

Hello and welcome to math today.

Planners filled out

Please turn to "Exercise 1" on lesson 15.

You should complete as much of this page as you can until I start class today.

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Lesson Summary

- The order of numbers in an ordered pair is important because the ordered pair should describe one location in the coordinate plane.
- The first number (called the *first coordinate*) describes a location using the horizontal direction.
- The second number (called the *second coordinate*) describes a location using the vertical direction.

Problem Set

1. Use the set of ordered pairs below to answer each question:

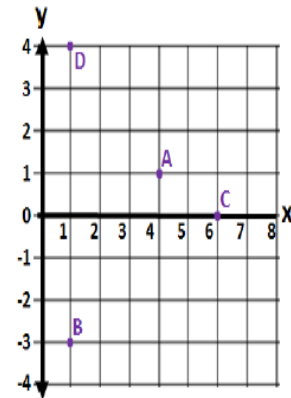
$\{(4,20), (8,4), (2,3), (15,3), (6,15), (6,30), (1,5), (6,18), (0,3)\}$

- a. Write the ordered pair(s) whose first and second coordinate have a greatest common factor of 3.
- b. Write the ordered pair(s) whose first coordinate is a factor of its second coordinate.
- c. Write the ordered pair(s) whose second coordinate is a prime number.

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2. Write ordered pairs that represent the location of points A, B, C, and D, where the first coordinate represents the horizontal direction, and the second coordinate represents the vertical direction.

~~x, y~~
 $A = (4, 1)$
 $B = (1, -3)$
 $C = (6, 0)$
 $D = (1, 4)$



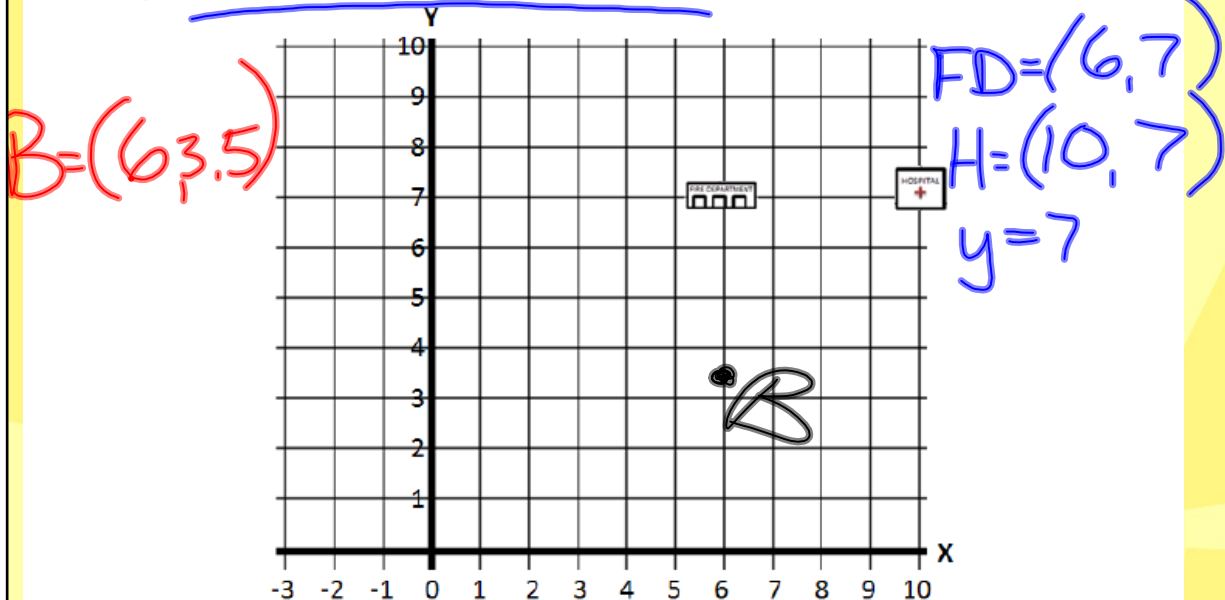
3. Extension:

Write ordered pairs of integers that satisfy the criteria in each part below. Remember that the origin is the point whose coordinates are (0,0). When possible, give ordered pairs such that: (i) both coordinates are positive; (ii) both coordinates are negative; and (iii) the coordinates have opposite signs in either order.

- These points' vertical distance from the origin is twice their horizontal distance.
- These points' horizontal distance from the origin is two units more than the vertical distance.
- These points' horizontal and vertical distances from the origin are equal but only one coordinate is positive.

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1. On the map below, the fire department and the hospital have one matching coordinate. Determine the proper order of the ordered pairs in the map, and write the correct ordered pairs for the locations of the fire department and hospital. Indicate which of their coordinates are the same.



2. On the map above, locate and label the locations of each description below:
- The local bank has the same first coordinate as the Fire Department, but its second coordinate is half of the fire department's second coordinate. What ordered pair describes the location of the bank? Locate and label the bank on the map using point B.

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- b. The Village Police Department has the same second coordinate as the bank, but its first coordinate is -2 . What ordered pair describes the location of the Village Police Department? Locate and label the Village Police Department on the map using point P .

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Lesson 15: Locating Ordered Pairs on the Coordinate Plane

Student Outcomes

- Students extend their understanding of the coordinate plane to include all four quadrants, and recognize that the axes (identified as the x -axis and y -axis) of the coordinate plane divide the plane into four regions called quadrants (that are labeled from first to fourth and are denoted by Roman Numerals).
- Students identify the origin, and locate points other than the origin, which lie on an axis.
- Students locate points in the coordinate plane that correspond to given ordered pairs of integers and other rational numbers.

Classwork

Opening Exercise (5 minutes)

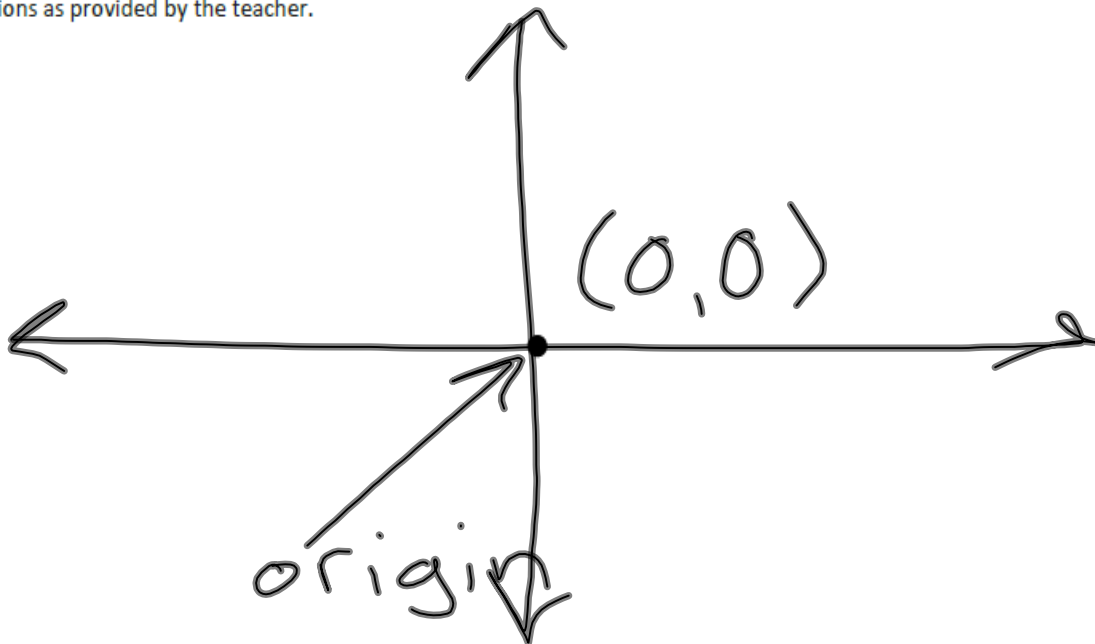
Hang posters on the wall, each containing one of the following terms: x -axis, y -axis, x -coordinate, y -coordinate, origin, and coordinate pair. Pair students up and have them discuss these vocabulary terms and what they remember about the terms from Grade 5. Student pairs will then write what they discussed on the posters with the appropriate vocabulary term. Some important aspects for students to remember include:

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Classwork

Example 1: Extending the Axes Beyond Zero

The point below represents zero on the number line. Draw a number line to the right starting at zero. Then, follow directions as provided by the teacher.



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Example 2: Components of the Coordinate Plane

All points on the coordinate plane are described with reference to the origin. What is the origin, and what are its coordinates?

origin = starting point
(0,0)

To describe locations of points in the coordinate plane we use ordered pairs of numbers.

Order is important, so on the coordinate plane we use the form (x, y). The first coordinate represents the point's location from zero on the x-axis, and the second coordinate represents the point's location from zero on

the y-axis.

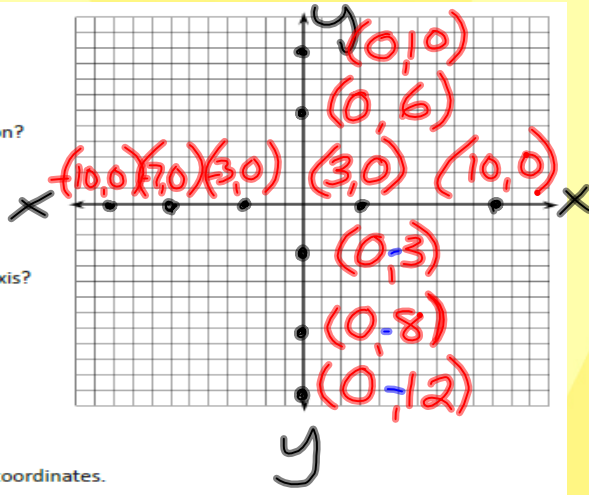
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1. Use the coordinate plane below to answer parts (a)–(c):

- Graph at least five points on the x -axis and label their coordinates.
- What do the coordinates of your points have in common?

$y = 0$

What must be true about any point that lies on the x -axis? Explain.



2. Use the coordinate plane to answer parts (a)–(c):

- Graph at least five points on the y -axis and label their coordinates.
- What do the coordinates of your points have in common?
- What must be true about any point that lies on the y -axis? Explain.

$x \text{ axis} = 0$

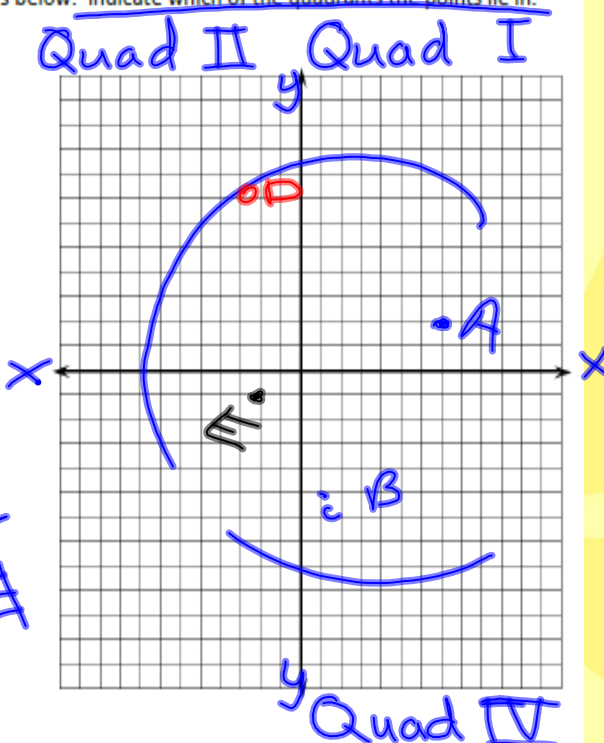
3. If the origin is the only point with 0 for both coordinates, what must be true about the origin?

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Exercises

4. Locate and label each point described by the ordered pairs below. Indicate which of the quadrants the points lie in.

- $(7,2)$ Quad I
- $(3,-4)$ Quad IV
- $(1,-5)$ Quad IV
- $(-3,8)$ Quad II
- $(-2,-1)$ Quad III



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5. Write the coordinates of at least one other point in each of the four quadrants.
- Quadrant I
 - Quadrant II
 - Quadrant III
 - Quadrant IV
6. Do you see any similarities in the points within each quadrant? Explain your reasoning.

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Lesson Summary

- The x -axis and y -axis of the coordinate plane are number lines that intersect at zero on each number line.
- The axes create four quadrants in the coordinate plane.
- Points in the coordinate plane lie either on an axis or in one of the four quadrants.

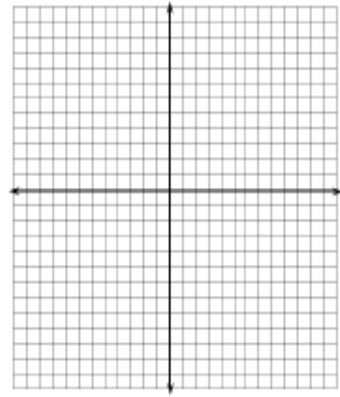
Problem Set

- Name the quadrant in which each of the points lies. If the point does not lie in a quadrant, specify which axis the point lies on.
 - $(-2, 5)$
 - $(9.2, 7)$
 - $(0, -4)$
 - $(8, -4)$
 - $(-1, -8)$
- Jackie claims that points with the same x - and y -coordinates must lie in Quadrant I or Quadrant III. Do you agree or disagree? Explain your answer.

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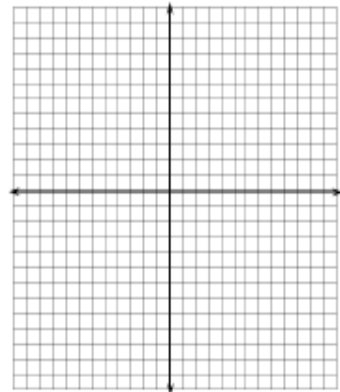
3. Locate and label each set of points on the coordinate plane. Describe similarities of the ordered pairs in each set and describe the points on the plane.

- a. $\{(-2,5), (-2,2), (-2,7), (-2, -3), (-2, 8)\}$
- b. $\{(-9,9), (-4,4), (-2,2), (1, -1), (3, -3), (0,0)\}$
- c. $\{(-7, -8), (5, -8), (0, -8), (10, -8), (-3, -8)\}$



4. Locate and label at least five points on the coordinate plane that have an x -coordinate of 6.

- a. What is true of the y -coordinates below the x -axis?
- b. What is true of the y -coordinates above the x -axis?
- c. What must be true of the y -coordinates on the x -axis?



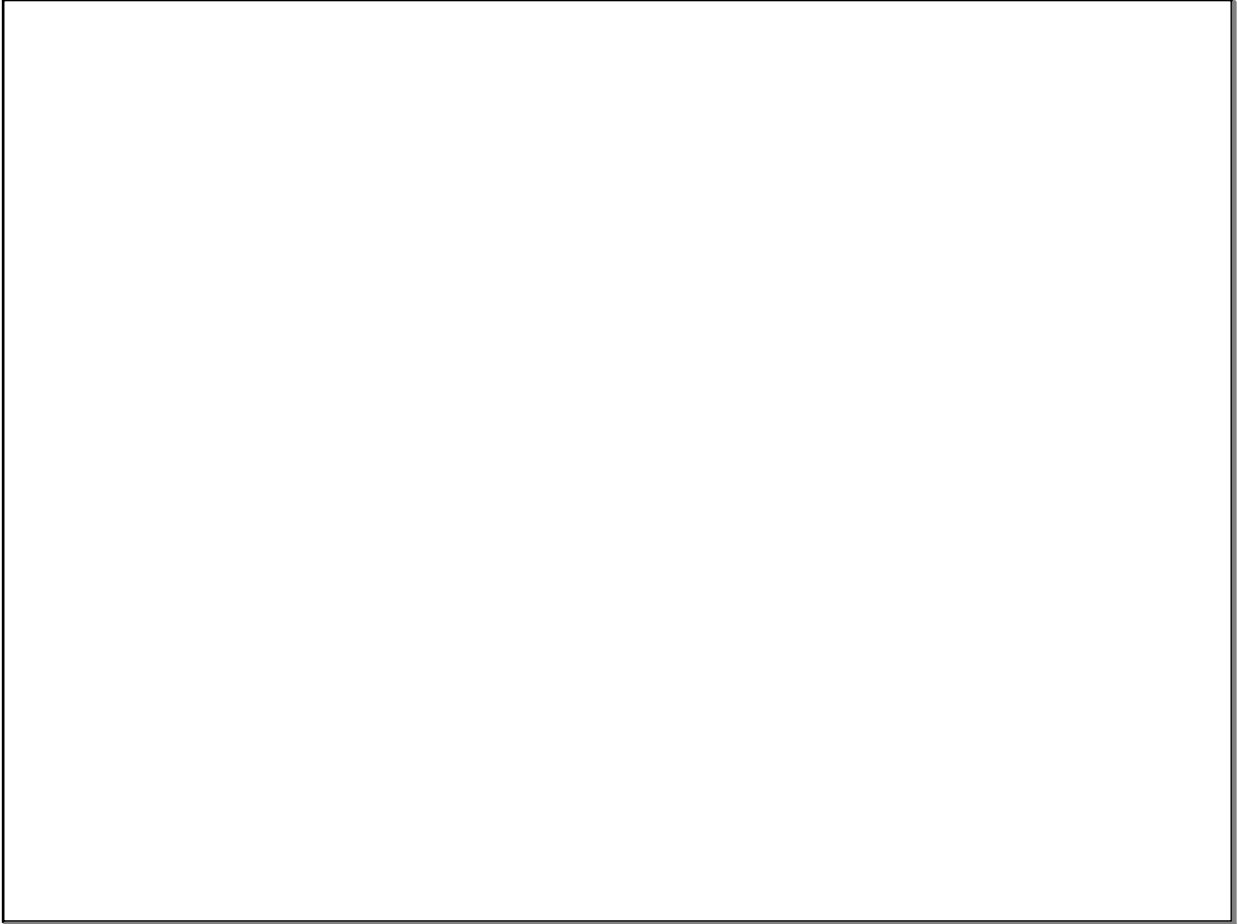
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Classwork

Opening Exercise (5 minutes)

Hang posters on the wall, each containing one of the following terms: x -axis, y -axis, x -coordinate, y -coordinate, origin, and coordinate pair. Pair students up and have them discuss these vocabulary terms and what they remember about the terms from Grade 5. Student pairs will then write what they discussed on the posters with the appropriate vocabulary term. Some important aspects for students to remember include:

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