

Unit 9 Parent Guide

Lesson 1—Negative Numbers in the Real World--Helpful Hints

*In today's lesson students will be discussing and analyzing situations in the real world where negative numbers are present. Students will also focus on the fact that a negative number described the opposite of a positive number and situation. See some examples below to assist your student on their homework for this lesson.

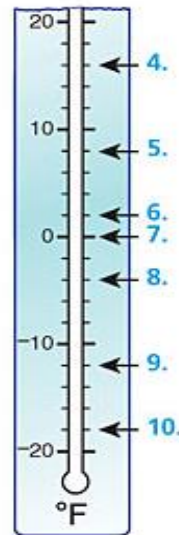
Opposites: two numbers are opposites if they are the same distance from zero on the number line, but in opposite directions. Example: If two temperatures are opposites, they are the same distance from zero on a thermometer.

-Examples of opposite (negative number) real world situations:

- withdrawal and deposit are opposites
- positive and negative are opposites
- above and below are opposites

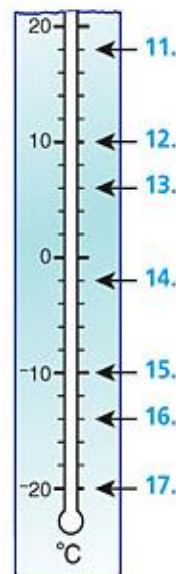
Example 1: Each arrow on the Fahrenheit thermometer points to a temperature. Write the temperature.

- 16°F or 16°F above zero
- 8°F or 8°F above zero
- 2°F or 2°F above zero
- 0°F
- 4°F below zero
- 12°F below zero
- 18°F below zero



Example 2: Each arrow on the Celsius thermometer points to a temperature. Write the **opposite** temperature.

- 18°C below zero
- 10°C below zero
- 6°C below zero
- 2°C or 2°C above zero
- 10°C or 10°C above zero
- 14°C or 14°C above zero
- 20°C or 20°C above zero



*Lesson 2—Integers on a Number Line --Helpful Hints

*Today's lesson will allow students the opportunity to use what they learned about negative (opposite) real world situations and apply it to positive and negative numbers on a number line. Students will also locate and plot integers on a number line. See below for important vocabulary and some specific examples:

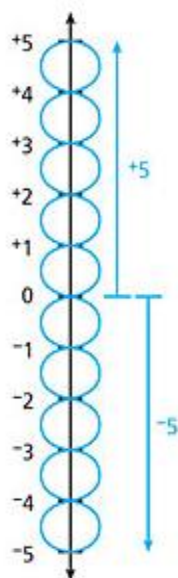
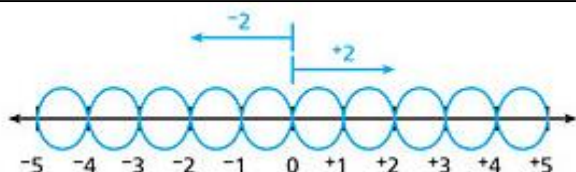
Origin: the origin of a number line is the point at 0

Positive numbers: numbers that are located on the number line to the right of, or above, the origin (0)

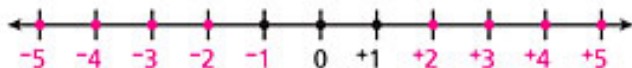
Negative numbers: numbers that are located on the number line to the left of, or below, the origin (0)

Integers: includes whole numbers, their opposites and 0

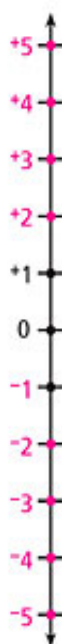
The loops shown on the horizontal line below represent one unit length. Students learned that the number line can describe both distance and direction. For example -2 can be described as 2 units to the left (negative -) of the origin (0) while +2 can be described as 2 units to the right (positive +) of the origin (0).



The loops shown on the vertical line, shown at the left, also represent one unit length. Students learned that the number line can describe both distance and direction. For example -5 can be described as 5 units below (negative -) the origin (0) while +5 can be described as 5 units above (positive +) the origin (0).



Students learned that marking points (writing numbers) on a number line is the same as showing the unit lengths as loops. Showing positive and negative values on a number line is an important skill because it will also help students with comparing and ordering negative and positive numbers in upcoming units. Students will be asked to label the number line by showing opposites. +1 is the opposite of -1 so they should be the same distance from 0, as shown on the number line above.



The same learning points and skills from numbering a horizontal number line should be applied to a vertical number line. The main things students need to remember is the positive numbers are always listed above the origin (0) and negative numbers are always listed below the origin (0). Again the idea of opposites should be used. +3 and -3 should be the same distance away from the origin except +3 should be above the 0 while -3 is below.

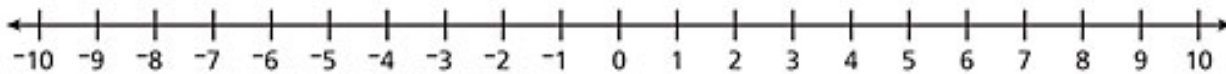
*Lesson 3—Compare and Order Integers--Helpful Hints

*Today students will use what they have learned about negative numbers in order to compare and order integers on a number line. Students will also learn about the math term **absolute value** and learn how to use it to write opposites and to compare integers. See below for important vocabulary and some specific examples:

Absolute Value: absolute value is a measure of the distance a number is from zero on a number line. The symbol $| |$ is used to indicate absolute value.

For today's homework and any extra practice with comparing and ordering integers, it is very helpful to create a number line for the numbers you are comparing or ordering or USE THE NUMBER LINE that has been provided.

Example 1: Use the number line below to answer the following questions.



$$-1 > -4$$

-1 is greater than -4 because -1 is closer to 0 and therefore closer to the positive

$$4 < 5$$

4 is less than 5 because they are both positive and 4 is a smaller amount than 5.

$$-8 = -8$$

-8 is equal to -8 because they are the exact same amount. They are equal

$$-1 > -7$$

-1 is greater than -7 because -1 is closer to 0 and therefore closer to the positive

Write the numbers in order from **least to greatest** -2, 0, -1

Answer: -2, -1, 0

Write the numbers in order from **greatest to least** -3, 0, 5, -1

Answer: 5, 0, -1, -3

Example 2: Write the absolute value of each number

****REMEMBER**** The absolute value is the **DISTANCE** a number is from zero!

$$|5| = \underline{5}$$

The absolute value of 5 is 5 because 5 is five spaces from 0.

$$|-2| = \underline{2}$$

The absolute value of -2 is 2 because 2 is two spaces from 0.

$$|-4| = \underline{4}$$

The absolute value of -4 is 4 because -4 is four spaces away from 0. The absolute value of -5 is 5 because -5 is five spaces away from 0.

$$|-5| = \underline{5}$$

Example 3: Use the absolute value to compare the numbers

****REMEMBER**** The absolute value is the DISTANCE a number is from zero!

*Note, when two negative numbers are compared using absolute value, the negative number with the LESSER absolute value is the GREATER number.

$-5 < -4$

-4 is greater than -5 because when using absolute value, -4 is only 4 spaces away from 0. Whereas -5 is 5 spaces away.

$-1 > -3$

-1 is greater than -3 because when using absolute value, -1 is only 1 space away from 0. Whereas -3 is 3 spaces away.

***Lesson 4—Integers and the Coordinate Plane--Helpful Hints**

*Today, students will be learning about coordinate planes. This learning will include, identifying the quadrants on a coordinate plane, how to locate and plot integers in all four quadrants of a coordinate plane and skills for how to graph the solutions of real world problems on a coordinate grid. Locating and plotting points on a coordinate grid is a skill students learned in 5th grade, but in 6th grade students are introduced to the same skill but in 4 quadrants (which includes negative numbers).

Ordered pair: consists of two coordinates. One x-coordinate and one y-coordinate. (5, 2)

x-axis: horizontal number line in a coordinate plane

y-axis: vertical number line in a coordinate plane

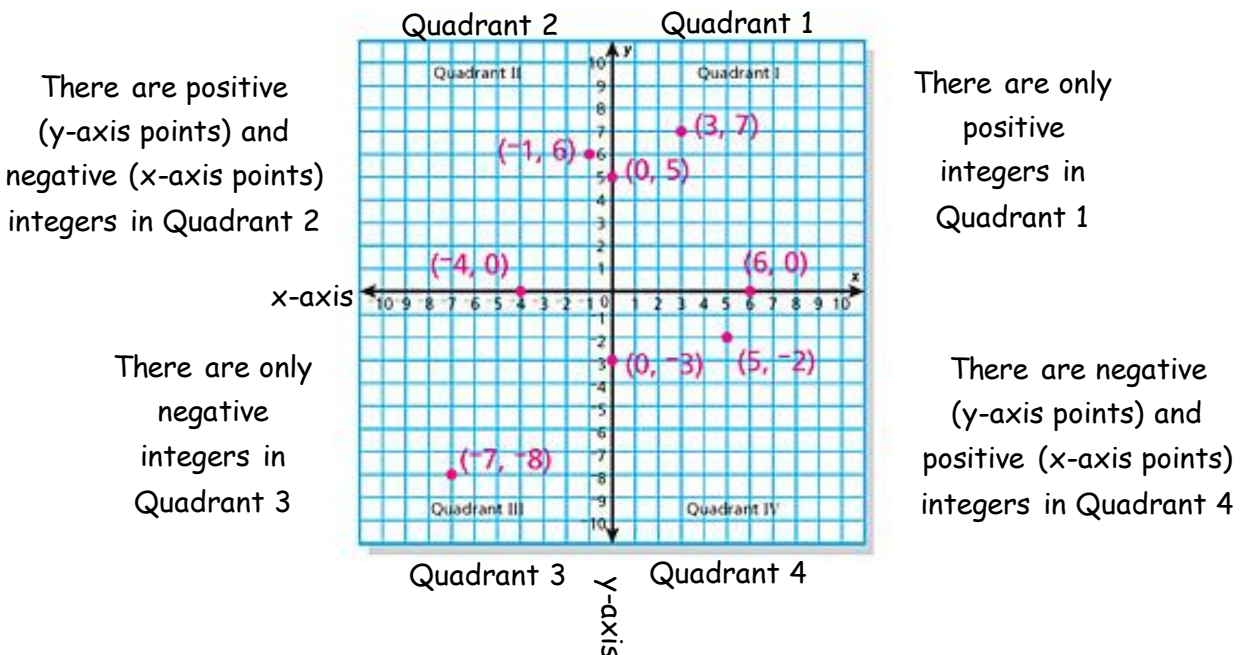
x-coordinate: point along the x-axis

y-coordinate: point along the y-axis

origin: the center point of a coordinate plane (0,0)

quadrant: the regions (areas) that a coordinate plane is divided into. There are 4 quadrants in a coordinate plane

coordinate plane: is formed by 2 perpendicular lines that intersect at the origin, 0.



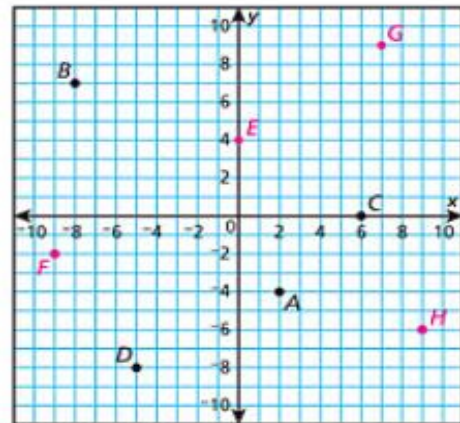
Use the coordinate plane at the right for Exercises 1–8.

Write the location of each point.

- Point A $(2, -4)$
- Point B $(-8, 7)$
- Point C $(6, 0)$
- Point D $(-5, -8)$

Plot and label each point.

- Point E at $(0, 4)$
- Point F at $(-9, -2)$
- Point G at $(7, 9)$
- Point H at $(9, -6)$



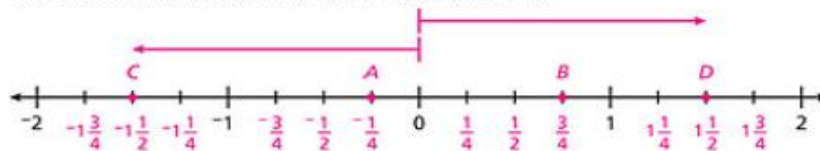
*Lesson 5—Rational Numbers on a Number Line--Helpful Hints

*Today students will focus on rational numbers. Students will locate and plot rational numbers on horizontal and vertical number lines and will also identify rational number opposites. See below for important vocabulary and some specific examples:

Rational number: is any number that can be expressed as a fraction $\frac{a}{b}$ where a and b are integers and b is not equal to zero

Example 1: Show fractions on a number line

Use the number line below for Exercises 1–8.



- How many equal lengths are between 0 and 1? 4
- What fractional unit does the number line show? fourths
- Label each tick mark of the number line with a fraction or mixed number in simplest form.
- Draw a point at $-\frac{1}{4}$. Label it A.
- Draw a point at $\frac{3}{4}$. Label it B.
- Draw a point at $-1\frac{1}{2}$. Label it C.
- Draw a point at $1\frac{1}{2}$. Label it D.

Example 2: Write the opposite rational number

$-\frac{11}{12}$ $\frac{11}{12}$ These are opposites because one is negative and the other is positive.

$\frac{1}{6}$ $-\frac{1}{6}$ These are opposites because one is positive and the other is negative.

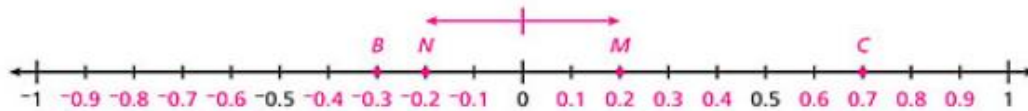
Example 3: Simplify

$-(1\frac{3}{4})$ $-1\frac{3}{4}$ This is simplified because the negative sign has been applied to the number inside the parentheses. When a negative is applied to a positive, it produces a negative

$-(-1\frac{2}{5})$ $1\frac{2}{5}$ This is simplified because the negative sign has been applied to the number inside the parentheses. When a negative is applied to a negative, it produces a positive

Example 4: Show decimals on a number line

Use the number line below for Exercises 21–26.



21. How many equal lengths are between 0 and 1? 10
22. What decimal place does the number line show? tenths
23. Label each tick mark on the number line with a decimal.
24. Draw a point at -0.3 . Label it B . 25. Draw a point at 0.7 . Label it C .
26. Draw a point at 0.2 and label it M . Draw a point at its opposite and label it N . Draw arrows above the number line to show that the numbers are opposites.

***Lesson 6—Compare and Order Rational Numbers--Helpful Hints**

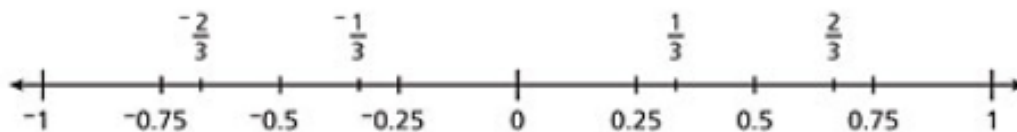
*In today's lesson students will use what they learned about rational numbers yesterday in order to compare and order rational numbers using a number line and in real world situations.

For today's homework and any extra practice with comparing and ordering rational numbers, it is very helpful to create a number line for the numbers you are comparing or ordering or USE THE NUMBERLINE that has been provided.

****REMEMBER** The absolute value is the DISTANCE a number is from zero!**

*Note, when two negative numbers are compared using absolute value, the negative number with the LESSER absolute value is the GREATER number.

Example 1: Use the number line below to answer the following questions.



Compare:

$$-0.5 > -1$$

$$0 > -\frac{1}{3}$$

$$|-0.5| < |-0.75|$$

$$-\frac{1}{3} < -(-0.5)$$

-0.5 is greater than -1 because -0.5 is closer to 0 than -1 and therefore closer to positive numbers.

0 is greater than $-\frac{1}{3}$ because 0 is closer to 0 than $-\frac{1}{3}$ and therefore closer to zero.

The absolute value of -0.5 is 0.5 and is less than the absolute value of -0.75 which is 0.75

$-\frac{1}{3}$ is less than $-(-0.5)$ because when the negative sign is applied to the number inside the parentheses, it becomes positive and 0.5 is greater than $-\frac{1}{3}$

Write the numbers in order from least to greatest

$$-\frac{2}{3}, 0, -1, -0.5$$

$$-1, -\frac{2}{3}, -0.5, 0$$

$$\frac{1}{3}, 0, -0.5, -\frac{1}{3}$$

$$-0.5, -\frac{1}{3}, 0, \frac{1}{3}$$

Write the numbers in order from greatest to least

$$0, \frac{2}{3}, -0.5$$

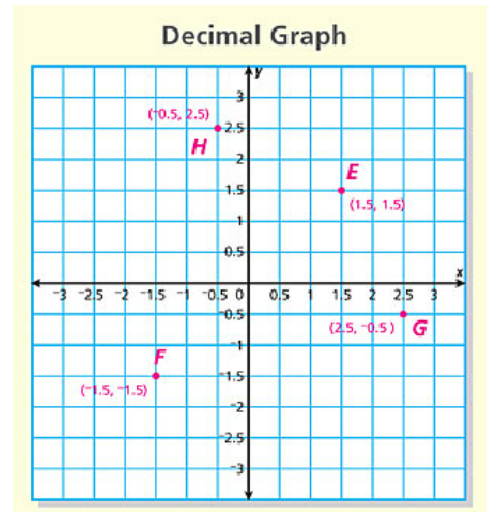
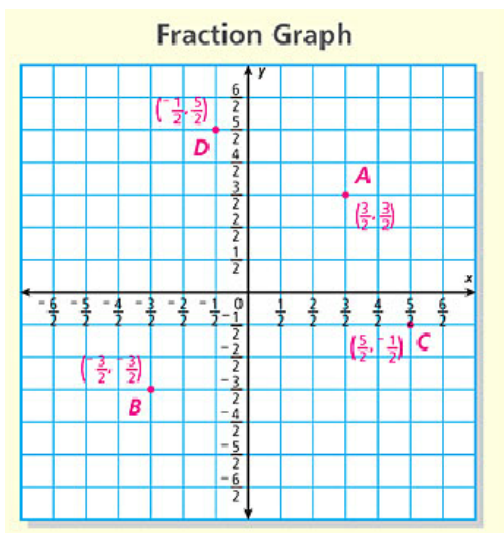
$$\frac{2}{3}, 0, -0.5$$

$$-0.25, -1, -0.75$$

$$-0.25, -0.75, -1$$

*Lesson 7—Rational Numbers on the Coordinate Plane--Helpful Hints

*Today students will continue to focus on rational numbers. Students will learn to use ordered (x, y) pairs to calculate distance in the coordinate plane. Students will also learn about reflections in the coordinate plane and will identify how that effects the coordinates. Learning how to graph real world situations in the coordinate plane using rational numbers will also be covered in today's lesson.



On the coordinate grid, an airport is located at Point A. Points B and C are airplanes. Use the grid for Exercises 1–4.

1. Write the location of each point.

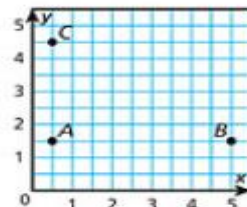
Point A $(\frac{1}{2}, 1\frac{1}{2})$ Point B $(5, 1\frac{1}{2})$ Point C $(\frac{1}{2}, 4\frac{1}{2})$
 or $(0.5, 1.5)$ or $(5, 1.5)$ or $(0.5, 4.5)$

2. Explain how subtraction can be used to find the number of unit lengths the plane at Point B is from the airport. Then write the distance.

Subtract the lesser x-coordinate from the greater; the plane is $5 - \frac{1}{2}$ or $4\frac{1}{2}$ unit lengths away.

3. Explain how subtraction can be used to find the number of unit lengths the plane at Point C is from the airport. Then write the distance.

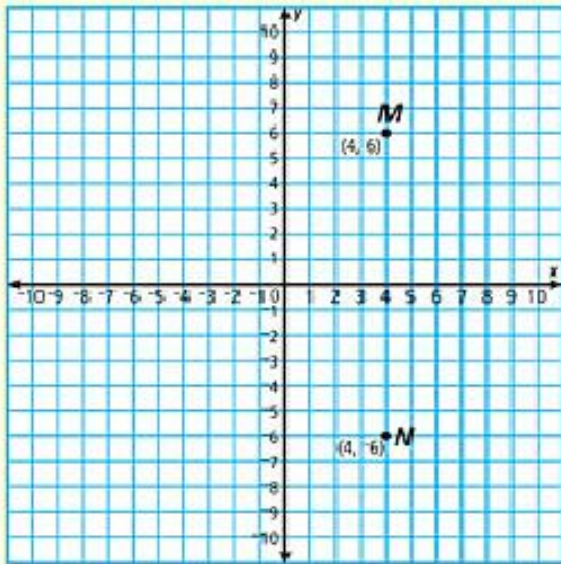
Subtract the lesser y-coordinate from the greater; the plane is $4\frac{1}{2} - 1\frac{1}{2}$ or 3 unit lengths away.



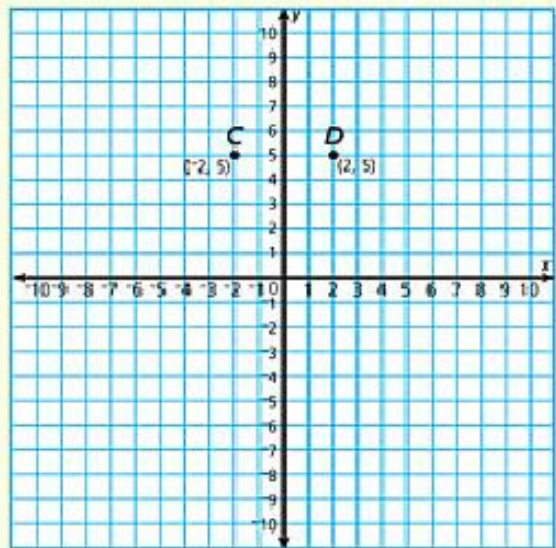
Skills and strategies taught in lesson 4 will be used in this lesson as well. The only difference will be that today the numbers will be rational numbers (fractions or decimals). Students will also be introduced to reflected points. See below for the definition and examples of reflected points.

Reflected point: a given point and its reflected point are mirror images across the x-axis, y-axis or both axes of the coordinate plane.

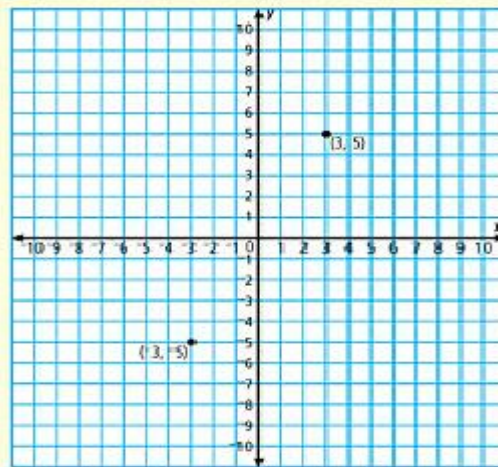
Reflection across the x-axis



Reflection across the y-axis



Reflection across both axes



Suppose a point at $(-1\frac{3}{4}, -2\frac{1}{4})$ is reflected across the x-axis. Explain how to find the location of the reflected point, and then write its location.

The x-coordinates of the points will be the same and the y-coordinates will be opposites; the reflected point is at $(-1\frac{3}{4}, 2\frac{1}{4})$.

Suppose a point at $(1\frac{1}{2}, -1\frac{1}{4})$ is reflected across the y-axis. Explain how to find the location of the reflected point, and then write its location.

The y-coordinates of the points will be the same and the x-coordinates will be opposites; the reflected point is at $(-1\frac{1}{2}, -1\frac{1}{4})$.