



ALPHA PLUS

TEACHER'S GUIDE

Math 4



SAMPLE FOR REVIEW

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SUCCESS **OAS**
with

Oklahoma Academic Standards

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Math 4

**Ensuring Student Success
with
Oklahoma Academic Standards**

Written by Oklahoma Teachers for Oklahoma Teachers

Aarti Hartfield



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SUCCESS *with* OAS

Math 4 by Aarti Hartfield

Aarti Hartfield graduated from SWOSU with a B.A. in Elementary Education in 2009. She landed her first teaching job as a 3rd grade teacher, and went on to teach 4th grade for six years, while pursuing her master's. In 2015, Aarti graduated from SWOSU with a master's degree in Elementary Administration. She is currently working as an instructional coach who mentors teachers to efficiently implement instructional practices and strategies.

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FOREWORD

Adopted in 2016 by the State Board of Education, the Oklahoma Academic Standards (OAS) mathematics objectives are measurably more rigorous in content and different in terms of vertical alignment than previous curriculum frameworks.

Immediately, Alpha Plus Educational Systems sought highly qualified teachers to develop a teaching and learning resource specifically aligned to the new standards. CEO Jan Barrick also enlisted my help and that of Dr. Frank Wang, President of the Oklahoma School of Science and Mathematics (OSSM), who is a nationally known, accomplished mathematics educator and an experienced textbook publisher. It has been my pleasure to help ensure the content is of high quality and will provide a solid mathematical foundation.

Written by Oklahoma teachers for Oklahoma teachers, the *Success with OAS: Alpha Plus Mathematics* series provides a robust set of resources relating mathematical skills to the real world of Oklahoma students.

-- Edna McDuffie Manning, *EdD.*, *Mathematics*
Founder and President Emerita, Oklahoma School of Science and Mathematics

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## INTRODUCTION

The *Success with OAS: Alpha Plus Mathematics* framework for instruction, independent student work, and continuous review will prepare students for comprehensive assessments at each grade level. Following is a summary addressing the most effective way to use each element.

### Teacher's Guide

Objective Statement: At the beginning of each lesson, the OAS objective is stated as adopted. This is helpful when writing lesson plans and understanding the focus of the lesson.

Real-World Connections: Students must be engaged and must relate the concept to their daily lives. Connecting to a real-world application taps into students' prior knowledge and shows the practicality behind the concept. It is suggested that the teacher start with a relevant, age-appropriate game, class discussion, website or video, role-play, or other group activity. This will illustrate the need to learn the skill so that students can use it in their daily lives.

Vocabulary: A list of vocabulary words critical to each OAS Objective is provided, particularly those used in the state's *Test and Item Specifications*. A complete vocabulary definition can be found in the student workbook and in the comprehensive Glossary at the end of the book.

Modeling: The Modeling section provides step-by-step instructions for one or more ways to teach the objective and the skills related to the lesson. Teachers may use this to direct students and add more examples or details as needed for the teachers' lesson plans.

Extension Activities: This is a list of possible resources to enhance the objective lesson. Every author provided links to tools they use in class, to online content available at no charge for teacher use, and to other lesson-planning resources.

Answer Key: Every Teacher's Guide includes a complete Answer Key for each assessment item in the student workbook. The Answer Key for the Continuous Review designates what objectives are assessed.

Comprehensive Examination: A Comprehensive Examination was developed to resemble the state assessment and encompasses every objective taught. It can be used as a pre-test and post-test for the school year to better prepare students for state-mandated tests. The Answer Key provides the answers with objective numbers.

### **Student Workbook**

Objective Statement: At the beginning of each student lesson is the objective statement. It clearly defines the focus of the lesson.

Real-World Connections: Written in age-appropriate language, this section reminds students of prior knowledge they have on the topic and how they might use this skill in their daily lives. Relevance is essential to student engagement in the lesson. Teachers can highlight this scenario for the students with a game, role-play, or other group activity.

Vocabulary: Each lesson includes a vocabulary list with definitions for the words the students will encounter on state assessments. Students should also learn to use the Glossary in the back of the book.

Guided Practice: Every objective lesson includes a Guided Practice, which is a set of items available for use in class as part of, or after, instruction. The ten practice problems reflect every skill students will use when they work independently.

Independent Practice: The Independent Practice is a series of twenty questions and activities the student may do independently, either in the classroom or for homework. The Independent Practice can also be used for reinforcement or review as needed.

Continuous Review: At the end of each lesson, there is a Continuous Review with ten questions covering objectives taught previously in the book or aligned to key skills from previous grade level(s). The Answer Key designates the objective each question assesses. The Continuous Review is in sequence after each objective lesson or can be used as a weekly assessment to reinforce past skills.

**OAS Mathematics**
**Table of Contents**
**4th grade**

| Suggested Order | Objective Number | Objective Description                                                                                                                                                                                                            | Teacher Guide Page Number | Student Book Page Number |
|-----------------|------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------------------------|
| 1               | 4.GM.1.1         | Identify points, lines, line segments, rays, angles, endpoints, and parallel and perpendicular lines in various contexts.                                                                                                        | 1                         | 1                        |
| 2               | 4.GM.1.2         | Describe, classify, and sketch quadrilaterals, including squares, rectangles, trapezoids, rhombuses, parallelograms, and kites. Recognize quadrilaterals in various contexts.                                                    | 17                        | 11                       |
| 3               | 4.GM.1.3         | Given two three-dimensional shapes, identify similarities, and differences.                                                                                                                                                      | 32                        | 21                       |
| 4               | 4.GM.2.1         | Measure angles in geometric figures and real-world objects with a protractor or angle ruler.                                                                                                                                     | 48                        | 33                       |
| 5               | 4.N.1.1          | Demonstrate fluency with multiplication and division facts with factors up to 12.                                                                                                                                                | 66                        | 49                       |
| 6               | 4.N.1.2          | Use an understanding of place value to multiply or divide a number by 10, 100, and 1,000.                                                                                                                                        | 84                        | 59                       |
| 7               | 4.N.1.3          | Multiply 3-digit by 1-digit or 2-digit by 2-digit whole numbers, using efficient and generalizable procedures and strategies, based on knowledge of place value, including but not limited to standard algorithms.               | 95                        | 67                       |
| 8               | 4.N.1.4          | Estimate products of 3-digit by 1-digit or 2-digit by 2-digit whole numbers using rounding, benchmarks and place value to assess the reasonableness of results. Explore larger numbers using technology to investigate patterns. | 112                       | 77                       |

**OAS Mathematics**
**Table of Contents**
**4th grade**

| Suggested Order | Objective Number | Objective Description                                                                                                                                                                                                                                                                                                                | Teacher Guide Page Number | Student Book Page Number |
|-----------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------------------------|
| 9               | 4.N.1.5          | Solve multi-step real-world and mathematical problems requiring the use of addition, subtraction, and multiplication of multi-digit whole numbers. Use various strategies, including the relationship between operations, the use of appropriate technology, and the context of the problem to assess the reasonableness of results. | 124                       | 87                       |
| 10              | 4.N.1.6          | Use strategies and algorithms based on knowledge of place value, equality, and properties of operations to divide 3-digit dividend by 1-digit whole number divisors. (e.g., mental strategies, standard algorithms, partial quotients, repeated subtraction, the commutative, associative, and distributive properties.)             | 139                       | 99                       |
| 11              | 4.N.1.7          | Determine the unknown addend or factor in equivalent and non-equivalent expressions (e.g., $5 + 6 = 4 + \square$ , $3 \times 8 < 3 \times \square$ ).                                                                                                                                                                                | 156                       | 109                      |
| 12              | 4.GM.2.2         | Find the area of polygons that can be decomposed into rectangles.                                                                                                                                                                                                                                                                    | 170                       | 117                      |
| 13              | 4.GM.2.3         | Using a variety of tools and strategies, develop the concept that the volume of rectangular prisms with whole-number edge lengths can be found counting the total number of same-sized unit cubes that fill a shape without gaps or overlaps. Use appropriate measurements such as $cm^3$ .                                          | 187                       | 127                      |
| 14              | 4.GM.2.4         | Choose an appropriate instrument and measure the length of an object to the nearest whole centimeter or quarter-inch.                                                                                                                                                                                                                | 203                       | 139                      |

**OAS Mathematics**
**Table of Contents**
**4th grade**

| Suggested Order | Objective Number | Objective Description                                                                                                                                                                                                                                                                   | Teacher Guide Page Number | Student Book Page Number |
|-----------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------------------------|
| 15              | 4.GM.2.5         | Solve problems that deal with measurements of length, when to use liquid volumes, when to use mass, temperatures above zero and money using addition, subtraction, multiplication, or division as appropriate (customary and metric).                                                   | 216                       | 149                      |
| 16              | 4.GM.3.1         | Determine elapsed time.                                                                                                                                                                                                                                                                 | 229                       | 157                      |
| 17              | 4.GM.3.2         | Solve problems involving the conversion of one measure of time to another.                                                                                                                                                                                                              | 242                       | 167                      |
| 18              | 4.N.2.1          | Represent and rename equivalent fractions using fraction models (e.g., parts of a set, area models, fraction strips, and number lines).                                                                                                                                                 | 251                       | 173                      |
| 19              | 4.N.2.2          | Use benchmark fractions ( $0, \frac{1}{4}, \frac{1}{3}, \frac{1}{2}, \frac{2}{3}, \frac{3}{4}, 1$ ) to locate additional fractions on a number line. Use models to order and compare whole numbers and fractions less than and greater than one using comparative language and symbols. | 272                       | 185                      |
| 20              | 4.N.2.3          | Decompose a fraction in more than one way into a sum of fractions with the same denominator using concrete and pictorial models and recording results with symbolic representations (e.g., $\frac{3}{4} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4}$ ).                                   | 286                       | 193                      |
| 21              | 4.N.2.4          | Use fraction models to add and subtract fractions with like denominators in real-world and mathematical situations.                                                                                                                                                                     | 305                       | 207                      |
| 22              | 4.N.2.5          | Represent tenths and hundredths with concrete models, making connections between fractions and decimals.                                                                                                                                                                                | 319                       | 217                      |

**OAS Mathematics**
**Table of Contents**
**4th grade**

| Suggested Order | Objective Number | Objective Description                                                                                                                                                                                                          | Teacher Guide Page Number | Student Book Page Number |
|-----------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------------------------|
| 23              | 4.N.2.6          | Represent, read, and write decimals up to at least the hundredths place in a variety of contexts including money.                                                                                                              | 337                       | 233                      |
| 24              | 4.N.2.7          | Compare and order decimals and whole numbers using place value, a number line, and models such as grids and base 10 blocks.                                                                                                    | 352                       | 243                      |
| 25              | 4.N.2.8          | Compare benchmark fractions ( $\frac{1}{4}$ , $\frac{1}{3}$ , $\frac{1}{2}$ , $\frac{2}{3}$ , $\frac{3}{4}$ ) and decimals (0.25, 0.50, 0.75) in real world and mathematical situations.                                       | 368                       | 255                      |
| 26              | 4.N.3.1          | Given a total cost (whole dollars up to \$20 or coins) and amount paid (whole dollars up to \$20 or coins), find the change required in a variety of ways. Limited to whole dollars up to \$20 or sets of coins.               | 381                       | 265                      |
| 27              | 4.A.1.1          | Create input/output chart or table to represent or extend a numerical pattern.                                                                                                                                                 | 394                       | 277                      |
| 28              | 4.A.1.2          | Describe the single operation rule for a pattern from an input/output table or function machine involving any operation of a whole number.                                                                                     | 411                       | 291                      |
| 29              | 4.A.1.3          | Create growth patterns involving geometric shapes and define the single operation rule of the pattern.                                                                                                                         | 431                       | 309                      |
| 30              | 4.A.2.1          | Use number sense, properties of multiplication and the relationship between multiplication and division to solve problems and find values for the unknowns represented by letters and symbols that make number sentences true. | 455                       | 329                      |

**OAS Mathematics**
**Table of Contents**
**4th grade**

| Suggested Order | Objective Number | Objective Description                                                                                                                                                                                                                            | Teacher Guide Page Number | Student Book Page Number |
|-----------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|--------------------------|
| 31              | 4.A.2.2          | Solve for unknowns in problems by solving open sentences (equations) and other problems involving addition, subtraction, multiplication, or division with whole numbers. Use real-world situations to represent number sentences and vice versa. | 467                       | 339                      |
| 32              | 4.D.1.1          | Represent data on a frequency table or line plot marked with whole numbers and fractions using appropriate titles, labels, and units.                                                                                                            | 479                       | 349                      |
| 33              | 4.D.1.2          | Use tables, bar graphs, timelines, and Venn diagrams to display data sets. The data may include benchmark fractions of decimals ( $\frac{1}{4}$ , $\frac{1}{3}$ , $\frac{1}{2}$ , $\frac{2}{3}$ , $\frac{3}{4}$ , 0.25, 0.50, and 0.75).         | 511                       | 371                      |
| 34              | 4.D.1.3          | Solve one- and two-step problems using data in whole number, decimal, or fraction form in a frequency table and line plot.                                                                                                                       | 531                       | 385                      |

## Teacher's Guide

### 4.GM.1.1 Identify points, lines, line segments, rays, angles, endpoints, and parallel and perpendicular lines in various contexts.

#### Real-World Connections

Students can look at a road map to visualize geometric shapes, such as lines, points, and angles. Use a local road map to illustrate how the paths of roads and highways create geometric shapes. Encourage students to also identify geometric shapes in nature. This can be illustrated by looking at spider webs or snowflakes. Use the terms line, point, and angle when looking at maps or things from nature. Encourage students to identify other places in the real-world where they see geometric shapes such as in architecture or a baseball field.

#### Vocabulary

point, endpoints, lines, line segment, ray, parallel lines, perpendicular lines, angles, right angle, acute angle, obtuse angle, straight angle

#### Modeling

**Step 1:** Discuss points.

A **point** is an object that has no dimensions. It has no properties other than location. It has no length, no width, and no depth.

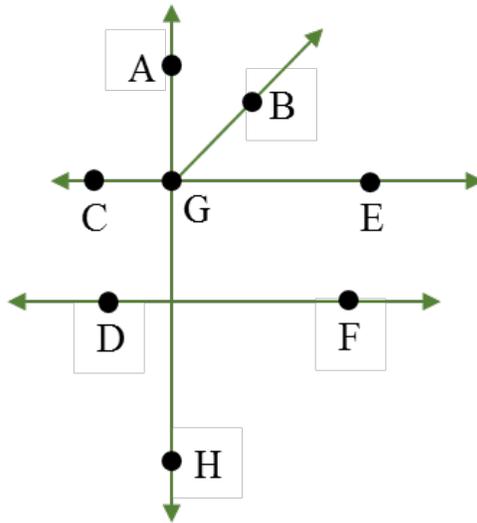
#### Examples:

- A point can be referred to a location on a map.



## Teacher's Guide 4.GM.1.1

- A point can be referred to a position on a line.
  - A-H are all points located on the lines in the example.

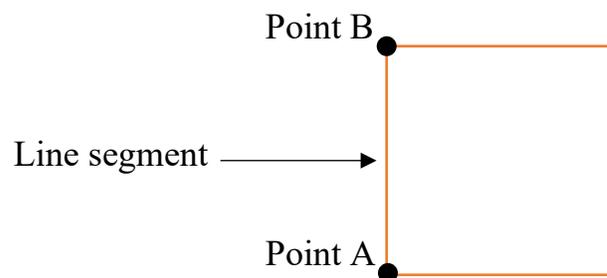


**Step 2:** Discuss lines, line segments, and endpoints.

A **line** is a straight path that is endless in opposite directions. A line is drawn with arrows on each end to show that it keeps going.



A **line segment** is part of a line that extends from one point to another. A square is made of four-line segments. The line segment shown on the square runs from Point A to Point B.



An **endpoint** is where both ends of the line segment stop. They are at the ends of line segments. They are usually drawn to look like dots.

In the example above, Point A and Point B are endpoints.

## Teacher's Guide 4.GM.1.1

**Step 3:** Discuss rays and angles.

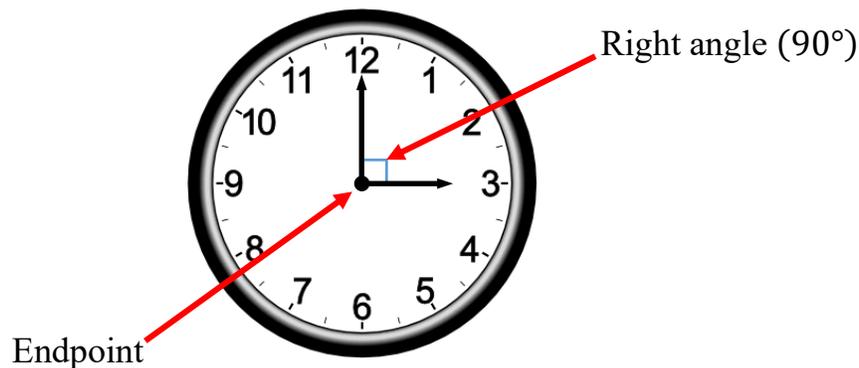
A **ray** is part of a line that has one endpoint and goes on forever in the other direction.



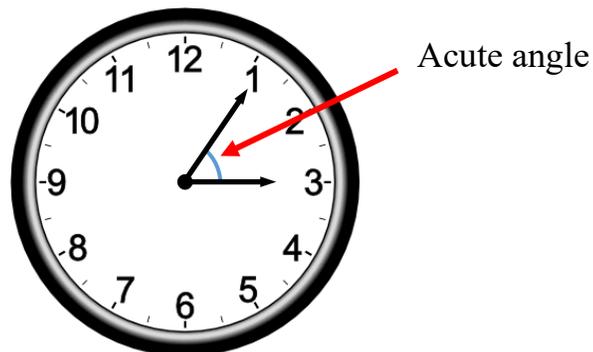
When two rays have the same endpoint, they form an **angle**. Angles are measured in degrees ( $^{\circ}$ ). Think of a clock; the hands on a clock are the rays. the endpoint is where the two hands meet at the center of the clock. As the hands move around the clock, they form different angles. When one hand is on the twelve and the other is on the three, the angle they form measures  $90^{\circ}$ .

**Examples:**

This angle is called a **right angle**.

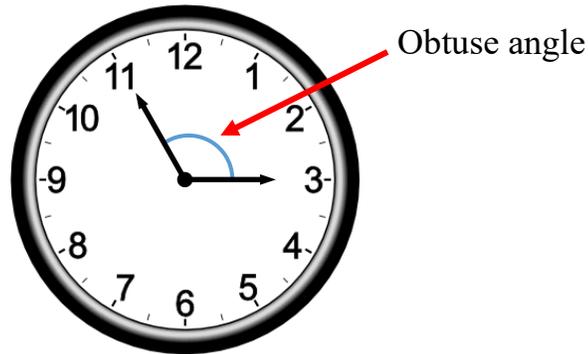


Move the hand that is on the twelve forward to the one. Now the angle is less than  $90^{\circ}$ . When an angle is greater than  $0^{\circ}$  but less than  $90^{\circ}$ , it is called an **acute angle**.



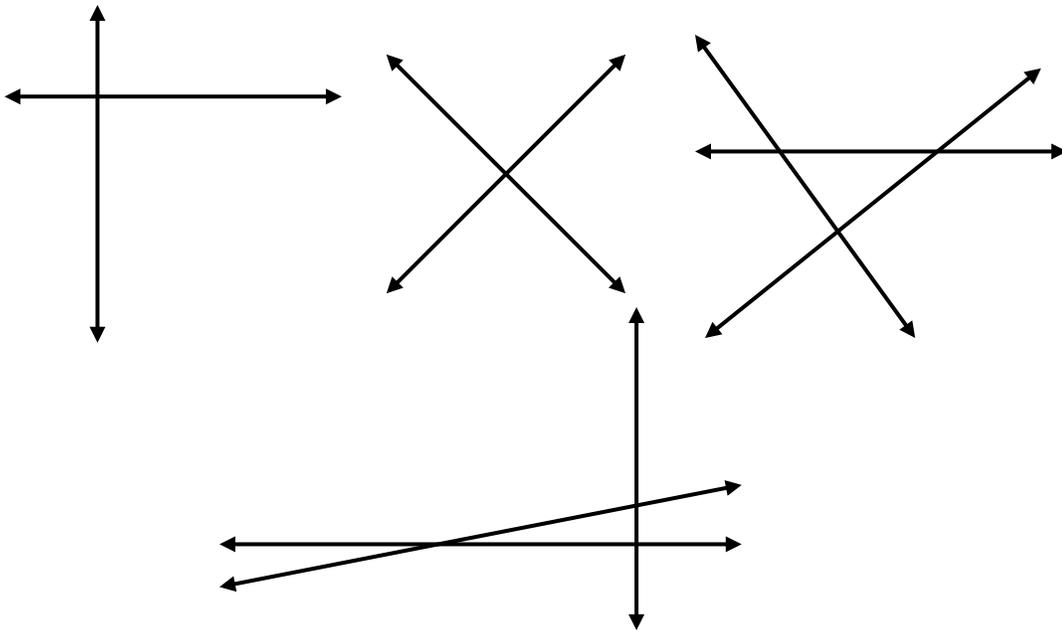
## Teacher's Guide 4.GM.1.1

Move the hand the other way, toward the eleven. Now the angle is more than  $90^\circ$  but less than  $180^\circ$ . It is called an **obtuse angle**.



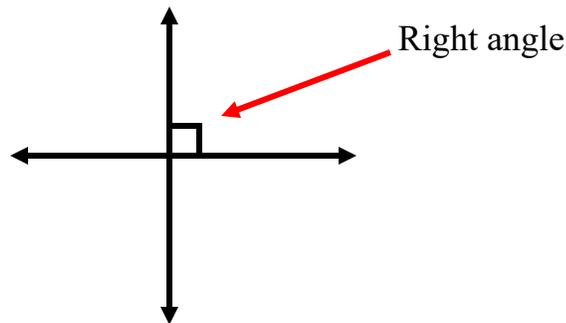
**Step 4:** Discuss intersecting, perpendicular, and parallel lines.

The place where two streets cross each other is called an intersection. The point where two lines meet is also called an intersection. Below are examples of **intersecting lines**.



## Teacher's Guide 4.GM.1.1

**Perpendicular lines** are lines that intersect, or meet, at right angles.



Parallel lines are lines that never meet or touch. Railroad tracks are good examples of parallel lines.



### Extension Activities

Demonstrate to students how to create parallel lines, perpendicular lines, and intersecting lines with their arms or hands.

A center can be created for students to demonstrate their understanding of each geometric shape by using pipe cleaners or toothpicks for the lines and marshmallows for the endpoints.

Divide into groups of two. Each group needs a clock with moveable hands. One student moves the hands of the clock, while the other student identifies the angles.

This YouTube<sup>®</sup> song introduces parallel, perpendicular, and intersecting lines.

[https://www.youtube.com/watch?v=P3AOoLbA3us&list=PLMTzm\\_A-B8RLt5-TJQWrTdEsXiUQfbzKu&index=4](https://www.youtube.com/watch?v=P3AOoLbA3us&list=PLMTzm_A-B8RLt5-TJQWrTdEsXiUQfbzKu&index=4)

This YouTube<sup>®</sup> song introduces angles and angle types.

[https://www.youtube.com/watch?v=NVuMULQjb3o&list=PLMTzm\\_A-B8RLt5-TJQWrTdEsXiUQfbzKu&index=1](https://www.youtube.com/watch?v=NVuMULQjb3o&list=PLMTzm_A-B8RLt5-TJQWrTdEsXiUQfbzKu&index=1)

## **Teacher's Guide 4.GM.1.1**

See also Oklahoma State Department of Education objective analysis of 4.GM.1.1:

<http://okmathframework.pbworks.com/w/page/112172362/4-GM-1-1>

Have students represent math relationships in words, symbols and pictures, go to:

<http://www.uen.org/Lessonplan/preview.cgi?LPid=21520>

## Answer Key 4.GM.1.1

### Guided Practice

1.  $\overline{HK}, \overline{IK}, \overline{KL}, \overline{JL}, \overline{ML}, \overline{PR}, \overline{PO}, \overline{NO}, \overline{PL}, \overline{KO}$  (all are possibilities)
2.  $\overrightarrow{KO}, \overrightarrow{NO}$  or  $\overrightarrow{PR}, \overrightarrow{LP}$  (check student's work for other correct answers)
3.  $\angle NOK, \angle LPR, \angle KOP, \angle LPO$
4.  $\overrightarrow{IO}, \overrightarrow{JP}$
5.  $\angle HKO, \angle MLJ, \angle KLP$
6.  $\overrightarrow{CE}, \overrightarrow{CD}, \overrightarrow{CG}, \overrightarrow{CH}, \overrightarrow{CA}, \overrightarrow{CB}, \overrightarrow{FG}$  (all are possibilities)
7.  $\angle GCB, \angle GCA, \angle ACF, \angle BCF$  (all are possibilities)
8.  $\overline{AC}, \overline{CE}, \overline{CG}, \overline{CB}, \overline{CD}, \overline{CF}, \overline{FB}, \overline{FH}, \overline{FG}$  (all are possibilities)
9.  $D$  is a point
10.  $\overrightarrow{FB}, \overrightarrow{DE}$

### Independent Practice

1. Point
2. Parallel lines
3. Perpendicular lines, right angles
4. Acute angle
5. Obtuse angle
6. Line segment
7.  $\overrightarrow{ZV}, \overrightarrow{WP}, \overrightarrow{XT}, \overrightarrow{QY}$  (check student's work for other correct answers)
8.  $\overrightarrow{ZV}, \overrightarrow{PW}; \overrightarrow{YQ}, \overrightarrow{XT}$
9.  $\angle SUW, \angle PRO, \angle QRO, \angle SUT$  (check student's work for other correct answers)
10.  $\overrightarrow{RQ}, \overrightarrow{RO}, \overrightarrow{RP}, \overrightarrow{YZ}, \overrightarrow{UT}, \overrightarrow{US}, \overrightarrow{UW}, \overrightarrow{XV}$  (check student's work for other correct answers)
11. right angle
12. acute angle
13. obtuse angle
14.  $D$
15.  $\overrightarrow{AB}$ , a ray
16. point  $A$
17. obtuse angle
18. segment  $AB$
19. acute angle
20. intersecting lines

## Answer Key 4.GM.1.1

### Continuous Review (3<sup>rd</sup> Grade Review)

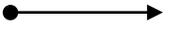
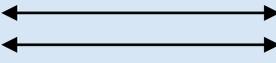
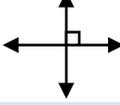
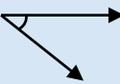
1. (3.N.2.7) 237
2. (3.N.2.3) 93,653
3. (3.N.2.6) 8
4. (3.N.2.6) 10
5. (3.GM.2.4) 24 feet
6. (3.N.4.2) 5 nickels
7. (3.N.3.1)  $\frac{7}{10}$
8. (3.N.3.1)  $\frac{3}{4}$
9. (3.N.3.1)  $\frac{1}{2}$
10. (3.GM.3.1) 60 minutes

**4.GM.1.1 Identify points, lines, line segments, rays, angles, endpoints, and parallel and perpendicular lines in various contexts.**

**Real-World Connections**

Have you ever seen a spider web up close? Did you notice all the lines and shapes? This is an example from Mother Nature showing that geometry is seen and used every day and everywhere. Buildings, windows, and roads are all examples of geometry with the use of various lines, points, and angles.

**Vocabulary**

|                            |                                                                                                 |                                                                                       |
|----------------------------|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| <b>point</b>               | an exact location in space                                                                      |    |
| <b>line</b>                | a straight path of points that goes on forever in opposite directions                           |    |
| <b>line segment</b>        | a part of a line with two endpoints                                                             |    |
| <b>ray</b>                 | a part of a line with one endpoint; the other part of the line goes on forever in one direction |    |
| <b>parallel lines</b>      | two line segments that stay the same distance apart and never intersect                         |  |
| <b>perpendicular lines</b> | segments that cross each other to form square corners                                           |  |
| <b>angle</b>               | two rays connected with a common endpoint called a vertex                                       |  |
| <b>right angle</b>         | two rays connected to form a square corner that measures 90°                                    |  |
| <b>acute angle</b>         | an angle with a measure greater than 0°                                                         |  |
| <b>obtuse angle</b>        | an angle with a measure greater than 90°, but less than 180°                                    |  |
| <b>straight angle</b>      | two rays connected to form a straight line that measures 180°                                   |   |

Examples



$\overleftrightarrow{AB}$  is a line.



$\overline{DE}$  is a line segment.

$\angle AGB$  is an acute angle  
 $\angle BGC$  is an obtuse angle  
 $\overleftrightarrow{CE}$  and  $\overleftrightarrow{DF}$  are parallel lines  
 $\overleftrightarrow{AH}$  and  $\overleftrightarrow{DF}$  are perpendicular lines

**Guided Practice (4.GM.1.1)**

Name: \_\_\_\_\_

For questions 1 through 5, use the figure below.

1. Name two line segments.

\_\_\_\_\_

2. Name one pair of perpendicular lines.

\_\_\_\_\_

3. Name two right angles.

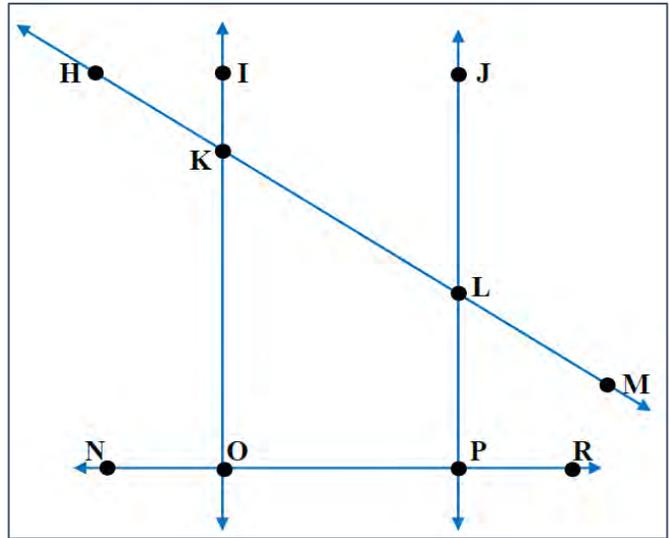
\_\_\_\_\_

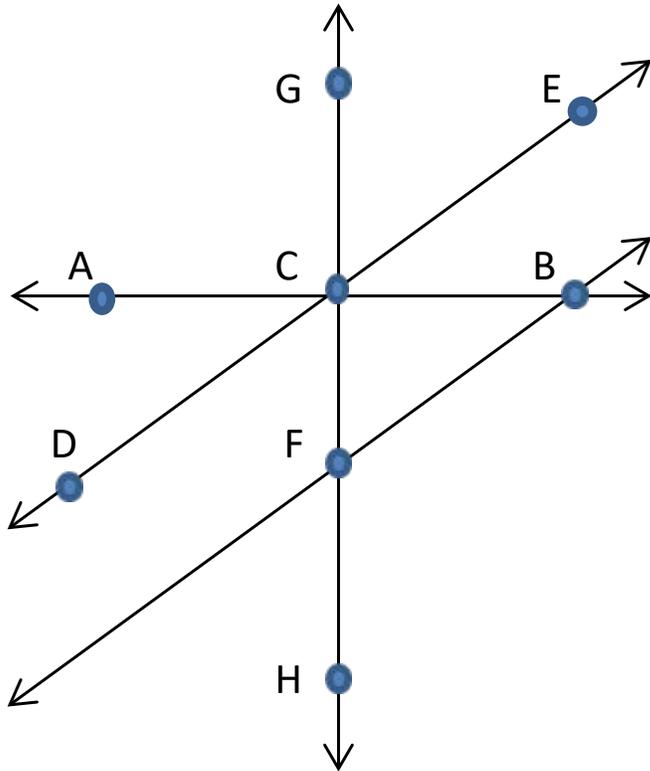
4. Name one pair of parallel lines.

\_\_\_\_\_

5. Name three obtuse angles.

\_\_\_\_\_





For questions 6 through 10, use the figure above.

6. Name 4 rays. \_\_\_\_\_
7. Name two right angles. \_\_\_\_\_
8. Name four line segments. \_\_\_\_\_
9. What is D? \_\_\_\_\_
10. Name one pair of parallel lines. \_\_\_\_\_

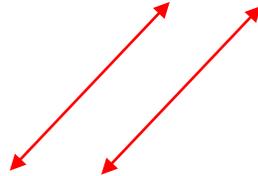
**4.GM.1.1 Identify points, lines, line segments, rays, angles, endpoints, and parallel and perpendicular lines in various contexts.**

For questions 1 through 6, use geometric terms to describe each example.

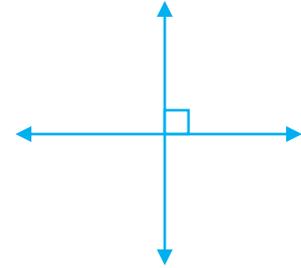
1. \_\_\_\_\_



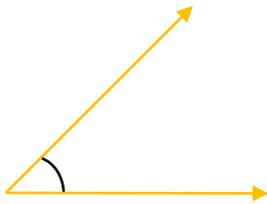
2. \_\_\_\_\_



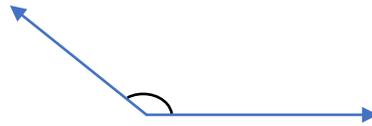
3. \_\_\_\_\_



4. \_\_\_\_\_



5. \_\_\_\_\_



6. \_\_\_\_\_



Use the following figure to answer questions 7 through 10.

7. Name three lines.

\_\_\_\_\_

8. Name two pairs of parallel lines.

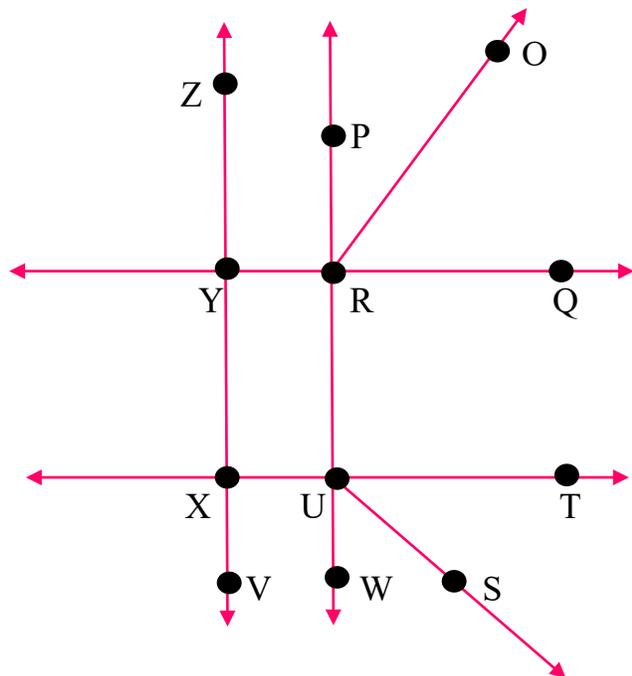
\_\_\_\_\_

9. Name two acute angles.

\_\_\_\_\_

10. Name three rays.

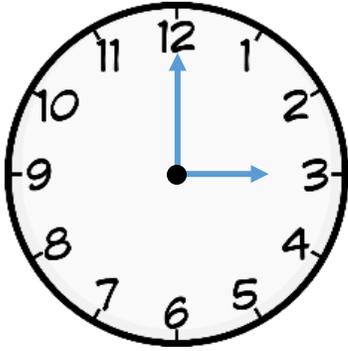
\_\_\_\_\_



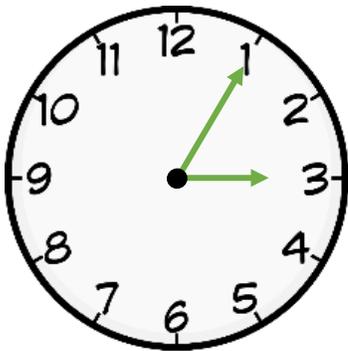
**Independent Practice (4.GM.1.1)**

Name: \_\_\_\_\_

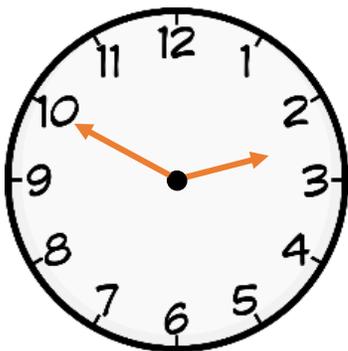
*Use geometric terms to describe each example.*



11. \_\_\_\_\_



12. \_\_\_\_\_



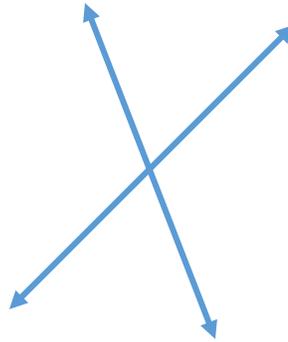
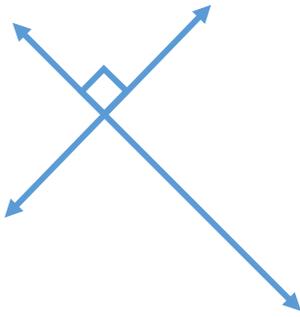
13. \_\_\_\_\_

**Independent Practice (4.GM.1.1)**

Name: \_\_\_\_\_

*Answer the following questions.*

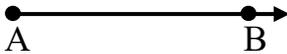
14. Which is true about these 2 pairs of lines?



- A One pair shows intersecting lines
- B One pair shows parallel lines
- C Both pairs show parallel lines
- D Both pairs show intersecting lines

*Name the figure using geometric terms.*

15. \_\_\_\_\_



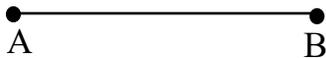
16. \_\_\_\_\_



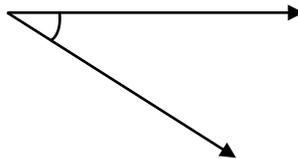
17. \_\_\_\_\_



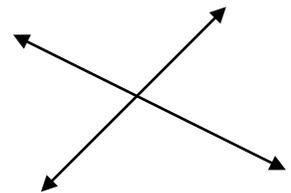
18. \_\_\_\_\_



19. \_\_\_\_\_



20. \_\_\_\_\_



# 4<sup>th</sup> Grade

# COMPREHENSIVE ASSESSMENT

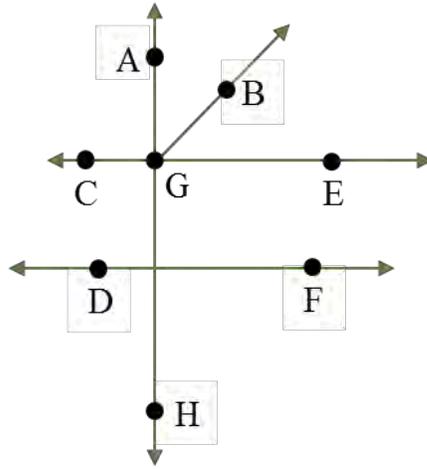
1. Choose the correct letter that represents two lines.

A  $\overline{CG}$  and  $\overline{GE}$

B  $\overline{DF}$  and  $\overline{GB}$

C  $\overline{GB}$  and  $\overline{GA}$

D  $\overline{AH}$  and  $\overline{DF}$



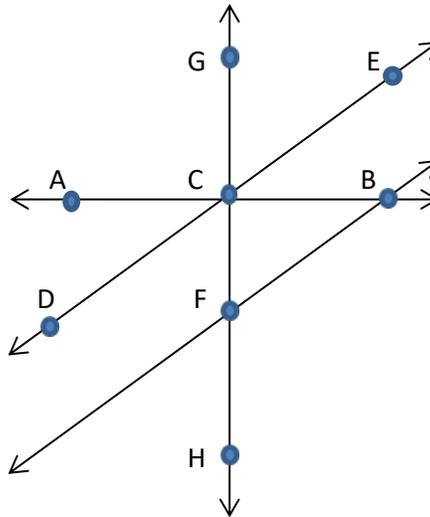
2. Name the set of lines that make perpendicular lines.

A  $\overline{AB}$  and  $\overline{GH}$

B  $\overline{AC}$  and  $\overline{AB}$

C  $\overline{DE}$  and  $\overline{FB}$

D  $\overline{AB}$  and  $\overline{DE}$



3. A shape with 4 sides that must include one pair of parallel lines is classified as a

A Rhombus

B Parallelogram

C Triangle

D Trapezoid

4. How many vertices does a triangular prism have?

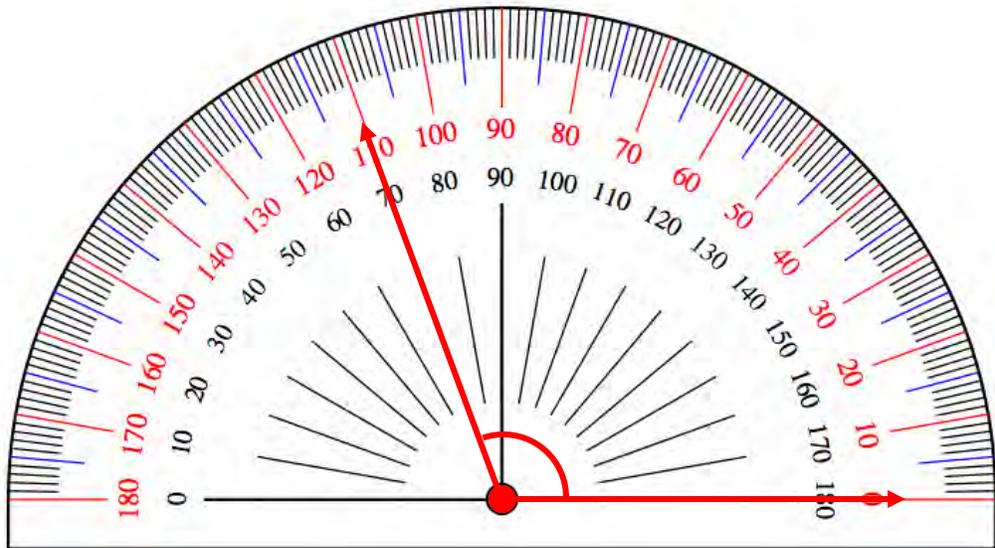
- A 5 vertices
- B 7 vertices
- C 6 vertices
- D 9 vertices

5. Which solid figure has six faces, twelve edges, and eight vertices?

- A Triangular pyramid
- B Sphere
- C Rectangular Prism
- D Cylinder

6. What is the measurement of the angle?

- A  $70^\circ$
- B  $110^\circ$
- C  $90^\circ$
- D  $180^\circ$



Use the following frequency table to answer questions 48 through 50.

48. How many days did it rain in April?

| Average Days of Rainfall in April |                       |           |
|-----------------------------------|-----------------------|-----------|
| Inches                            | Number of Days Rained | Frequency |
| 4.0                               |                       | 2         |
| 4.2                               |                       | 2         |
| 4.4                               |                       | 3         |
| 4.6                               |                       | 4         |
| 4.8                               |                       | 3         |
| 5.0                               |                       | 1         |
| 5.2                               |                       | 2         |
| 5.4                               |                       | 3         |

- A 20 days
- B 8 days
- C 10 days
- D 19 days

49. According to the table, what quantity, in inches, of rain was recorded most often?

- A 5.0 inches
- B 5.4 inches
- C 4.8 inches
- D 4.6 inches

| Average Days of Rainfall in April |                       |           |
|-----------------------------------|-----------------------|-----------|
| Inches                            | Number of Days Rained | Frequency |
| 4.0                               |                       | 2         |
| 4.2                               |                       | 2         |
| 4.4                               |                       | 3         |
| 4.6                               |                       | 4         |
| 4.8                               |                       | 3         |
| 5.0                               |                       | 1         |
| 5.2                               |                       | 2         |
| 5.4                               |                       | 3         |

### A

**acute angle:** an angle with a measure greater than  $0^\circ$  but less than  $90^\circ$

**addends:** are the digits in an addition problem that are being added

**absolute value:** the absolute value of a real number is its (non-negative) distance from 0 on a number line; this is also known as magnitude

**addition:** to join two or more numbers or quantities to get one number called a sum or total

**additive comparison problems:** the underlying question is what amount would be added to one quantity to result in the other

**algebraic expression:** a mathematical phrase combining numbers and/or variables; an expression does not contain equality or inequality signs but may include other operators and grouping symbols; both sides of an equation are expressions

**algebraic equation:** includes mathematical signs, symbols, and numbers connected with an equal sign ( $=$ ); an algebraic equation contains an equal sign

**algorithm:** a step-by-step process for solving a problem

**angle:** a figure formed by two rays with a common endpoint called the vertex and it is measured in degrees ( $^\circ$ )

**angle ruler:** similar to a protractor and is used to measure and draw angles

**analog clock:** a clock with hour, minute, and, sometimes, second hands

**approximation:** the estimate a number, amount or total, often rounding it off to the nearest 10 or 100

**area:** the space occupied by a flat shape (closed two-dimensional shape) or the surface of an object; the number of unit squares that cover the surface of a closed figure; measured in square units such as square centimeters, square feet, square inches, etc.

**area models:** a model using area to show multiplication or division

**area of a circle:** the area of the interior of the circle, which can be found with  $A = \pi r^2$  where  $r$  is the radius and  $\pi$  the irrational number “pi”

**area of a parallelogram:** the area of the interior of the parallelogram; is measured in square units; can be found by using the formula  $A = bh$

**area of similar triangles:** if two similar triangles have sides in the ratio  $x:y$ , then their areas are in the ratio  $x^2:y^2$

**area of a square or rectangle:** the area of the interior of the square or rectangle; is measured in square units; can be found by using the formula  $A = l \times w$  or  $A = lw$ ; area of a square can also be found using the formula  $A = s^2$

**area of a trapezoid:** the sum of its bases multiplied by the height of the trapezoid then divided by 2; the area is measured in square units and can be found using the formula  $A = \frac{1}{2}(b_1 + b_2)h$

## OAS Mathematics Glossary

**area of triangles:** amount of surface a triangle covers and measured in square units; can be found using the formula  $A = \frac{1}{2}bh$

**arrays:** an orderly arrangement of objects arranged in rows or columns

**ascending:** increasing in size

**ascending order:** numbers arranged from smallest to largest

**associative property of addition:** states that the sum remains the same regardless of how they are grouped,  $(a + b) + c = a + (b + c)$

**associative property of multiplication:** states that the product remains the same regardless of how they are grouped,  $(a \times b) \times c = a \times (b \times c)$

**attributes:** characteristics

**average:** a number expressing the central or typical value in a set of data, in particular- the mode, median, or most commonly the mean, which is found by dividing the sum of the values in the set by the number of values in the set

**axis:** a real or imaginary reference line

### B

**bar graph:** a graph that compares data from several situations using vertical or horizontal bars

**bar notation:** a horizontal bar over decimals to indicate that they repeat

**base:** the number or variable representing the factor being multiplied

**base area:** the area of the base denoted with  $B$

**base 10 blocks:** blocks which show base-10 number values

**base of a figure:** a face on which the 3D figure sits

**benchmark:** something by which other things can be measured or compared

**benchmark fractions:** fractions that are easy to visualize or represent, such as,  $\frac{1}{4}$ ,  $\frac{1}{3}$ ,  $\frac{1}{2}$ ,  $\frac{2}{3}$ , and  $\frac{3}{4}$

**biased:** sample in which individuals, items, or data were not equally likely to have been chosen

**box and whisker plot:** a diagram or graph using a number line to show the distribution of a set of data which displays the median, upper and lower quartiles, and the maximum and minimum values of the data

### C

**calculate:** to work something out, a mathematical operation

**calculator:** electronic device used for making mathematical calculations

**capacity:** the maximum amount or number that can be contained or accommodated

**cent:** equals one hundredth of a dollar (100 cents equal one dollar)

**centimeter:** a length of measurement that is equal to 1/100 (0.01) of a meter; it is part of the metric system of measurement, which is used around the world

### W

**weight:** how heavy an object is, such as ounce (oz), pound (lb), and ton (T)

**whole number:** positive numbers, including zero, without any decimal or fractional parts. (ex: 0, 1,2,3,4,5, ....)

**whole number exponents:** the numbers 0, 1, 2, 3...that indicate how many times the base is used as a factor, e.g., in  $4^3 = 4 \times 4 \times 4 = 64$ , the exponent 3, indicating that 4 is repeated as a factor three times

**wide division:** a strategy to use to solve division problems, instead of long division

**width:** breadth/distance across from side to side

**withdrawal:** money taken out of a bank or money removed from a saving account or a checking account

**word form:** a number written out in words to represent the value of the digits

**word problem:** a math problem presented as a scenario in text form with a variety of number sentences

### X

**x-axis:** the horizontal number line of a coordinate plane used to show horizontal distance

**x-coordinate:** the first number in an ordered pair, it shows the distance a point is along the horizontal axis

**x-intercept:** where the line crosses the  $x$ -axis,  $y = 0$ , when in standard form it is  $C/A$

### Y

**y-axis:** the vertical number line of a coordinate plane used to show vertical distance

**y-coordinate:** the second number in an ordered pair, it shows the distance a point is along the vertical axis

**y-intercept:** where the line crosses the  $y$ -axis,  $x = 0$ , when in standard form it is  $C/B$ , when in slope-intercept form it is  $b$

**yard:** 1 yard is equivalent to 3 feet or 36 inches

### Z

**zero:** the numeral 0, used as a place holder (nothing, none, nil, naught)



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