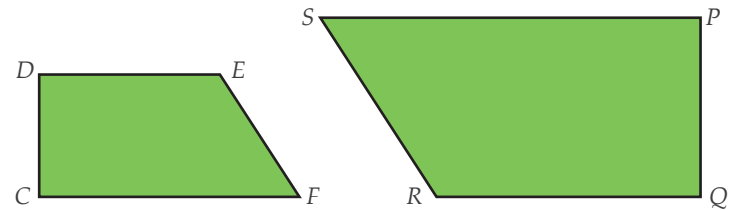
$\triangle QRS \cong$  \_\_\_\_\_

$\angle ZXY \cong$  \_\_\_\_\_

$\overline{ZY} =$  \_\_\_\_\_

$m\angle ZYX =$  \_\_\_\_\_

4. The trapezoids below are similar. Complete the similarity statement. Then list 4 pairs of congruent angles.



trapezoid  $CDEF \sim$  trapezoid \_\_\_\_\_

\_\_\_\_\_  $\cong$  \_\_\_\_\_

\_\_\_\_\_  $\cong$  \_\_\_\_\_

\_\_\_\_\_  $\cong$  \_\_\_\_\_

\_\_\_\_\_  $\cong$  \_\_\_\_\_

5.  $\triangle ABC$  and  $\triangle MNO$  are congruent. Use the information below to find each angle measure.

$m\angle ABC = 110^\circ$

$m\angle NOM = 45^\circ$

$m\angle MNO =$  \_\_\_\_\_

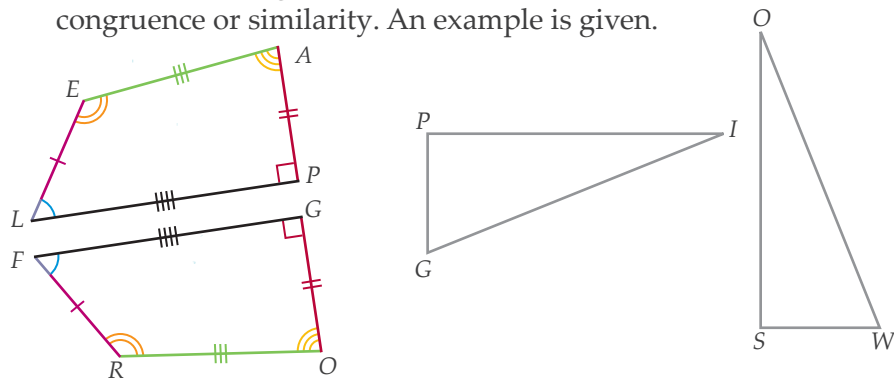
$m\angle BCA =$  \_\_\_\_\_

$m\angle CAB =$  \_\_\_\_\_

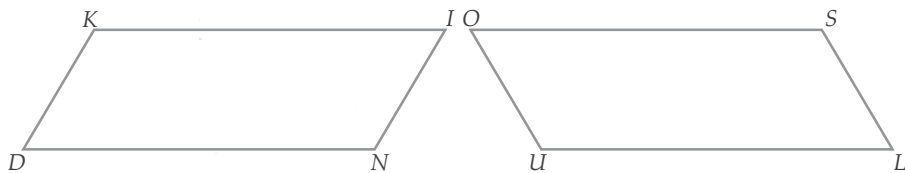
$m\angle OMN =$  \_\_\_\_\_

## Practice

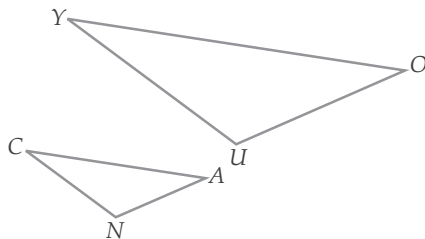
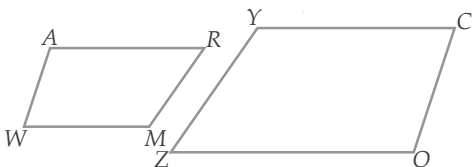
6. Each pair of figures below is either congruent or similar. Use colored pencils to show the corresponding parts of each pair. Then name the figures and make a statement about their congruence or similarity. An example is given.



trapezoid  $LEAP \cong$  trapezoid  $FROG$  \_\_\_\_\_



\_\_\_\_\_



\_\_\_\_\_

## Review

1. Create a unit rate using the given information. Then use it to answer the question. [Lesson 95](#)

There are 52 weeks in one year. How many weeks are in 4 years?

unit rate \_\_\_\_\_ answer \_\_\_\_\_

There are 60 minutes in one hour. How many minutes are in 7 hours?

unit rate \_\_\_\_\_ answer \_\_\_\_\_

There are 24 hours in one day. How many days are in 144 hours?

unit rate \_\_\_\_\_ answer \_\_\_\_\_

2. Evaluate each expression for the values given and write the answer on the line. [Lesson 35](#)

$b^2 + c^3 + 9$        $b = 7$      $c = 2$       \_\_\_\_\_

$5d - 8e - 17$        $d = 8$      $e = 5$       \_\_\_\_\_

3. Simplify each expression. [Lesson 46](#)

$8h - 11g + 19h + 2g$  \_\_\_\_\_       $-16q - 8p - 10q + 12p$  \_\_\_\_\_

$-3 + 9t + 21 - 4t$  \_\_\_\_\_       $14u - 9v + 25$  \_\_\_\_\_

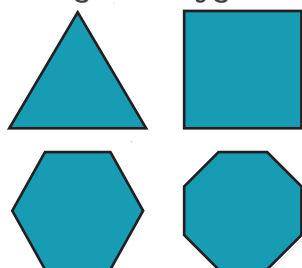
## Mini Lesson

Platonic solids are named for the Greek philosopher Plato.

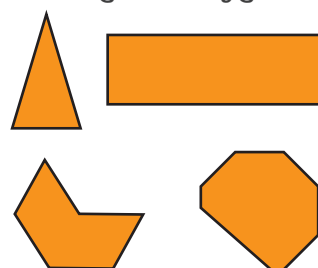
A **polygon** is a two-dimensional, closed shape with straight sides. Examples of polygons are triangles, rectangles, hexagons, and octagons. A **regular polygon** is a polygon that has all sides of equal length and all angles of equal measure. Polygons that are not regular are called irregular polygons.

The five regular polyhedrons below are referred to as Platonic solids.

**Regular Polygons**



**Irregular Polygons**

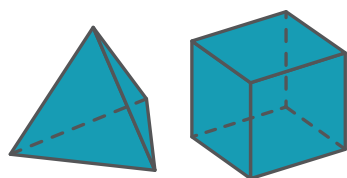


Some regular polygons have special names. For example, a regular triangle is called an equilateral triangle. A regular quadrilateral is called a square.

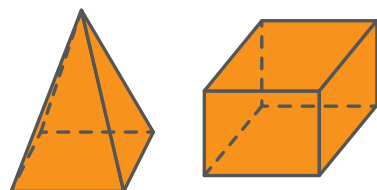
A **polyhedron** is a three-dimensional figure with polygons as faces. Examples of polyhedrons are prisms and pyramids; their faces are made up of polygons. Since polygons do not have curved edges, polyhedrons do not have curved surfaces. Spheres and cylinders are not polyhedrons because they have curved surfaces.

Just as there are regular polygons, there are also regular polyhedrons. A regular polyhedron is a polyhedron that has congruent regular polygons as faces.

**Regular Polyhedrons**



**Irregular Polyhedrons**



### Platonic Solids

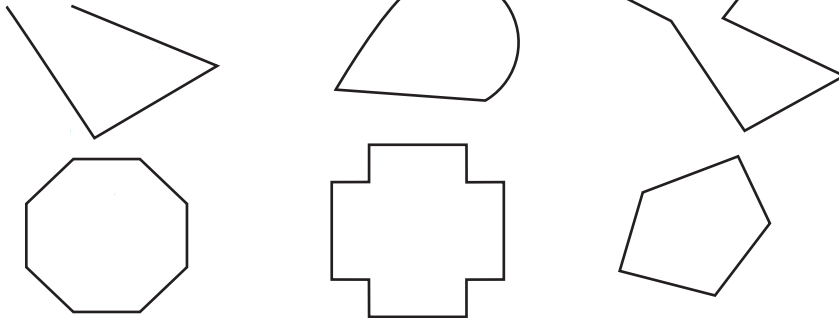
<p><b>Tetrahedron</b> <i>All faces are equilateral triangles. There are 4 faces.</i></p>	
<p><b>Cube</b> <i>All faces are squares. There are 6 faces.</i></p>	
<p><b>Octahedron</b> <i>All faces are equilateral triangles. There are 8 faces.</i></p>	
<p><b>Dodecahedron</b> <i>All faces are regular pentagons. There are 12 faces.</i></p>	
<p><b>Icosahedron</b> <i>All faces are equilateral triangles. There are 20 faces.</i></p>	



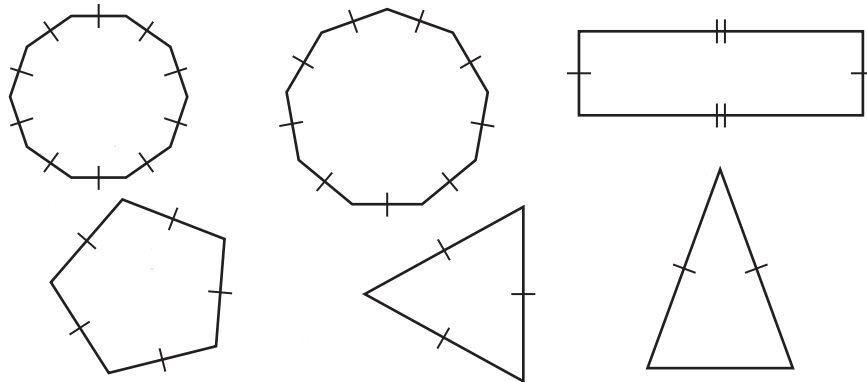
**Practice**

★ Hint: Use a marker to mark vertices and edges that you have already counted.

1. Color the polygons.



2. Color the regular polygons green and the irregular polygons red.



3. Write *T* next to statements that are true and *F* next to statements that are false.

- \_\_\_ All polyhedrons are Platonic solids.
- \_\_\_ All Platonic solids are polyhedrons.
- \_\_\_ A cylinder is a polyhedron but not a Platonic solid.
- \_\_\_ Square pyramids are Platonic solids.
- \_\_\_ Octahedrons are polyhedrons.

4. Cut out the two templates for Platonic solids on the next page. Be careful not to cut off the tabs. Then fold on the black lines and glue the tabs to create a tetrahedron and a dodecahedron. Once they are assembled, use the Platonic solids that you created to fill in the chart and answer the questions below the chart.

	number of vertices	number of edges	number of faces
tetrahedron			
*cube			
*octahedron			
dodecahedron			

\*The rows for cube and octahedron are completed during the video for this lesson.

Circle the answer:

All of the numbers in the table are *even* / *odd* numbers.

Which two Platonic solids have the same number of edges?

\_\_\_\_\_ and \_\_\_\_\_

For each Platonic solid, take the number of vertices (*V*), subtract the number of edges (*E*), and then add the number of faces (*F*). You should get the same answer every time. Write the number in the blank to complete the formula.

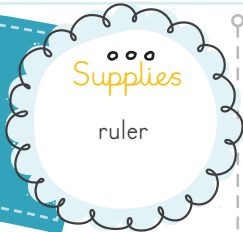
$$V - E + F = \underline{\hspace{2cm}}$$

An icosahedron has 20 faces and 12 vertices. Using the formula you just discovered, find the number of edges in an icosahedron:

Number of edges: \_\_\_\_\_

Lesson  
103

# HISTOGRAMS



Watch the video lesson and/or read the mini lesson.

## Warm-Up

Below are the distances (in meters) jumped by female skiers in the first round of the 2018 Olympics ski jumping event. Complete the frequency table from the given data.

56    77.5    84.5    86.5    89.5    94    101.5  
 71.5    78    85    86.5    91.5    97    102.5  
 72    80    85    88    93    98.5    103.5  
 74.5    80.5    86    88    93    99    105.5  
 77    83    86.5    88.5    93.5    101    106.5

Distance (m)	Frequency
50–60	
60–70	
70–80	
80–90	
90–100	
100–110	

When a data point is on the edge of an interval, it goes in the upper interval.

## Video Lesson



Scan the QR code or watch the video lesson on [goodandbeautiful.com/Math6](http://goodandbeautiful.com/Math6).

Time (sec)	Frequency	Time (sec)	Frequency
30–35		30–37	
35–40		37–44	
40–45		44–51	
45–50		51–58	
50–55		58–65	
55–60		65–72	
60–65			
65–70			
70–75			

## Mental Math Checkup

1. Convert each percent or decimal to a fraction.

45% =       0.24 =       67% =

2. Convert each improper fraction to a mixed number or whole number.

$\frac{124}{10} = \text{$        $\frac{89}{11} = \text{$        $\frac{300}{15} = \text{$

3. Simplify using the order of operations.

$5 \cdot 12 \div 6 = \text{$        $22 - 6 \cdot 2 = \text{$

## Mini Lesson

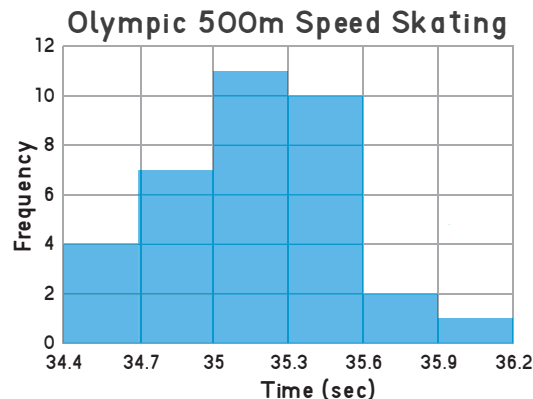
A **histogram** is a bar graph that displays data in intervals of equal size with no space between the bars. Creating a frequency table can help to organize the data needed to create a histogram. Each interval of a frequency table shows a range of values and corresponds to one bar on the histogram.

Example: Create a frequency table and histogram for the data below.

Here are the top 35 times from the 2018 men’s Olympic speed skating 500 meter race (in seconds):

34.410	34.420	34.650	34.680	34.780	34.831	34.839
34.890	34.900	34.930	34.934	35.010	35.020	35.080
35.130	35.154	35.158	35.160	35.192	35.196	35.220
35.230	35.310	35.330	35.340	35.380	35.410	35.500
35.506	35.510	35.545	35.546	35.640	35.860	35.920

Time (sec)	Frequency
34.4–34.7	
34.7–35.0	
35.0–35.3	
35.3–35.6	
35.6–35.9	
35.9–36.2	

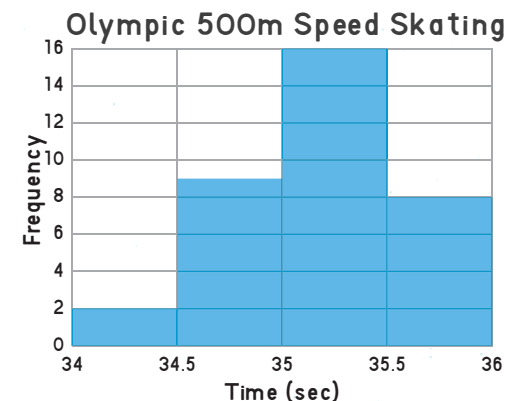


This histogram and frequency table are organized with intervals of size 0.3 seconds. Notice that the minimum value for the intervals is 34.4 seconds, and the maximum is 36.2 seconds.

When making a frequency table and histogram, it is important to pick intervals that allow all the data to be seen easily. The same data set is shown in the next two graphs but with different interval sizes.

This frequency table and histogram use intervals of size 0.5 seconds. The minimum value for the intervals is 34.0 seconds, and the maximum is 36.0 seconds.

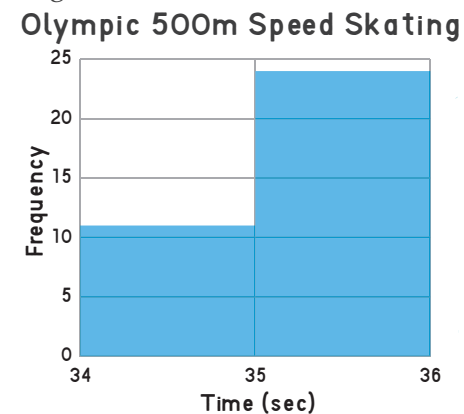
Time (sec)	Frequency
34.0–34.5	
34.5–35.0	
35.0–35.5	 
35.5–36.0	



Notice how this histogram only has four bars of data instead of six bars. This is because the intervals are larger, so one bar represents a greater range of time, and fewer bars are needed to cover the same data.

Here is the same data again but this time with intervals of size 1.0 seconds. The minimum value for the intervals is still 34.0 seconds, and the maximum is 36.0 seconds. Once again, there are fewer bars for this histogram because of the larger intervals.

Time (sec)	Frequency
34.0–35.0	 
35.0–36.0	         



The first graph with six bars makes it easiest to see all the data because of the smaller intervals.

Practice

Use the data below for all problems on this page.

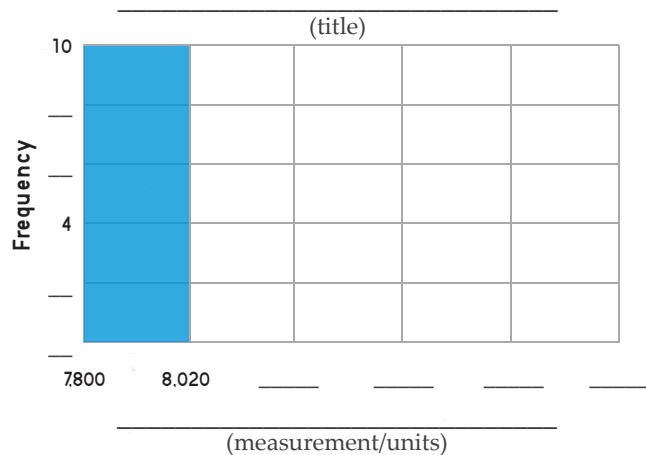
The heights of some of the world's highest mountain peaks (rounded to the nearest meter) are listed below:

8,848	8,611	8,188	7,893	8,516	8,126
8,051	7,884	8,586	8,080	7,821	7,871
8,167	7,952	8,163	8,091	7,823	7,932
8,035	7,804	8,485	8,027	7,937	7,816

- Using a minimum value of 7,800 m and a maximum value of 8,900 m for the intervals, create a frequency table for the given data with intervals of 220 m. An example is given.

Height (m)	Frequency
7,800–8,020	

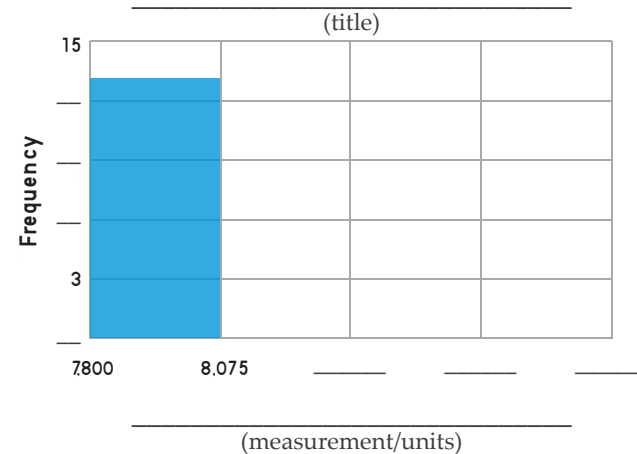
Create a histogram for this data based on the intervals you used above. Be sure to label and title your graph.



- Using the same data set and minimum and maximum values for the intervals, create a frequency table for the data with intervals of 275 m. An example is given.

Height (m)	Frequency
7,800–8,075	

Create a histogram for this data based on the intervals you used above. Be sure to label and title your graph.



- How are these two histograms similar? \_\_\_\_\_

How are these two histograms different? \_\_\_\_\_

Do you think one of them represents this data set better than the other? Why or why not? \_\_\_\_\_

# LITERARY Lengths

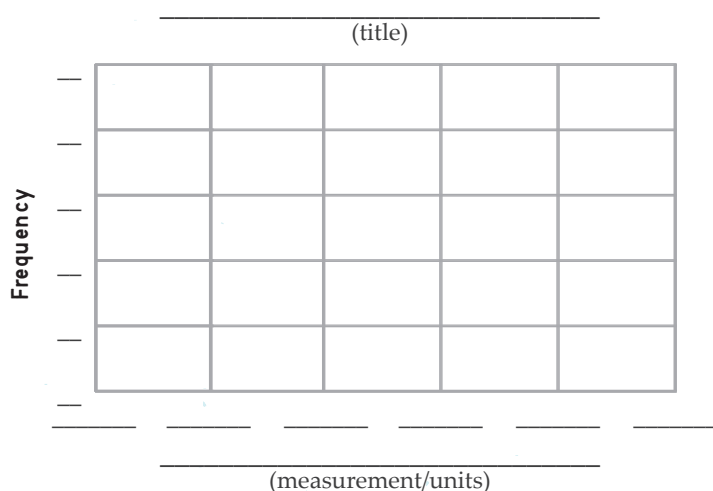
Using a ruler, measure the length of 20 different books around your home. You may use any units you wish, but you should use the same units for all measurements. Record your measurements here:

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_ 5. \_\_\_\_\_
6. \_\_\_\_\_ 7. \_\_\_\_\_ 8. \_\_\_\_\_ 9. \_\_\_\_\_ 10. \_\_\_\_\_
11. \_\_\_\_\_ 12. \_\_\_\_\_ 13. \_\_\_\_\_ 14. \_\_\_\_\_ 15. \_\_\_\_\_
16. \_\_\_\_\_ 17. \_\_\_\_\_ 18. \_\_\_\_\_ 19. \_\_\_\_\_ 20. \_\_\_\_\_

Choose a minimum and maximum value for your intervals that will include all of your measurements, and divide this range into 5 equal intervals. Use these intervals to create a frequency table for your data. Make sure you fill in the units for length in parentheses.

Length ( )					
Frequency					

Now create a histogram for this data based on the intervals you used above. Be sure to label and title your graph.

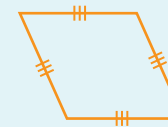
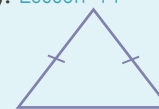
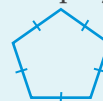


## Review

1. Write *C* next to closed-ended questions and *O* next to open-ended questions. [Lesson 100](#)

- |  |  |
|--|--|
| <p>___ What is your favorite month?</p> <p>___ What time do you get up in the morning?</p> <p>___ Do you prefer Mexican or Chinese food?</p> | <p>___ Do you like to sing?</p> <p>___ Do you floss before or after brushing?</p> <p>___ What's your favorite sport?</p> |
|--|--|

2. Write *R* inside the regular polygon(s) and *I* inside the irregular polygon(s). [Lesson 99](#)



3. Use the information below to fill in the blanks. [Lesson 66](#)

principal amount: \$2,400      compound interest rate: 2%

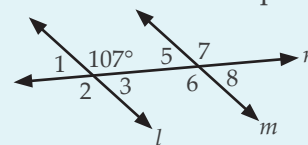
interest earned during year 1: \_\_\_\_\_

**total** amount after one year: \_\_\_\_\_

interest earned during year 2: \_\_\_\_\_

**total** amount after two years: \_\_\_\_\_

4. Lines *l* and *m* are parallel. Write the answers on the lines. [Lesson 98](#)



$m\angle 3 = \underline{\hspace{2cm}}$      $m\angle 6 = \underline{\hspace{2cm}}$

Which angle corresponds with the given angle? \_\_\_\_\_

# WORD PROBLEM STRATEGIES

There is no video for this lesson.

## Word Problem Strategies

Sometimes word problems can seem intimidating at first, but now that you're a secret math agent, you should possess some strategies for tackling them without fear! The "secret" to solving word problems is to determine what is being asked, what information is given, and what information is needed to answer the question. Some word problems include extra information that is not needed.

These strategies may be helpful when solving word problems:

- Q Draw a picture or diagram.
- Q Find a pattern.
- Q Make a list, table, or chart.
- Q Use a smaller or simpler case.
- Q Write and solve an equation.
- Q Guess, check, and revise.

In this lesson you will be introduced to some of these strategies, and then you will practice using them to solve problems.

### Determining What Is Asked, Given & Needed

Example: Five friends are going to a movie. Movie tickets cost \$9 per person. The theater can seat 300 people. How much will the five friends pay for tickets?

- What is being asked? How much will five movie tickets cost?
- What is given? 5 friends, \$9 per ticket, 300 seats
- What is needed? the cost per ticket

**TOP SECRET**

SECRET CODE  
CLUES

Today you get to imagine that you are a secret math agent with an upcoming mission in an undisclosed location! Each word problem you solve has a letter or number underneath it. On the last page, write the letter or number from each problem on the line above its answer. When you are finished with the problems, unscramble the letters and/or numbers in each box to learn about your next mission.

It may be helpful to cross out information that is not needed:

**Five friends are going to a movie. Movie tickets cost \$9 per person. The theater can seat 300 people. How much will the five friends pay for tickets?**

Now answer the question. Use a problem-solving strategy if desired. For example, drawing a picture or diagram might be helpful:

\$9	\$9	\$9	\$9	\$9
-----	-----	-----	-----	-----

$\$9 + \$9 + \$9 + \$9 + \$9 = 5 \cdot \$9 = \$45$ . The friends will pay \$45.

Determine what is being asked, what is given, and what is needed in the word problem below. Then solve the problem.

1. Bentley is inviting 11 friends over for a barbecue. He will need 24 hot dogs. There are 8 hot dogs in a package, and there are 10 packages of hot dogs in a case. How many packages of hot dogs should Bentley buy?

What is being asked? \_\_\_\_\_

What is given? \_\_\_\_\_

What is needed? \_\_\_\_\_

Cross out any information in the word problem that isn't needed.

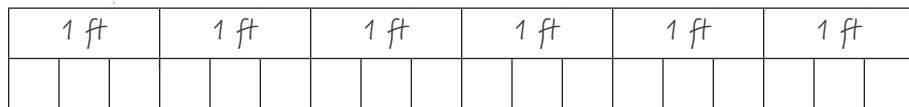
Answer:  packages

5

As you practice each problem-solving strategy, continue to consider what is being asked, what is given, and what is needed.

### Draw a Picture or Diagram

Example: Cambree is cutting a 6-foot-long board into pieces that are  $\frac{1}{3}$  of a foot long. How many pieces will there be?



The diagram shows each foot of the 6-foot board. The smaller pieces are  $\frac{1}{3}$  of a foot. There are 18 of them, so there will be **18 pieces**.

Solve the problems on this page by drawing a picture or a diagram.

1. Josh is lining up his toy boats and toy cars next to each other. The boats are 10 cm long, and the cars are 6 cm long. When will the two lines of toys first be the same length?

at  cm  
R

2. Cadence is laying tile in her foyer, which is a square with an area of 81 ft<sup>2</sup>. How many 18-inch by 18-inch square tiles will she need to cover the foyer?

tiles  
C

3. Robert is planting a garden. One-third of the garden will be corn, and  $\frac{1}{3}$  will be potatoes. He will split the remaining area into three parts, two of which will be onions, and one of which will be radishes. What fraction of the garden will be onions, and what fraction will be radishes?

onions  
O

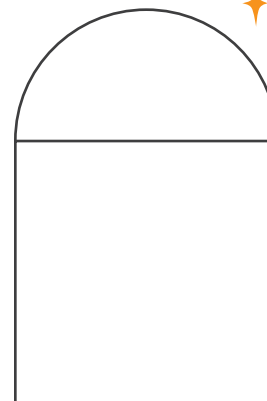
radishes  
E

4. The perimeter of a rectangle is 58 meters. One side measures 11 meters. What is the area of the rectangle?

m<sup>2</sup>  
M

5. Elias is making a stained glass window that is a square with a semicircle on top of it. The diameter of the semicircle is 6 ft. What is the area of the window?

Hint: A picture is given. Find the area of the square and the semicircle and add them together.



ft<sup>2</sup>  
2.



### Make a List, Table, or Chart

Example: If a recipe that makes 30 cookies uses 2 eggs, how many eggs are needed to make 75 cookies?

Make a table. Fill in the given values, and then find the missing values. Continue the table until the desired value is reached.

Eggs	1	2	3	4	5
Cookies	15	30	45	60	75

Five eggs are needed to make 75 cookies.

Solve the problems below by making a list, table, or chart.

- If two large pizzas cost \$17, how much will five large pizzas cost at the same unit price?


\$   
N

- How many outfits can be made with three shirts, three pairs of pants, and two pairs of boots?   
 ✨ Hint: Name the shirts S1, S2, and S3; the pants P1, P2, and P3; and the boots B1 and B2. Consider drawing a tree diagram. Develop an organized way to create a list of possible outfits. Then count the outfits on the list.

outfits  
L

### Write and Solve an Equation

Example: Six out of 40 science club members are also in a book club. What percent of science club members are in the book club?

Think of what is being asked. ➡➡ What percent of 40 is 6?

Write an equation. Use a variable for the unknown. Use multiplication for "of" and equals for "is."

$$x \cdot 40 = 6$$

Divide both sides by 40 to get  $x = 0.15$ . Because the question asked for a percent, convert the decimal to a percent.  $x = 15\%$

15% of science club members are in the book club.

Solve the problems below by writing and solving an equation.

- Out of 90 restaurant customers, 36 chose roasted asparagus as a side dish. What percent of customers chose the asparagus?

%  
K

- If you triple Martin's age and add 4, you get his mom's age. Martin's mom is 43. How old is Martin?

years old  
6

- Marilyn divides the money in her purse evenly among her 6 grandchildren. If each grandchild receives \$4.62, how much money was in Marilyn's purse?

\$   
Y





### Use a Smaller or Simpler Case

Example: What number is multiplied by 55 to get 4,015?

If you're not sure what operation to use to get the answer, think of a smaller or simpler case. For example, what number is multiplied by 5 to get 30? It's 6. And 30 divided by 5 is 6. So to find the answer to the question, divide.

$$4,015 \div 55 = 73$$

Solve the problems on this side of the page by thinking of a smaller or simpler case.

1. What number is 19 multiplied by to get 1,558?

A

2. What number do you divide 777.6 by to get 9?

Hint: Think of a smaller case, such as "What number do I have to divide 27 by to get 9?" and think of the relationships between the numbers.

T

3. What do you have to add to -14 to get 95?

Hint: What do you have to add to 90 to get 95? What is the mathematical relationship between the numbers?

U

4. What do you have to add to 23.78 to get 32?

J

Congratulations, secret math agent! You have proven that you are ready for more mathematical missions. You are to report to the Palace Museum in Beijing, China. Unscramble the letters to reveal more details about the meeting.

$\frac{2}{9}$  36 36 3 18 40

Meet at the Gallery of \_\_\_\_\_

109 13 27.72 50.13 18 8.22

Date: \_\_\_\_\_

82 3  $\frac{1}{9}$  86.4  $\frac{1}{9}$  30 86.4  $\frac{2}{9}$

Your Code Name (a living thing): \_\_\_\_\_

$\frac{2}{9}$  30 82 42.50 198  $\frac{2}{9}$

Your Mission Leader's Code Name (a color): \_\_\_\_\_

Note: There is no review for this lesson.



# COURSE REVIEW

Supplies  
ruler

There are approximately 18,000 species of butterflies in the world. They come in a variety of colors and sizes and can be found almost all over the world, even in parts of the arctic tundra. You'll learn more about these magnificent insects as you review concepts from Math 6.

Note: Although Lesson 117 was an introduction to calculators, calculators should not be used on this review.

## Factors & Factoring

Lessons 2, 3, 48 & 71

Viceroy and monarch butterflies have a lot in common. Their patterns and coloring are almost the same. Throughout this course you have learned to find and use the *greatest common factor* of numbers.

Write the prime factorization of each number. Then find the GCF of the numbers.

140: \_\_\_\_\_

GCF: \_\_\_\_\_

98: \_\_\_\_\_

Factor each expression.

$98v + 140$  \_\_\_\_\_

$15 + 60m$  \_\_\_\_\_

Use the distributive property to simplify each expression.

$11(12 + 7b + 4)$  \_\_\_\_\_

$\frac{2}{3}(39f + 15)$  \_\_\_\_\_

## Operations with Fractions, Decimals & Integers

Lessons 9, 12–13, 17, 25, 31–32 & 56

Butterflies have a four-stage life cycle. In the problems below, perform the four basic operations with fractions, decimals, and integers.

Simplify.

$\frac{2}{3} = \frac{4}{15}$  \_\_\_\_\_

$\frac{5}{8} + \frac{3}{16} =$  \_\_\_\_\_

$\frac{5}{8} \div \frac{3}{16} =$  \_\_\_\_\_

$5\frac{1}{2} - 2\frac{2}{3} =$  \_\_\_\_\_

$22.1 - 1.58 =$  \_\_\_\_\_

$163 + 98.6 =$  \_\_\_\_\_

$68.04 \div 5.4 =$  \_\_\_\_\_

$19.2 \cdot 8.5 =$  \_\_\_\_\_

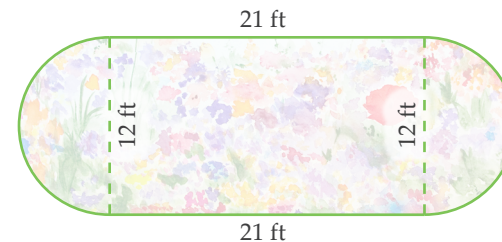
$29 + (-56) =$  \_\_\_\_\_

$-23 \cdot 15 =$  \_\_\_\_\_

## Area, Perimeter & Volume

Lessons 22, 42, 73 & 107

Butterflies are pollinators. Suppose a flower garden with the outline shown below was planted to attract butterflies. Find the area and perimeter of the garden. Use 3.14 for  $\pi$ .



$A \approx$  \_\_\_\_\_  $\text{ft}^2$

$P \approx$  \_\_\_\_\_  $\text{ft}$

Convert the area to square yards.

$A \approx$  \_\_\_\_\_  $\text{yd}^2$

Suppose the butterfly conservatory at a botanical garden is built in the shape of a rectangular prism. The area of the base is  $9,200 \text{ ft}^2$ , and it is 20 feet tall. Find the volume of the conservatory in cubic feet.

$V =$  \_\_\_\_\_  $\text{ft}^3$

### Converting Units & Scientific Notation

Lessons 67–69, 106, 109 & 116

Suppose that a pupa (chrysalis) took two weeks to transform into a butterfly. Convert two weeks to hours.

$$2 \text{ weeks} = \underline{\hspace{2cm}} \text{ hours}$$



A female Queen Alexandra's birdwing has a wingspan of up to 28 cm and can weigh up to 12 g. Convert 28 cm to

kilometers, and then rewrite the answer in scientific notation. Convert 12 g to milligrams, and then rewrite the answer in scientific notation.

$$28 \text{ cm} = \underline{\hspace{2cm}} \text{ km} = \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} \text{ km}$$

$$12 \text{ g} = \underline{\hspace{2cm}} \text{ mg} = \underline{\hspace{1cm}} \times \underline{\hspace{1cm}} \text{ mg}$$

Butterflies are cold-blooded, and most are unable to fly when the temperature is below 60 °F. Convert 60 °F to degrees Celsius. Round to the nearest tenth.

$$60 \text{ °F} \approx \underline{\hspace{2cm}} \text{ °C}$$

Suppose a watering can at a botanical garden holds 1.5 gallons. How many cups does it hold?

$$\underline{\hspace{2cm}} \text{ c}$$

### Solving Equations & Inequalities

Lessons 49–50, 61–62, 72 & 81

Solve each equation or inequality.

$$7.2b = 64.8$$

$$89 = 8u - 15$$

$$b = \underline{\hspace{2cm}}$$

$$u = \underline{\hspace{2cm}}$$

$$t^2 = 64$$

$$e + 15 = -2$$

$$t = \underline{\hspace{2cm}}, t = \underline{\hspace{2cm}}$$

$$e = \underline{\hspace{2cm}}$$

$$\sqrt[3]{r} = -4$$

$$\frac{f}{8} - 41 = 11$$

$$r = \underline{\hspace{2cm}}$$

$$f = \underline{\hspace{2cm}}$$

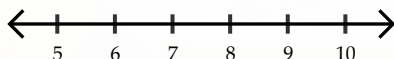
$$12 \geq 3l + 9$$

\_\_\_\_\_

Solve the inequality and graph the solution on the number line below.

$$8y - 47 > 17$$

\_\_\_\_\_



### Percents, Ratios & Proportions

Lessons 52–55, 85 & 91–93

Some butterflies use camouflage to avoid predators. Some species eat toxins as caterpillars and become poisonous. Other species have coloring similar to poisonous species, so predators avoid them as well.

Just as there is more than one way for butterflies to avoid predators, you have learned more than one way to solve problems involving percents. Solve each problem below using the method of your choice.

What is 15% of 114? \_\_\_\_\_

30 is 24% of what number? \_\_\_\_\_

84 is what percent of 120? \_\_\_\_\_

The ratio of children to adults at a butterfly conservatory is 2 : 5. There are 203 people at the conservatory.

How many of them are children? \_\_\_\_\_

Three out of every 16 butterflies in a butterfly conservatory are monarchs. There are 546 butterflies that are NOT monarchs.

How many butterflies are in the conservatory? \_\_\_\_\_

### Percent Discounts & Tax

Lessons 64 & 65

Alek plans to buy a pair of binoculars for observing butterflies. Find each amount below. Round to the nearest cent.

original price: \$18.98

percent discount: 10%

tax rate: 6%

amount of discount: \_\_\_\_\_

sale price: \_\_\_\_\_

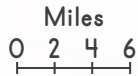
amount of tax: \_\_\_\_\_

total cost: \_\_\_\_\_

### Scale Drawings

Lesson 94

Brian and Arlene are using a city map to find a butterfly conservatory. Use a ruler (centimeter side) to find the map scale.



\_\_\_\_\_ : \_\_\_\_\_

Arlene measures the distance from their hotel to the conservatory on the map. The measured distance is 0.75 cm.

What is the actual distance? \_\_\_\_\_

### Proportions on a Graph

Lessons 82 & 86

Create a ratio table and answer the questions for the scenario below. Then graph the equation.

If 4 tickets to a butterfly conservatory cost \$10, how much will 6 tickets cost? \_\_\_\_\_

$x$	$y$
2	
4	10
6	
8	

Write an equation to represent the scenario.

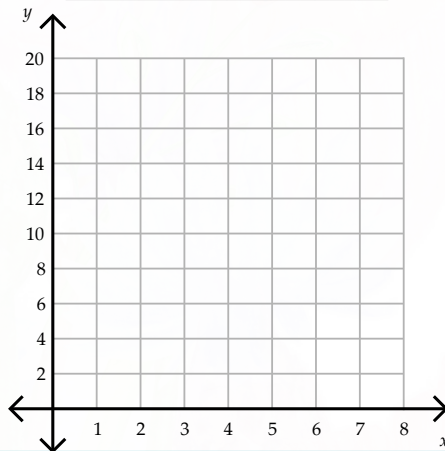
\_\_\_\_\_

What is the independent variable?

\_\_\_\_\_

What is the dependent variable?

\_\_\_\_\_



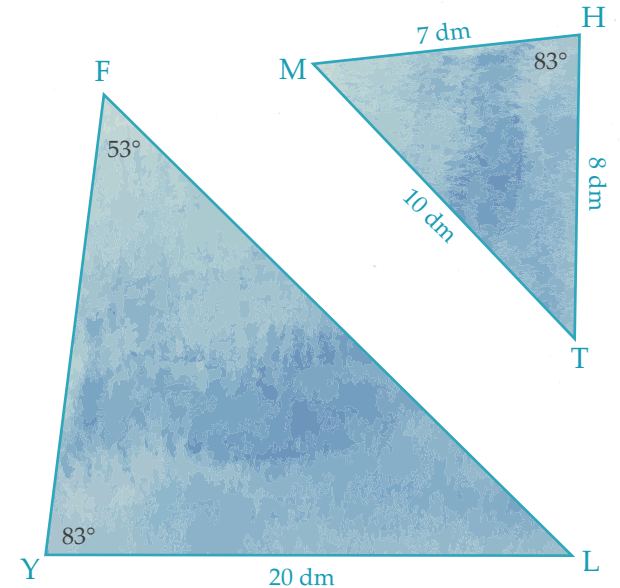
### Similar Figures

Lessons 6, 96 & 97

Butterflies and moths are genetically *similar*.

Complete the statements below for the *similar* triangles.

$$\triangle MTH \sim \triangle FLY$$



$m\angle FLY = \underline{\hspace{2cm}}$

$m\angle TMH = \underline{\hspace{2cm}}$

$m\angle MTH = \underline{\hspace{2cm}}$

$FY = \underline{\hspace{2cm}}$

$FL = \underline{\hspace{2cm}}$

$\angle YFL \cong \underline{\hspace{2cm}}$



Simply

Good and Beautiful

**MATH 6**  
**ANSWER**  
**KEY**



# Math 6 Answer Key

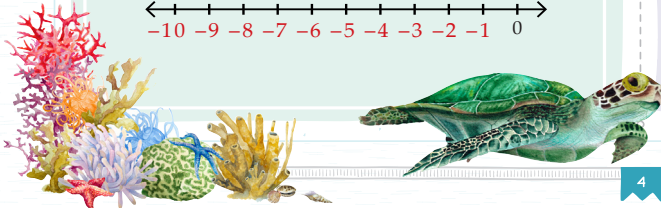
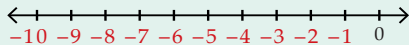
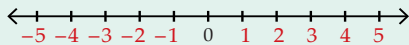
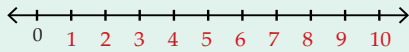
<b>Book 1 Answer Key</b> .....	1
<b>Book 2 Answer Key</b> .....	93

# OPPOSITES AND ABSOLUTE VALUE

Watch the video lesson and/or read the mini lesson.

## Warm-Up

The warm-up is discussed in the video. This section can be completed either before or during the video. Using a scale that counts by one, label the missing numbers on each of the number lines.



## Video Lesson



Scan the QR code or watch the video lesson on [goodandbeautiful.com/Math6](http://goodandbeautiful.com/Math6). This section is completed during the video.

$$|-12| = 12$$

$$|0| = 0$$

$$|35| = 35$$

$$\left|\frac{3}{5}\right| = \frac{3}{5}$$

$$|-100| = 100$$

$$|-8.2| = 8.2$$

$$|14| = |-14|$$

## Mental Math Checkup

Write the answers in the spaces provided. This section is completed independently.

- Count by 100 from 0 to 1,000.
- Add 1,000 to each number.  
239,719   **240,719**   76,736   **77,736**   3,791   **4,791**
- What is the third month of the year?   **March**

## Practice

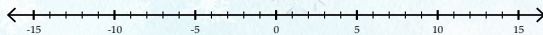
1. If the number is an integer, write "yes" on the line. If not, write "no."

7 yes   -40 yes   0 yes    $\frac{4}{5}$  no  
5.1 no    $\frac{1}{3}$  no   -21 yes   -8.4 no

2. Write each of the expressions as an integer. Some examples are given.

a loss of \$2,000   -2,000   500 ft below sea level   -500  
a drop of 15 °F   -15   a debt of \$10   -10  
a price increase of \$60   60   a deposit of \$50   50  
125 ft above sea level   125   a withdrawal of \$50   -50  
30 degrees below zero   -30   a gain of \$45   45

3. Find the opposite of each number. Use the number line for help if necessary.



Number	Opposite	Number	Opposite
4	-4	12	-12
7	-7	-12	12
-2	2	-5	5
-1	1	8	-8
0	0	3	-3

4. Find the absolute value of each number.

$|450|$  450    $|-22|$  22    $|0|$  0    $|-108|$  108  
 $|5|$  5    $|-15|$  15    $|-3|$  3    $|18|$  18

5. Find the change from the first temperature to the second. Write the change as an integer.

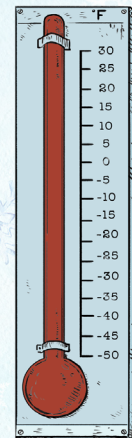
5 °F to 15 °F   10   -50 °F to -25 °F   25  
0 °F to -15 °F   -15   -10 °F to -35 °F   -25  
25 °F to 15 °F   -10   -5 °F to 15 °F   20

6. Compare the following using <, >, or =.

$|0| < |-5|$     $7 > |2|$     $|-4| = |4|$   
 $|5| < 7$     $|-15| < |-23|$     $32 > |-30|$

7. Cross off the incorrect absolute values.

$|-15| = 15$     ~~$|-15| = -15$~~   
 ~~$|-5| = -5$~~     $|-5| = 5$   
 ~~$|15| = -15$~~     $|15| = 15$   
 $|5| = 5$     ~~$|5| = -5$~~



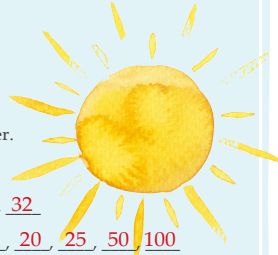
Practice

8. Circle the greater value in each row.
- a. the opposite of 3      2
  - b. -25      the opposite of -24
  - c. -14      -14
  - d. the opposite of 4      the opposite of -4
  - e. 10      ten less than zero
  - the opposite of 8      -9
9. Circle the correct word in *italics* to make a true statement.
- The absolute value of a positive number is a positive *negative* number.
- The absolute value of a negative number is a positive *negative* number.
- The opposite of a positive number is a positive *negative* number.
- The opposite of a negative number is a positive *negative* number.
10. Complete the chart below. The first row is given as an example.

Number	Opposite	Absolute Value
$-\frac{5}{8}$	$\frac{5}{8}$	$\frac{5}{8}$
3.4	-3.4	3.4
-27.482	27.482	27.482
$-\frac{1}{5}$	$\frac{1}{5}$	$\frac{1}{5}$
$\frac{3}{10}$	$-\frac{3}{10}$	$\frac{3}{10}$
-50.5	50.5	50.5

Review

1. Circle the even numbers and cross out the odd numbers.
- ~~589,137~~    1,792,870    ~~84,781,791~~    901,728,176
2. Compare each pair of numbers using  $<$ ,  $>$ , or  $=$ .
- $6,371,278 < 6,372,278$
- $5.810 = 5.81$
- $431,081 < 431,801$
3. Complete each problem.
- $654 \div 3 = \underline{218}$      $382,718 + 12,795 = \underline{395,513}$
- $5,361 \times 12 = \underline{64,332}$      $265,710 - 12,795 = \underline{252,915}$
4. List the next five multiples of each number.
- 20: 40, 60, 80, 100, 120
- 50: 100, 150, 200, 250, 300
- 12: 24, 36, 48, 60, 72
5. List the factors of each number.
- 25: 1, 5, 25
- 32: 1, 2, 4, 8, 16, 32
- 100: 1, 2, 4, 5, 10, 20, 25, 50, 100



Lesson 2

PRIME FACTORIZATION

Watch the video lesson and/or read the mini lesson.

Warm-Up

The warm-up is discussed in the video. This section can be completed either before or during the video.

Write each expression as a number in standard form.

$4^2$	$2^5$	$3^3$
<u>16</u>	<u>32</u>	<u>27</u>

Write each expression using exponents.

$7 \times 7 \times 7 \times 7$	$10 \times 10$
<u><math>7^4</math></u>	<u><math>10^2</math></u>

Video Lesson



Scan the QR code or watch the video lesson on [goodandbeautiful.com/Math6](http://goodandbeautiful.com/Math6). This section is completed during the video.

60

Factor trees may vary.

$2^2 \times 3 \times 5$

Mental Math Checkup

Write the answers in the spaces provided. This section is completed independently.

- Count by 50 from 0 to 500.
- Add 10,000 to each number.  
726,101    736,101    27,193,716    27,203,716    827,719    837,719
- How many quarters are in \$2.00?    8



# PERIMETER AND AREA OF IRREGULAR FIGURES

Watch the video lesson and/or read the mini lesson.

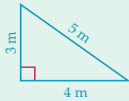
## Warm-Up

Find the area and perimeter of the shapes below.



$A = 45 \text{ ft}^2$

$P = 36 \text{ ft}$



$A = 6 \text{ m}^2$

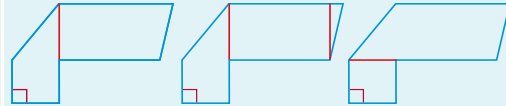
$P = 12 \text{ m}$



## Video Lesson



Scan the QR code or watch the video lesson on [goodandbeautiful.com/Math6](http://goodandbeautiful.com/Math6).



Answers will vary; examples are shown above.

## Mental Math Checkup

- Count by 150 from 0 to 1,500.
- Multiply each number by 5,000.  
8 **40,000**    4 **20,000**    12 **60,000**
- How much time has passed from 8:15 AM to 9:45 AM? **1 hour 30 minutes**

**Total area should be the same as listed on the chart for each building even if the child divides the building differently.**

Note: Angles that look like right angles are right angles.

**Area Calculations:**

- D:**  $460 \text{ ft} \times 150 \text{ ft} = 69,000 \text{ ft}^2$
- A:**  $\frac{1}{2}(110 \text{ ft} \times 140 \text{ ft}) = 7,700 \text{ ft}^2$
- F:**  $400 \text{ ft} \times 110 \text{ ft} = 44,000 \text{ ft}^2$ ;  $220 \text{ ft} \times 120 \text{ ft} = 26,400 \text{ ft}^2$ ;  $220 \text{ ft} \times 120 \text{ ft} = 26,400 \text{ ft}^2$
- E:**  $\frac{1}{2}(270 \text{ ft} + 210 \text{ ft})100 \text{ ft} = 24,000 \text{ ft}^2$ ;  $\frac{1}{2}(230 \text{ ft} + 340 \text{ ft})100 \text{ ft} = 28,500 \text{ ft}^2$
- B:**  $500 \text{ ft} \times 260 \text{ ft} = 130,000 \text{ ft}^2$ ;  $\frac{1}{2}(140 \text{ ft} \times 150 \text{ ft}) = 10,500 \text{ ft}^2$
- C:**  $\frac{1}{2}(380 \text{ ft} + 260 \text{ ft})100 \text{ ft} = 32,000 \text{ ft}^2$ ;  $120 \text{ ft} \times 130 \text{ ft} = 15,600 \text{ ft}^2$

# SURFACE AREA AND NETS

Watch the video lesson and/or read the mini lesson.

## Warm-Up

Write the area formula for each shape.

rectangle:  $A = bh$

parallelogram:  $A = bh$

triangle:  $A = \frac{1}{2}bh$

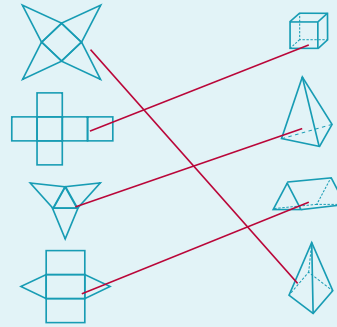
trapezoid:  $A = \frac{1}{2}(b_1 + b_2)h$



## Video Lesson



Scan the QR code or watch the video lesson on [goodandbeautiful.com/Math6](http://goodandbeautiful.com/Math6).

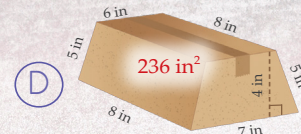
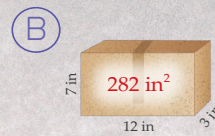
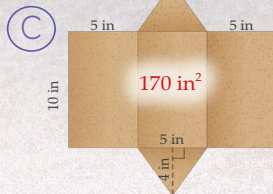
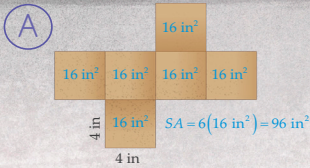
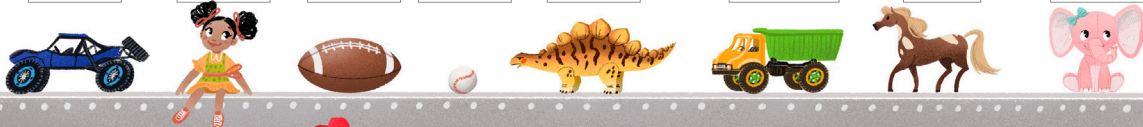


## Mental Math Checkup

- Count by 250 from 0 to 2,500.
- Multiply each number by 700.  
5 **3,500**    10 **7,000**    12 **8,400**
- If today is Tuesday, what day will it be 10 days from now? **Friday**

# TOY FACTORY Shipping

RC car 236 in <sup>2</sup>	doll 180 in <sup>2</sup>	football 295 in <sup>2</sup>	baseball 96 in <sup>2</sup>	dinosaur 170 in <sup>2</sup>	dump truck 282 in <sup>2</sup>	horse 212 in <sup>2</sup>	elephant 161 in <sup>2</sup>
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**DISTRIBUTIVE PROPERTY & FACTORING** Lessons 47 & 48

Write the second factor in expanded form, and then use the distributive property to multiply.

$$3 \cdot 821 = 3(800 + 20 + 1) \\ = 2,400 + 60 + 3 \\ = 2,463$$

$$7 \cdot 1,028 = 7(1,000 + 20 + 8) \\ = 7,000 + 140 + 56 \\ = 7,196$$

Factor each expression.

$$9 + 63 = 9(1 + 7) \quad 24 + 18 = 6(4 + 3) \quad 75 + 15 = 15(5 + 1)$$

**SQUARE ROOTS, CUBE ROOTS & COMBINING LIKE TERMS** Lessons 33 & 46

Complete each problem.

$$\sqrt{144} - \sqrt[3]{64} = 8 \quad \sqrt[3]{125} + \sqrt{100} = 15 \quad \sqrt{121} \cdot \sqrt[3]{8} = 22$$

Cross out the statements that are not true.

$$3a + 8b + 2a = 5a + 8b$$

~~$$4x - y = 3xy$$~~

~~$$-2r + 4r^2 = 6r$$~~

$$5m + 4n - n = 5m + 3n$$

**COMPLEX FRACTIONS** Lesson 56

Simplify the complex fractions.

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

$$\frac{\frac{2}{3}}{4} = \frac{1}{6}$$

$$\frac{\frac{1}{4}}{\frac{5}{8}} = \frac{2}{5}$$

**COMPLEMENTARY & SUPPLEMENTARY ANGLES** Lesson 38

Find the complementary angle measures.

$$63^\circ \text{ } 27^\circ$$

$$18^\circ \text{ } 72^\circ$$

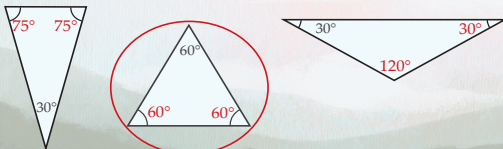
Find the supplementary angle measures.

$$20^\circ \text{ } 160^\circ$$

$$145^\circ \text{ } 35^\circ$$

**SYMMETRY, TRIANGLES & SEMICIRCLES** Lessons 36, 39 & 42

Write the missing angle measures on each triangle. Then circle the triangle(s) that have rotational symmetry.



Find the area and perimeter of the semicircle.



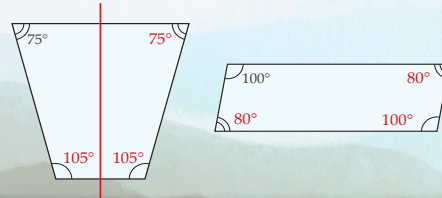
$$A \approx 353.25 \text{ mm}^2$$

$$P \approx 77.1 \text{ mm}$$

See Reference Chart for area & perimeter formulas.

**SYMMETRY & QUADRILATERALS** Lessons 36 & 40

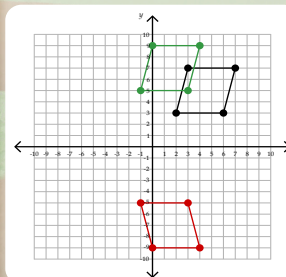
Draw all lines of symmetry on the shapes below. Then write the missing angle measures.



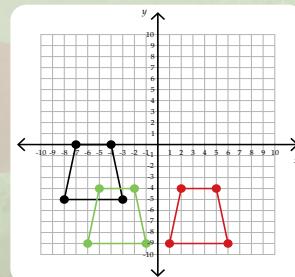
**TRANSFORMATIONS** Lesson 36

Translate each shape according to the information given.

Translate the parallelogram 3 units left and 2 units up. Then reflect it over the x-axis.



Translate the trapezoid 2 units right and 4 units down. Then reflect it over the y-axis.



**ANGLES** Lesson 37

Classify each angle as acute (A), right (R), obtuse (O), or straight (S).

$$90^\circ \quad \underline{R}$$

$$15^\circ \quad \underline{A}$$

$$173^\circ \quad \underline{O}$$

$$180^\circ \quad \underline{S}$$




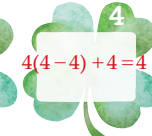

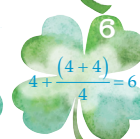

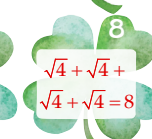


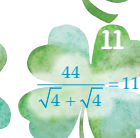
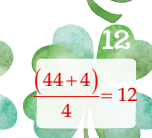
# FOUR SEASONS GAMES

There is no video or review for this lesson.

Regardless of which season it is where you are right now, today you will participate in brain-stretching activities for all four seasons: winter, spring, summer, and fall.

## Spring

Welcome to spring! Clover is one of the first plants to turn green and begin to thrive each spring. Clovers usually have three leaves, but sometimes a very rare four-leaf clover can be found. In the puzzles below, make each number in the list using exactly four 4s and different operations. You can add, subtract, multiply, divide, or use square roots. You may need parentheses as well. Four examples are given.

 $\frac{4}{4} - 4 - 4 = 1$	 $\frac{4}{4} + \frac{4}{4} = 2$	 $\frac{(4+4+4)}{4} = 3$	 $4(4-4) + 4 = 4$
 $\frac{(4 \cdot 4 + 4)}{4} = 5$	 $4 + \frac{(4+4)}{4} = 6$	 $\frac{44}{4} - 4 = 7$	 $\frac{\sqrt{4} + \sqrt{4} + \sqrt{4} + \sqrt{4}}{4} = 8$
 $\frac{4}{4} + 4 + 4 = 9$	 $\frac{(44-4)}{4} = 10$	 $\frac{44}{\sqrt{4} + \sqrt{4}} = 11$	 $\frac{(44+4)}{4} = 12$

Answers will vary.

## Summer

Use the cipher at the bottom of the page to answer the summer picnic riddles. Use the given answer to the first riddle to figure out how the cipher works.

Hint: Once you figure out the code for a letter, fill in all the blanks for that letter on the page.

What does the sun drink out of?

S U N G L A S S E S

A large cooler of water weighs 40 lb. What must you put in it to make it weigh 20 lb?

A H O L E

What fruit doesn't like to be alone?

A P E A R



What did summer say to spring?

"H E L P I ' M G O I N G

T O F A L L !"




### CIPHER



A	B	C	J	K	L	S	W
D	E	F	M	N	O	T	X
G	H	I	P	Q	R	U	Y
						V	Z





## Fall



Find the numerical value of each of the four fall items: leaf, apple, pumpkin, and scarecrow.

Hint: Don't try to solve the equations in order. Only one equation can be solved first, and the solution to that equation will help you solve another equation.

 +  = 

8.3 =  + 

 +  +  = 

 -  = 1.3

- leaf = 5.45
- apple = 4.15
- pumpkin = 9.6
- scarecrow = 3.2

## Winter

Four different families have planned a family ski trip to four different countries during four different winter months. Use the clues to figure out which family is going to which country during which month.

Hint: Once you know an answer, put a ✓ in that box and fill in the rest of the row and column of that 4 x 4 box with Xs. You may need to go through the clues more than once. You may use a map if needed.

		Month				Country			
		December	January	February	March	Switzerland	United States	France	Canada
Family	Schmidt	X	✓	X	X	X	X	X	✓
	Noor	X	X	X	✓	✓	X	X	X
	Chen	X	X	✓	X	X	✓	X	X
	Lopez	✓	X	X	X	X	X	✓	X
Country	Switzerland	X	X	X	✓				
	United States	X	X	✓	X				
	France	✓	X	X	X				
	Canada	X	✓	X	X				



- The Chen family is not going to Europe.
- The family who is traveling to France will go during the week of Christmas.
- The Noor family is not traveling to North America.
- The Schmidt family will travel three weeks after the family who is going to France and will visit the country north of the United States.
- The Chen family will be traveling one month after the Schmidt family and one month before the Noor family.

Practice

2	2	2	2	2	2	5	2	2	2	2	2	2	2
2	2	2	2	2	2	5	5	5	2	2	2	2	2
2	2	2	2	5	5	5	5	5	2	2	2	2	2
2	2	2	5	5	5	5	5	5	5	5	2	2	2
2	5	5	5	5	5	5	5	5	5	5	5	2	2
5	5	5	5	5	5	5	5	5	5	5	5	5	5
2	6	6	6	6	6	6	6	6	6	6	6	6	2
2	6	6	6	6	6	6	6	6	6	6	6	6	2
2	6	2	2	6	4	4	4	6	2	2	6	2	2
2	6	2	2	6	4	$\frac{2}{2}$	$\frac{2}{2}$	4	6	2	2	6	2
2	6	6	6	6	4	4	$\frac{4}{4}$	$\frac{4}{4}$	6	6	6	6	2
2	6	6	6	6	4	4	4	3	6	6	6	6	2
2	6	6	6	6	4	4	4	4	6	6	6	6	2
2	6	6	6	6	4	4	4	4	6	6	6	6	2
1	1	1	1	1	7	7	7	1	1	1	1	1	1
1	1	1	1	1	7	7	7	1	1	1	1	1	1

Color Key

$x < 1$ black	$x < -6$ gray	$x < 35$ white	$x > 28$ brown
$x > -1$ blue	$x > 2$ green	$x < 9$ red	

Review

1. What is the probability of rolling an even number on a standard die and flipping heads on a coin? *Lesson 77*

$\frac{1}{4}$

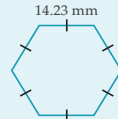
2. Simplify each fraction. *Lesson 3*

$\frac{12}{26} = \frac{6}{13}$        $\frac{28}{40} = \frac{7}{10}$        $\frac{21}{81} = \frac{7}{27}$

3. Multiply. *Lesson 13*

$16 \cdot 0.02 = 0.32$        $9 \cdot 0.0005 = 0.0045$        $20 \cdot 0.0011 = 0.022$

4. Find the perimeter of the hexagon. *Lesson 12*

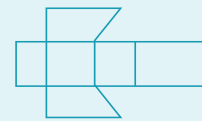


$P = 85.38 \text{ mm}$

5. Write the name of the figure represented by each net. *Lesson 22*



triangular pyramid



trapezoidal prism

Lesson 82

DEPENDENT AND INDEPENDENT VARIABLES

Supplies  
blue and red colored pencils  
protractor

Watch the video lesson and/or read the mini lesson.

Warm-Up

Find the rule for each sequence of numbers.

15, 6, -3, -12, ...

rule:  $-9$

-1, -4, -16, -64, ...

rule:  $\times 4$

Video Lesson



Scan the QR code or watch the video lesson on [goodandbeautiful.com/Math6](http://goodandbeautiful.com/Math6).



independent variable: $x$	$x$	$y$	equation: $y = x + 7$
	-3	4	
dependent variable: $y$	1	8	Find $y$ when $x$ is 100: $y = x + 7$ $y = 100 + 7$ $y = 107$
	5	12	
	9	16	

Mental Math Checkup

- Count down by 12 from 24 to -84.  
24, 12, 0, -12, -24, -36, -48, -60, -72, -84
- Find each percent.  
What is 200% of 10? 20      What is 200% of 20? 40
- Multiply or divide.  
 $300 \div 15 = 20$        $42 \cdot 2,000 = 84,000$

## Instructions

This assessment is different from the other assessments you have taken in Math 6. Instead of covering only concepts taught in Unit 4, this assessment covers concepts you have learned throughout the entire course, and the problems are designed to assess multiple skills. For example, a single complex fractions problem in the fraction and integer operations section covers concepts such as dividing fractions, canceling before multiplying, multiplying fractions, plotting a fraction on a number line, and converting an improper fraction to a mixed number or whole number. This assessment does not cover every skill you learned in Math 6; instead, it focuses on skills you need to know to successfully start Math 7. Here are some tips: First, read the instructions carefully. Second, do not rush through the problems. Third, if you start to

- get frustrated with one section, skip to a different section and then come back later. The sections do not need to be completed in order.
- For Lesson 119, complete all the exercises with purple headers only. You may cover the additional practice sections or fold the page to concentrate only on the purple sections. Have your parent or teacher correct the work. If there are mistakes in a section, your parent or teacher will check the orange "Additional Practice" checkbox for that section.
- For Lesson 120, complete all the orange sections that are checked. If you still make multiple mistakes, review those sections.
- Parents/teachers may determine if the student may use the Reference Chart for the assessment. It is recommended that the student first try the assessment without the Reference Chart and then refer to it if needed.

Although Lesson 117 was an introduction to calculators, calculators should not be used on the assessment.

## Student

### FACTORS & FACTORING (LESSONS 2, 3, 48 & 71)

Find the prime factorization of each number. Then find the GCF of the numbers.

48:  $2^4 \cdot 3$

GCF: 8

56:  $2^3 \cdot 7$

Factor each expression.

$9 + 48 = 3(3 + 16)$      $7b + 56 = 7(b + 8)$      $48 + 56q = 8(6 + 7q)$

### Additional Practice

#### FACTORS & FACTORING

Separate each composite number into a factor pair until every factor is a prime number.

Find the prime factorization of each number. Then find the GCF of the numbers.

36:  $2^2 \cdot 3^2$

GCF: 6

42:  $2 \cdot 3 \cdot 7$

This template can be used for factoring:  $\underline{\hspace{1cm}}(\underline{\hspace{1cm}} + \underline{\hspace{1cm}})$ . Write the GCF in the first blank and determine what terms multiplied by the GCF equal the terms in the expression.

Factor each expression.

$3 + 42 = 3(1 + 14)$      $12 + 36t = 12(1 + 3t)$      $42r + 36 = 6(7r + 6)$

### FRACTION AND INTEGER OPERATIONS (LESSONS 9, 14, 25 & 56)

Simplify. Then plot the answers on the number line below.

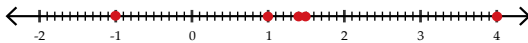
$\frac{7}{15} = 1\frac{1}{2}$

$-4 \div 4 = -1$

$\frac{18}{4} - \frac{7}{2} = 1$

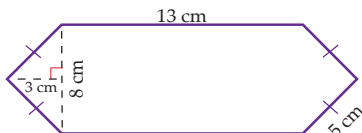
$2 - (-2) = 4$

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



### GEOMETRIC FIGURES (LESSONS 7, 21, 22 & 73)

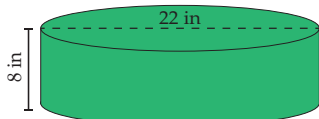
Find the perimeter and area of the figure.



$P = 46 \text{ cm}$

$A = 128 \text{ cm}^2$

Find the volume of the solid. Use 3.14 for  $\pi$ .



$V \approx 3,039.52 \text{ in}^3$

### Additional Practice

#### FRACTION AND INTEGER OPERATIONS

Find common denominators before adding or subtracting.

$\frac{30}{6} - \frac{13}{3} = \frac{2}{3}$

$\frac{1}{5} + \frac{14}{5} = 3$

Cancel before multiplying. Multiply the numerators; multiply the denominators. To divide, multiply the first number by the reciprocal of the second number. A complex fraction is division.

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

$\frac{3}{4} \div \frac{3}{2} = \frac{3}{2}$

**Integer operations rules:**

**Addition:** add and keep the sign

**Subtraction:** subtract and use the sign of the greater absolute value

**Multiplication/Division:** same signs  $\rightarrow$  answer is positive  
different signs  $\rightarrow$  answer is negative

$-4 \div 2 = -2$

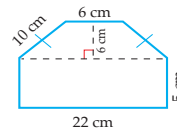
$-10 - 5 = -15$

### Additional Practice

#### GEOMETRIC FIGURES

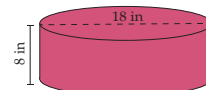
To find the volume of a prism or cylinder, multiply the area of the base by the height.  $V = \text{area of base} \cdot \text{height}$

Find the perimeter and area of the figure.



$P = 58 \text{ cm}$   
 $A = 194 \text{ cm}^2$

Find the volume of the solid. Use 3.14 for  $\pi$ .



$V \approx 2,034.72 \text{ in}^3$

