North Penn School District

Elementary Math Parent Letter

Grade 6

Unit 1 – Chapter 3: Rational Numbers

Examples for each lesson:

Lesson 3.1

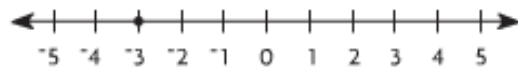# Understand Positive and Negative Numbers

Positive integers are to the right of 0 on the number line.
Negative integers are to the left of 0 on the number line.
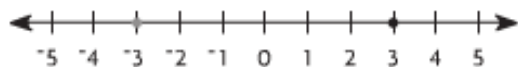**Opposites** are the same distance from 0, on opposite sides.

What is the opposite of ⁻3?

Step 1 Graph the integer.

⁻3 is a negative integer. Graph it to the left of 0.

Step 2 Graph the integer and its opposite on a number line.

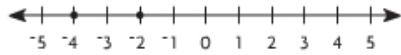The opposite of ⁻3 is 3 places to the right of 0.

So, the opposite of ⁻3 is 3.

Lesson 3.2

Compare and Order Integers

Use a number line to compare ⁻2 and ⁻4.

Step 1 Graph ⁻2 and ⁻4. Both numbers are negative integers. Graph them to the left of 0.

Step 2 Decide which number is greater. Numbers become greater as you move to the right on a number line.

⁻2 is to the right of ⁻4.

So, ⁻2 is greater than ⁻4. Write: ⁻2 > ⁻4.

Order these integers from least to greatest: 3, ⁻7, 0, 4, ⁻1.

Step 1 Graph the integers on a number line.

Step 2 Write the numbers in order from left (least) to right (greatest). ⁻7, ⁻1, 0, 3, 4
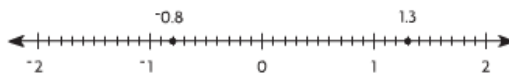
Lesson 3.3

Rational Numbers and the Number Line

Graph ⁻0.8 and 1.3 on the number line.

Step 1 Use positive and negative integers to help you locate the decimals. 0.8 is between 0 and 1, so ⁻0.8 is between 0 and ⁻1. 1.3 is between 1 and 2.

Step 2 The number line is marked in tenths. There is a tick mark every 0.1. Count 8 tick marks to the left of 0 for ⁻0.8. Count 3 tickmarks to the right of 1 for 1.3.
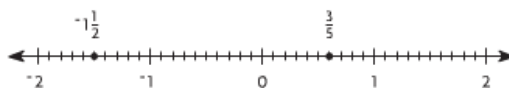

Graph $\frac{3}{5}$ and ⁻$1\frac{1}{2}$ on the number line.

Step 1 Use positive and negative integers to help you locate the fractions. $\frac{3}{5}$ is between 0 and 1. $1\frac{1}{2}$ is between 1 and 2, so ⁻$1\frac{1}{2}$ is between ⁻1 and ⁻2.

Step 2 The number line is marked in tenths. There is a tick mark every $\frac{1}{10}$. Use equivalent fractions to help you graph the points.

$-1\frac{1}{2} = -1\frac{5}{10}$ Count 5 tick marks to the left of ⁻1.

$\frac{3}{5} = \frac{6}{10}$ Count 6 tick marks to the right of 0.
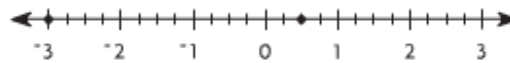
Compare and Order Rational Numbers

Compare 0.5 and ⁻3 using the number line.

Step 1 Graph the numbers. Use positive and negative integers to help you locate the decimals.
0.5 is between 0 and 1.
⁻3 is negative, so it is to the left of 0.

**Step 2** As you move right on the number line, numbers become greater.

$$\begin{array}{cccccccc} ^-3 & ^-2 & ^-1 & 0 & 1 & 2 & 3 \end{array}$$

So, 0.5 > ⁻3.

Compare $^-2\frac{1}{4}$ and $1\frac{1}{2}$ using the number line.

Step 1 Graph the numbers. Use positive and negative integers to help you locate the fractions.
$^-2\frac{1}{4}$ is between ⁻2 and ⁻3. $1\frac{1}{2}$ is between 1 and 2.

Step 2 As you move left on the number line, numbers become less.

$$\begin{array}{cccccccc} ^-3 & ^-2 & ^-1 & 0 & 1 & 2 & 3 \end{array}$$
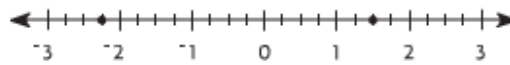
So, $^-2\frac{1}{4} < 1\frac{1}{2}$.

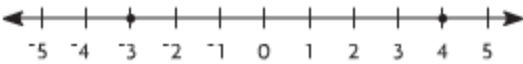More information on this strategy is available on Animated Math Model #12.

Absolute Value

Absolute value is a number's distance from 0 on a number line.
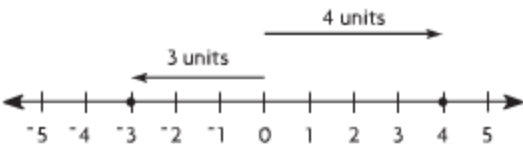Numbers and their opposites have the same absolute value.

Find the absolute value of ⁻3 and 4.

Step 1 Graph the numbers.

$$\begin{array}{ccccccccccc} ⁻5 & ⁻4 & ⁻3 & ⁻2 & ⁻1 & 0 & 1 & 2 & 3 & 4 & 5 \end{array}$$

Step 2 Find each number's distance from 0.

4 units

3 units

$$\begin{array}{ccccccccccc} ⁻5 & ⁻4 & ⁻3 & ⁻2 & ⁻1 & 0 & 1 & 2 & 3 & 4 & 5 \end{array}$$
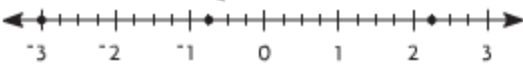
Step 3 Write the absolute value. $|⁻3| = 3$ $|4| = 4$
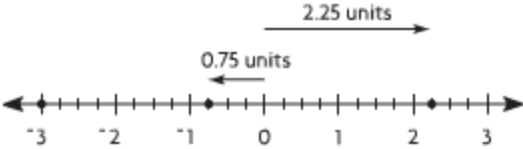
Find the absolute value of ⁻0.75 and 2.25.

2.25 units

Step 1 Graph the numbers.

0.75 units

$$\begin{array}{ccccccc} ⁻3 & ⁻2 & ⁻1 & 0 & 1 & 2 & 3 \end{array}$$

Step 2 Find each number's distance from 0.

Step 3 Write the absolute value. $|⁻0.75| = 0.75$ $|2.25| = 2.25$

More information on this strategy is available on Animated Math Model #13.

Lesson 3.6

Compare Absolute Values

Use absolute value to express an elevation less than ⁻10 meters as a depth.

Step 1 Elevation indicates distance from sea level.
A negative elevation means a distance below
sea level.
⁻10 is 10 units below 0 on the vertical number
line. This shows that the absolute value of
⁻10 is 10.

Step 2 Depth indicates distance below sea level.
It is always expressed as a positive number.
Use the absolute value of ⁻10 to find the
depth: $|{-10}| = 10$

Step 3 List three elevations that are less than
⁻10 meters. Write the corresponding depths.

Elevation (m)	Depth (m)
⁻15	15
⁻20	20
⁻30	30

So, an elevation less than ⁻10 meters is a depth greater than 10 meters.

(Vertical number line shown: 50, 40, 30, 20, 10, 0, ⁻10, ⁻20, ⁻30, ⁻40, ⁻50)
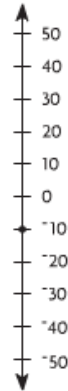
Lesson 3.7

Rational Numbers and the Coordinate Plane

A **coordinate plane** is formed by two intersecting lines
on a grid. The horizontal line is the *x*-axis. The vertical line
is the *y*-axis. They intersect at the **origin**.

An **ordered pair** shows the horizontal and vertical
distances a point is from the origin. Positive numbers
in an ordered pair mean "right" for the first number and
"up" for the second number. Negative numbers mean
"left" for the first number and "down" for the second number.

(Grid labeled: y-axis, Origin, x-axis)
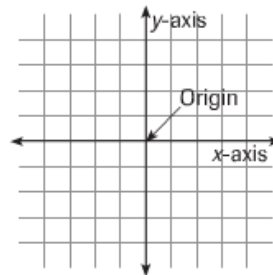
Write the ordered pair for point K.

Step 1 Place your finger at point K. Place your pencil
tip at the origin.

Step 2 With your pencil tip, count how many units to
the right or left of the origin point K is. Record
that number.

Point K is 2.5 units right of the origin, so the first
number in the ordered pair is ⁺2.5, or 2.5.

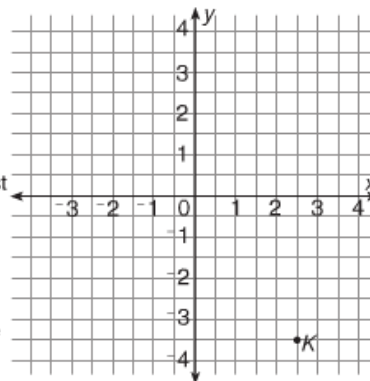**Step 3** With your pencil tip, count how many units
down from the origin point K is. Record that
number.

Point K is 3.5 units down from the origin, so the
second number in the ordered pair is ⁻3.5.

So, the ordered pair for point K is (2.5, ⁻3.5).

Lesson 3.8

Ordered Pair Relationships

You can tell which quadrant to graph a point in by looking at whether the coordinates are positive or negative.

Find the quadrant for the point (4, ⁻5).

Step 1 The *x*-coordinate is 4, a positive number. So, the point must be in Quadrant I or IV.

**Step 2** The *y*-coordinate is ⁻5, a negative number. So, the point must be in Quadrant III or IV.

Step 3 The only quadrant that the *x*- and *y*-coordinates have in common is Quadrant IV.

So, the point (4, ⁻5) is in Quadrant IV.

Two points are reflections of each other if the *x*-axis or *y*-axis forms a line of symmetry for the two points. This means that if you folded the graph along that axis, the two points would line up.

(⁻1, 3) and (⁻1, ⁻3) are reflected across the *x*-axis. The *x*-coordinates are the same. The *y*-coordinates are opposites.

(2, 4) and (⁻2, 4) are reflected across the *y*-axis. The *y*-coordinates are the same. The *x*-coordinates are opposites.
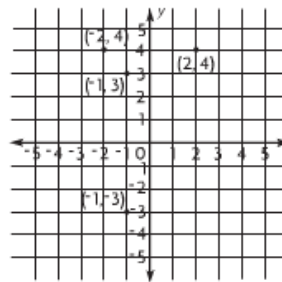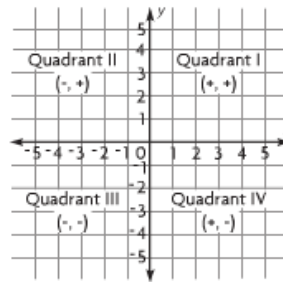
Lesson 3.9

Distance on the Coordinate Plane

Find the distance between (4, ⁻2) and (4, 3).

Step 1 Graph the points. Points with the same *x*-coordinate are on the same vertical line. Think of the vertical line as a number line that shows the *y*-coordinates.

Step 2 Use absolute value to find the distances between the *y*-coordinates and 0.

$|{-2}|$ shows the distance from ⁻2 to 0.
$|{-2}| = 2$ units
$|3|$ shows the distance from 3 to 0.
$|{-3}| = 3$ units

Step 3 Since the points are in different quadrants, add to find the total distance between the *y*-coordinates.

So, the distance between (4, ⁻2) and (4, 3) is 5 units.

Use the same steps when two points have the same *y*-coordinates. Find the distance between the *x*-coordinates to find the distance between the points.
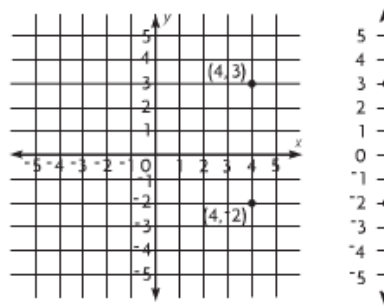
More information on this strategy is available on Animated Math Model #14.

Lesson 3.10

Problem Solving • The Coordinate Plane

Zachary is drawing a coordinate map of his town. He has graphed the police station at the point (2, ⁻1). He is going to place the library 4 units up from the police station. What ordered pair shows where he will graph the library?

Read the Problem		
What do I need to find? I need to find the _____ for the library.	**What information do I need to use?** The ordered pair for the _____ is _____. The library is _____ units _____ from the police station.	**How will I use the information?** I can draw a diagram to _____ the information on a coordinate plane.

Solve the Problem
Graph the point _____. Label it _____. From this point, count _____ units _____. Graph the new point, and label it _____. So, the ordered pair for the library will be _____.

Vocabulary

Absolute value – the distance of a number from zero on a number line

Integers – the set of whole numbers and their opposites

Line of symmetry – the line that divides a figure into two halves that are mirror images of each other

Line symmetry – the property a figure has if a line can separate the figure into two halves that are mirror images of each other

Opposites – two numbers that are the same distance from zero on the number line, but on different sides of zero

Quadrants – the four regions of the coordinate plane that are separated by the x- and y- axes

Rational number – any number that can be written as a/b, where *a* and *b* are integers and b≠0.