Integers and the Coordinate Plane

Review for Mastery: Integers and Absolute Value

Positive numbers are greater than 0. Use a positive number to represent a gain or increase. Include the positive sign (+).

an increase of 10 points   +10
a flower growth of 2 inches   +2
a gain of 15 yards in football   +15

Negative numbers are less than 0. Use a negative number to represent a loss or decrease. Also use a negative number to represent a value below or less than a certain value. Include the negative sign (–).

a bank withdrawal of $30   –30
a decrease of 9 points   –9
2°C below zero   –2

Opposites are the same distance from zero on a number line, but in different directions. –3 and 3 are opposites because each number is 3 units from zero on a number line.

Integers are the set of all whole numbers and their opposites.

Name a positive or negative number to represent each situation.

1. an increase of 3 points  2. spending $10

3. earning $25  4. a loss of 5 yards

Write each integer and its opposite. Then graph them on the number line.

5. –1  6. 9  7. 6  8. –5
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Review for Mastery: Comparing and Ordering Integers

You can use a number line to compare and order integers.

As you move right on a number line, the values of the integers increase. As you move left on a number line, the values of the integers decrease.

Compare –4 and 2.

–4 is to the left of 2, so –4 < 2.

Compare the integers. Write < or >.

1. 1 ___ –4
2. –5 ___ –2
3. –3 ___ 2
4. –1 ___ –4
5. 5 ___ 0
6. –2 ___ 3

Order –3, 4 and –1 from least to greatest.

The integers in order from least to greatest are –3, –1, 4.

Order the integers from least to greatest.

7. –2, –5, –1
8. 0, –5, 5
9. –4, 2, –3
10. 3, –1, –4
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Review for Mastery: The Coordinate Plane

The coordinate plane is divided into four quadrants. They are numbered I, II, III, and IV.

An ordered pair tells the location of a point. The $x$-coordinate tells you how far to move right or left. The $y$-coordinate tells you how far to move up or down.

The coordinates of point A are $(5, -4)$ because it is 5 units to the right of the origin and 4 units down. It is located in quadrant IV.

Name the quadrant or axis where each point is located. Then give the coordinates of each point.

1. $D$  
   __________________
2. $Q$  
   __________________
3. $F$  
   __________________
4. $T$  
   __________________
5. $P$  
   __________________
6. $W$  
   __________________

Graph each point on the coordinate plane.

7. $B (-1, 6)$  
8. $R (8, -5)$  
9. $V (-3, -4)$  
10. $Z (0, -6)$
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Review for Mastery: Transformations in the Coordinate Plane

Triangle $ABC$ is translated 8 units right and 2 units down. The translation is noted by triangle $A'B'C'$. The coordinates of triangle $ABC$ are $(-6, 7)$, $(-4, 2)$, and $(-7, 4)$. To find the coordinates of triangle $A'B'C'$, we count 8 units to the right from each of these vertices, and 2 units down. The vertices of triangle $A'B'C'$ are at $(2, 5)$, $(4, 0)$, and $(1, 2)$.

Triangle $DEF$ is reflected across the $x$-axis. The reflection is noted by triangle $D'E'F'$. The coordinates of triangle $DEF$ are $(3, 6)$, $(2, 3)$, and $(5, 1)$. To find the coordinates of triangle $D'E'F'$, we look for $y$-values beneath the $x$-axis whose absolute value are equal to the $y$-values of triangle $DEF$. The coordinates of triangle $D'E'F'$ are $(3, -6)$, $(2, -3)$, and $(5, -1)$.

Triangle $GHJ$ is rotated around the origin $90^\circ$ clockwise. The rotation is noted by triangle $G'H'J'$. The coordinates of triangle $GHJ$ are $(0, 4)$, $(5, 2)$, and $(0, 0)$. To find the coordinates of triangle $G'H'J'$, it is helpful to think of rotating the individual line segments around the anchored point $J$. We first rotate $JG$ $90^\circ$, and see that vertex $G'$ is at $(4, 0)$. We rotate $JH$ next, and see vertex $H'$ at $(2, -5)$. So, $G'H'J'$ is located at $(4, 0)$, $(2, -5)$, and $(0, 0)$.

Name the coordinates for the given transformations.

1. Reflection of $LMK$ across the $y$-axis

2. Translation of $NPR$ 4 units right and 2 units up
Lesson 4
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Review for Mastery: Polygons in the Coordinate Plane

A coordinate plane is a grid with the x- and y-axes set perpendicular to each other. A point on the coordinate plane has an x-coordinate and a y-coordinate.

To plot a point, count the number of units left or right from the origin for the x-coordinate. Then count the number of units up or down for the y-coordinate.

To graph a polygon, plot each point and connect the points in order.

Count the number of units to find the distance between points.

A rectangle has length and width. To find the perimeter:
1. Count the units to find the length: 6 units
2. Count the units to find the width: 3 units
3. Substitute the length and width into the perimeter formula and solve.
   \[ P = 2(6) + 2(3) = 18 \text{ units} \]

If you are given points but no diagram, plot the points first, and then find the perimeter.

Use these coordinates to answer questions 1 and 2:
A(2, 4), B(2, −4), C(−1, −4), D(−1, 4).

1. Graph the rectangle on the coordinate plane.
   For A, move ____ units left/right and ____ units up/down.
   For B, move ____ units left/right and ____ units up/down.
   For C, move ____ units left/right and ____ units up/down.
   For D, move ____ units left/right and ____ units up/down.

2. What is the perimeter of the rectangle?
   The length of the rectangle is ____ units.
   The width of the rectangle is ____ units.
   Substitute the length and width into the perimeter formula:
   \[ P = 2(____) + 2(____) = ____ \text{ units} \]