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Math 6

UNIT 3 – Interactive Notebook

3-6 Rational Numbers and the Coordinate Plane

| Name:		Date:	

Common Core Standards	CCSS.MATH.CONTENT.6.NS.C.8 Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.

The Coordinate Plane

The coordinate plane is composed of two number lines, one of which is the **horizontal number line** or also called the **x-axis** and the other one is the **vertical number line** or the **y-axis**.

The two number lines intersect each other perpendicularly at the **origin** with coordinates **(0, 0)**.
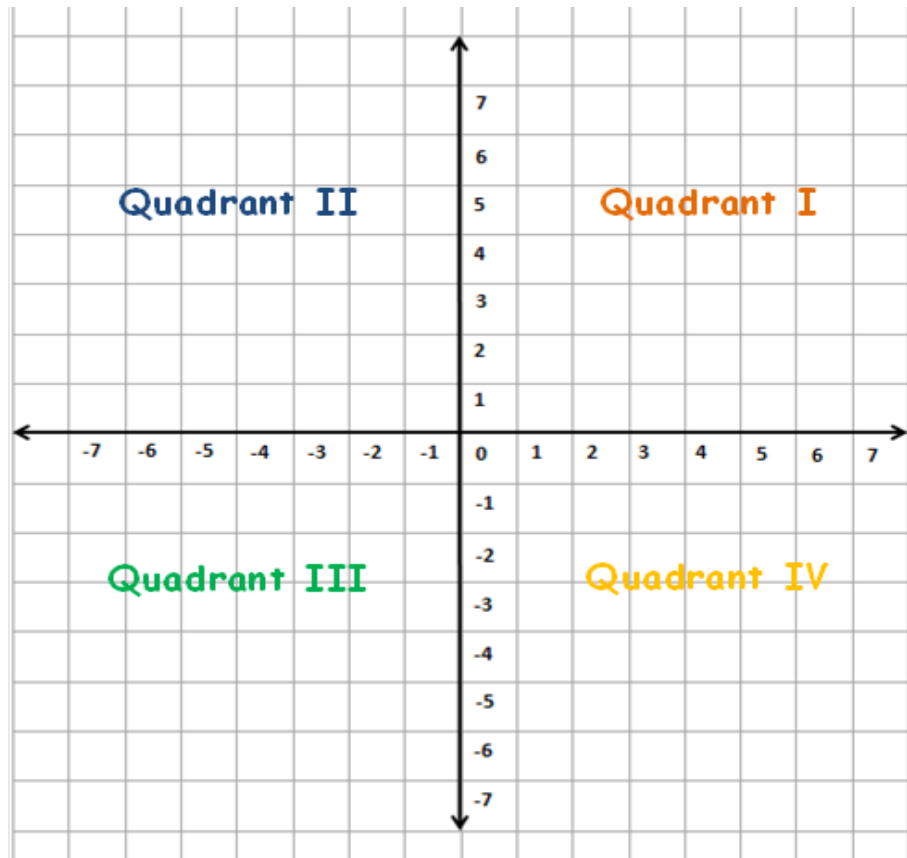
The intersection of the two number lines divides the plane into four regions called **quadrants**, labeled with Roman numerals I – IV, in a counterclockwise manner.

Points in the Coordinate Plane

The coordinate plane has infinitely many points. These points are determined by a number pair or an ordered pair called the "coordinates".
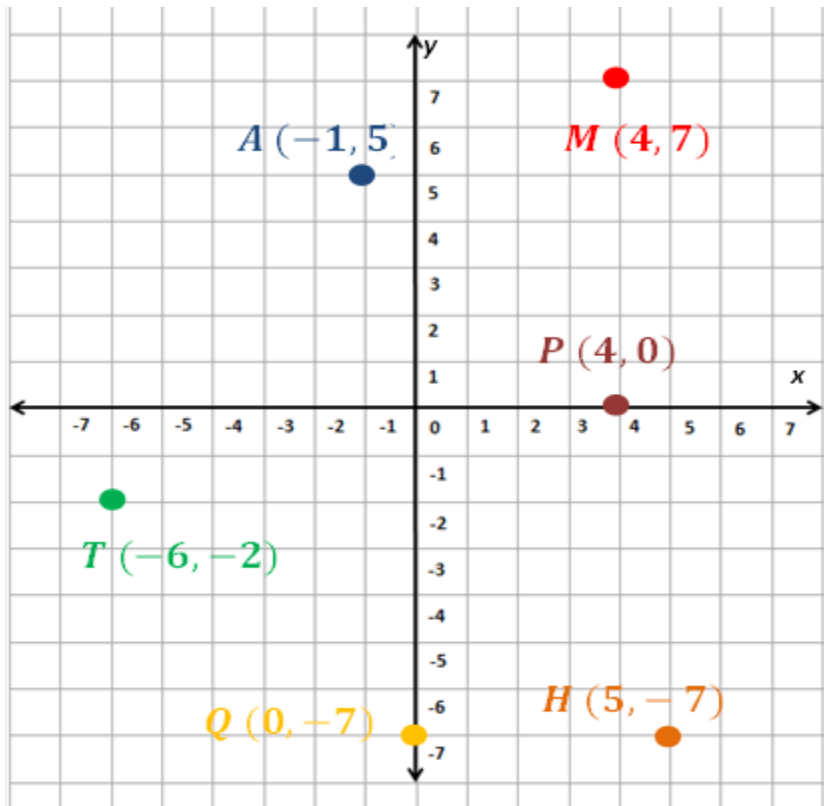
Each ordered pair is composed of two numbers of the form **(x, y)**.

The **first number x** is called the **x coordinate** or the **abscissa**, while the **second number y** is the **second coordinate** or the **ordinate**.

(x, y)

(first coordinate, second coordinate)

(x coordinate, y coordinate)

(abscissa, ordinate)

Sort This Out!

Given the ordered pairs below, put all x coordinates in the square and all y coordinates in the circle.

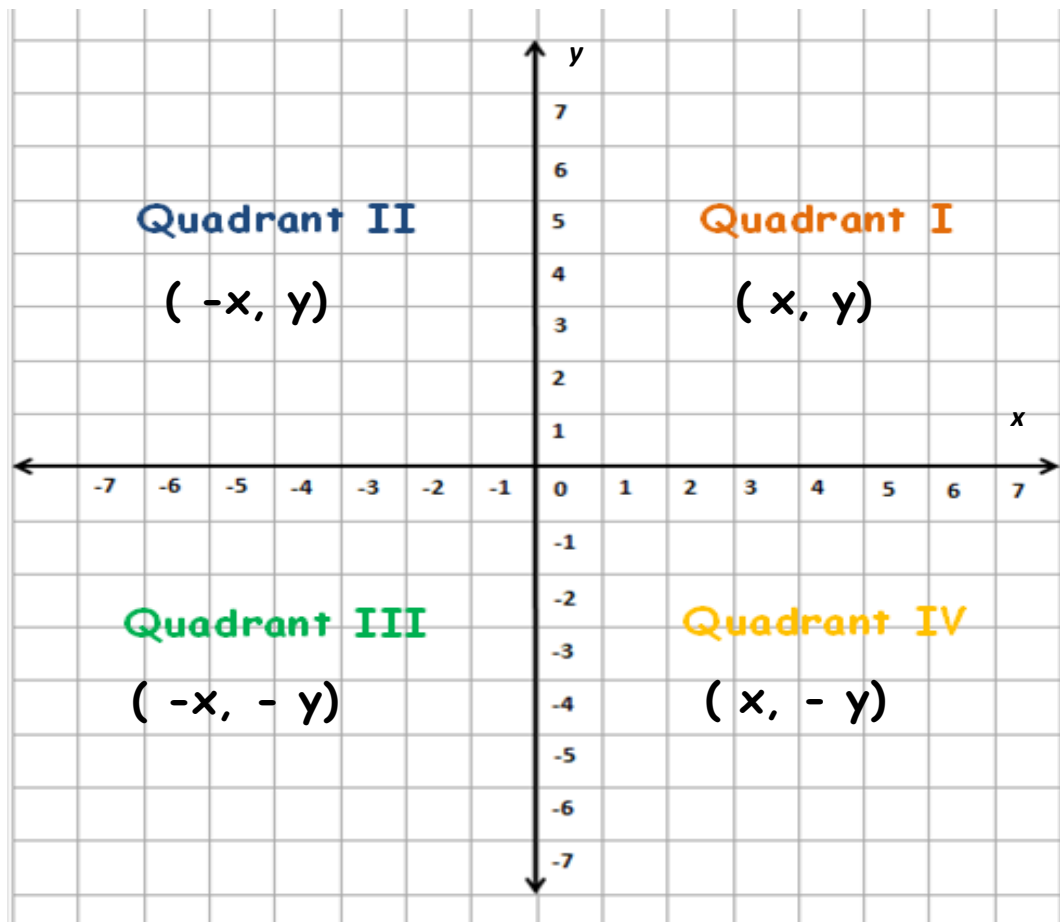|		
$(-1, 5)$	$(0, -8)$	$(\frac{1}{2}, -4)$
$(1, 0)$	$(3, 4)$	$(-1\frac{3}{4}, -7)$

x-coordinate

y-coordinate

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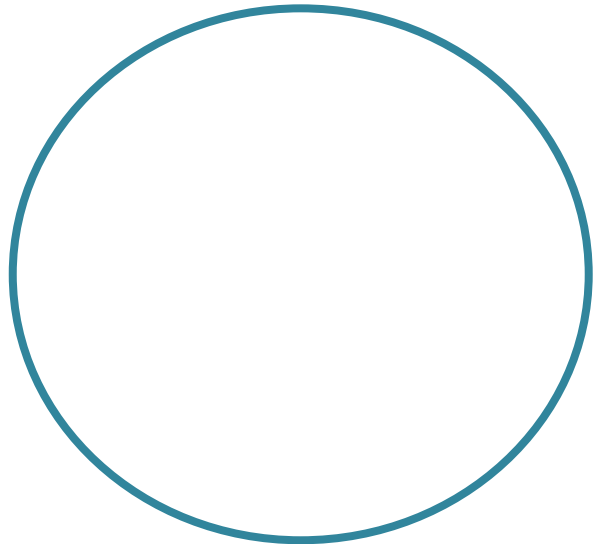
Location of Points in the Coordinate Plane

The coordinates in each quadrant of the coordinate plane varies.

Quadrant II

$(-x, y)$

Quadrant I

(x, y)

Quadrant III

$(-x, - y)$

Quadrant IV

$(x, - y)$

In Quadrant I:

The **x coordinate** and the **y coordinate** are both **positive**.

In Quadrant II:

The **x coordinate** is **negative** and the **y coordinate** is **positive**.

In Quadrant III:

The **x coordinate** and the **y coordinate** are both **negative**.

In Quadrant IV:

The **x coordinate** is **positive** and the **y coordinate** is **negative**.

In the x axis:

The **x coordinate** to the right of 0 is **positive** and the **y coordinate** is **0**.

The **x coordinate** to the left of 0 is **negative** and the **y coordinate** is **0**.

In the y axis:

The **y coordinate** above 0 is **positive** and the **x coordinate** is **0**.

The **y coordinate** below 0 is **negative** and the **x coordinate** is **0**.

Do You Know Where They're Going To?

Classify the given ordered pairs according to their location in the coordinate plane.

$(-1, 5)$	$(0, -8)$	$(\frac{1}{2}, -4)$
$(1, 0)$	$(3, 4)$	$(-1\frac{3}{4}, -7)$

Quadrant I	Quadrant II	Quadrant III

Quadrant IV	x-axis	y-axis

Naming Points in the Coordinate Plane

We follow specific rules in naming points in the coordinate plane. Remember that each point on the coordinate plane is determined by two rational numbers of the form **(x, y)**, where **x** is the **first coordinate** and **y** is the **second coordinate**. So, we'll name it using the numbers on the x axis first, followed by the number on the y axis.

The **x-coordinate** of a point describes the point's position in relation to the x-axis.

$(4, 7)$

The **y-coordinate** of a point describes the point's position in relation to the x-axis.

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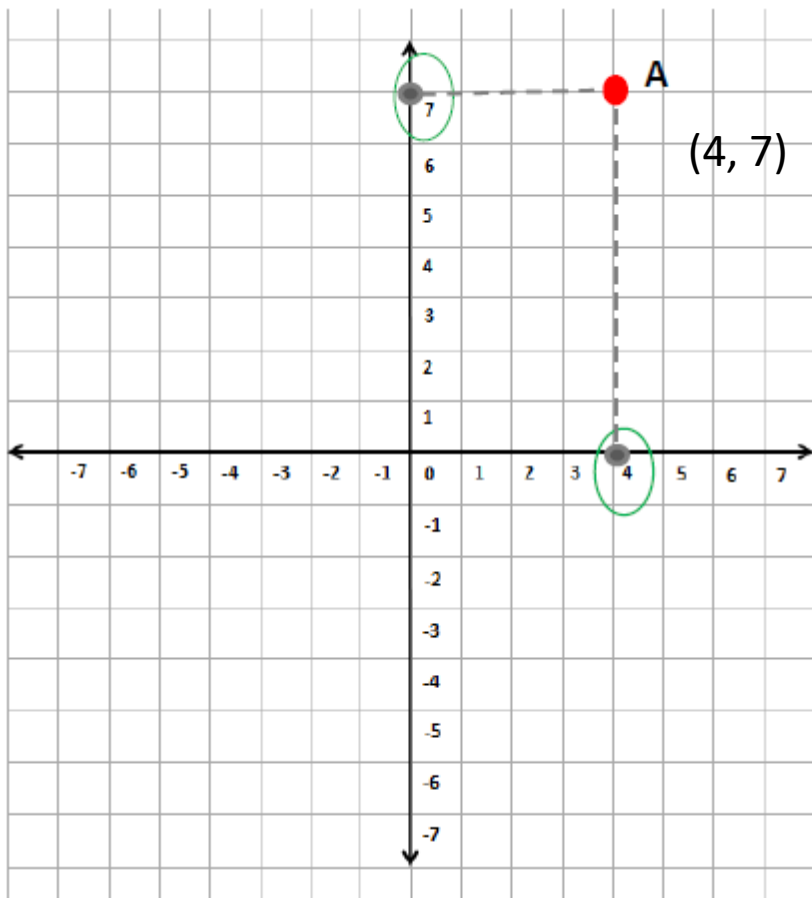
What's My Name?

Name the coordinates of the following objects on the coordinate plane.

1. Ball
2. Pencil
3. Book

4. Shirt
5. Bag
6. Flower
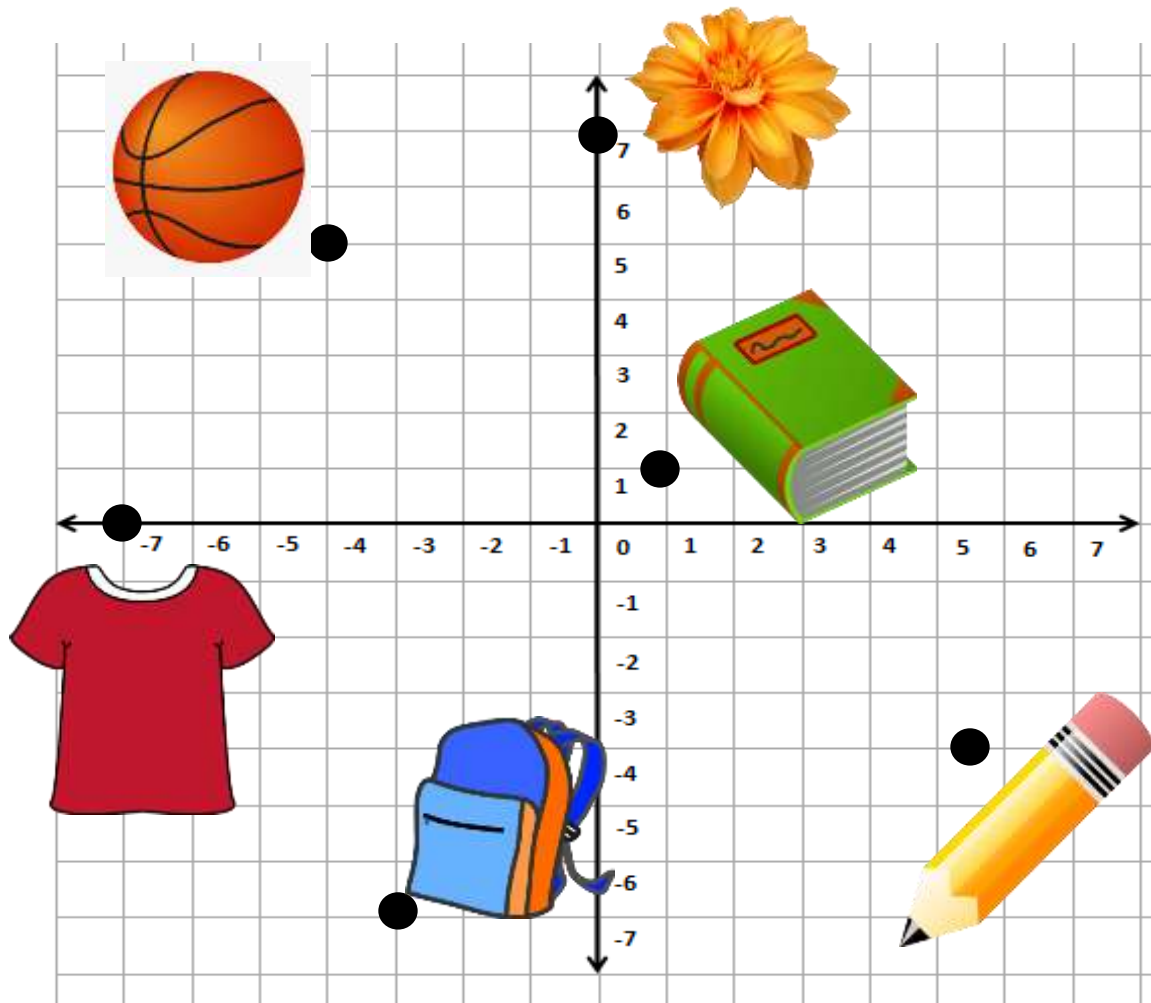
Plotting of Points in the Coordinate Plane

In graphing points in the coordinate plane, follow the order of the coordinates (x, y). To reach to a certain point (x, y), remember the following:

Steps:

1. Always start at the origin.

2. If the x-coordinate is positive, move as many units as indicated to the right. If the x-coordinate is negative, move as many units as indicated to the left.

3. If the y-coordinate is positive move as many units as indicated upward. If the y-coordinate is negative, move as many units downward.

Example:

Plot point *A* with coordinates (3, 4).

Step 1

Step 2

Step 3

A (3, 4)
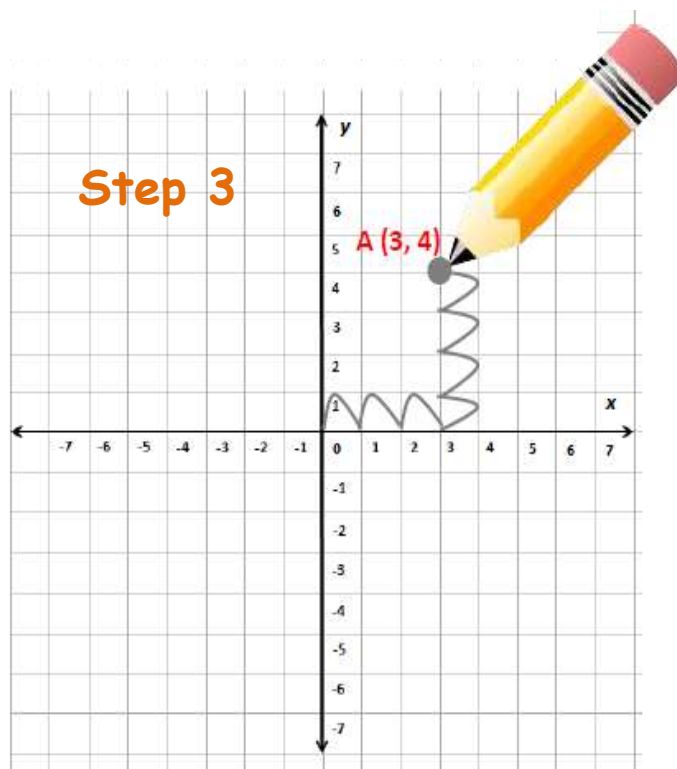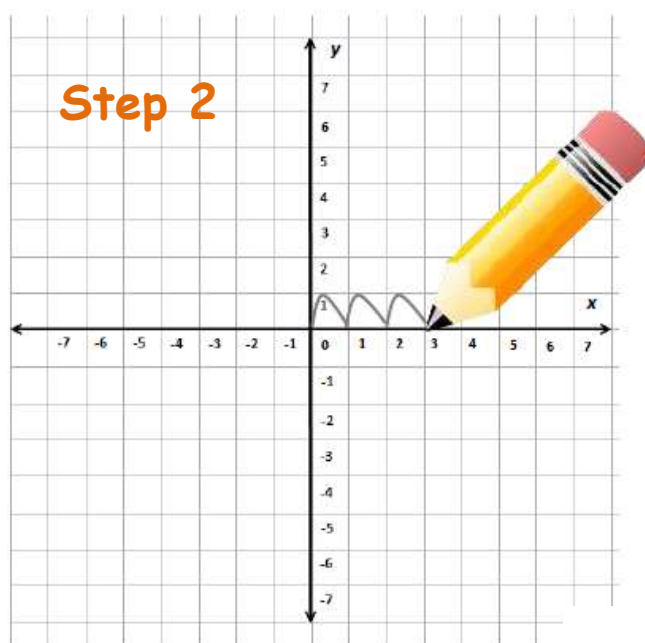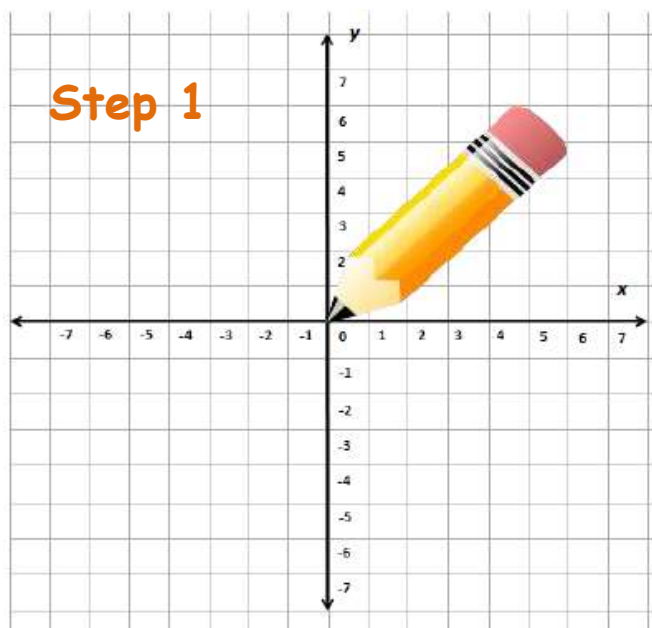
Home Sweet Home

You just moved in to your new home and decided to arrange some furniture. If the floor area of your home is the coordinate plane, arrange the given furniture using the coordinates below.
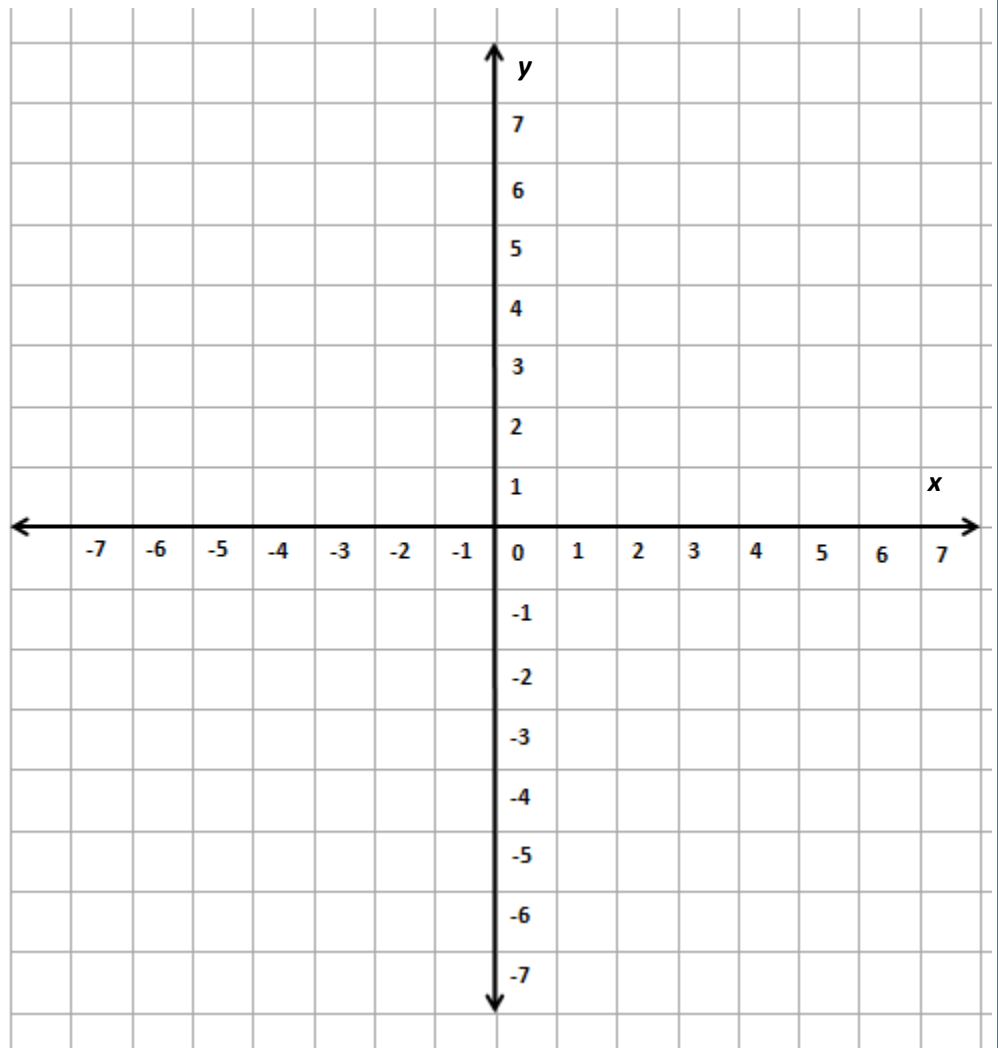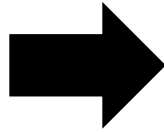
(-5, 2)

(2, -5)

(5, 2)

(-5, -2)

(2, 5)

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Task Cards

Match the each statement to the coordinates it describes.

1.
From the origin, move 3 units to the left and 6 units down.

a
(6, 3)

2.
From the origin, move 3 units to the right and 6 units up.

b
(-6, -3)

3.	c
From the origin, move 6 units to the left and 3 units up.	(-3, -6)

4.	d
From the origin, move 6 units to the right and 3 units up.	(3, 6)
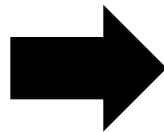
5.	e
From the origin, move 3 units to the left and 6 units up.	(0, 3)
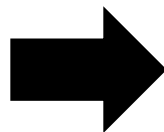
6.		f
From the origin, move 6 units to the left and 3 units down.	→	(-6, 3)
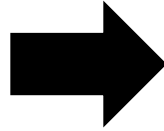
7.		g
From the origin, move 3 units to the right and 0 units up or down.	→	(-3, 6)
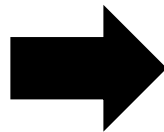
8.		h
From the origin, move 0 units along the x-axis and up 3 units.	→	(3, 0)

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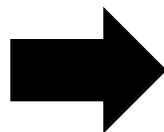
Answers:

Sort This Out!

x-coordinate

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

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

y-coordinate

$5, -8, -4,$

$0, 4, -7$

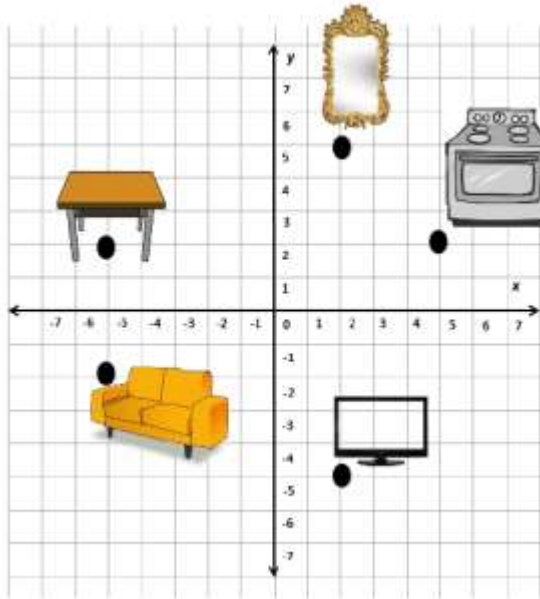## Do You Know Where They're Going to?

Quadrant I	Quadrant II	Quadrant III
$(3, 4)$	$(-1, 5)$	$(-1\frac{3}{4}, -7)$
Quadrant IV	x-axis	y-axis
$(\frac{1}{2}, -4)$	$(1, 0)$	$(0, -8)$

What's My Name?

1. Ball	$(4, 5)$	4. Shirt	$(-7, 0)$
2. Pencil	$(5\frac{1}{2}, -4)$	5. Bag	$(-3, -7)$
3. Book	$(1, 1)$	6. Flower	$(0, 7)$

Home Sweet Home

Task Cards

1. c

2. d

3. f

4. a

5. G

6 b

7. h

8. e