Math122 College Algebra

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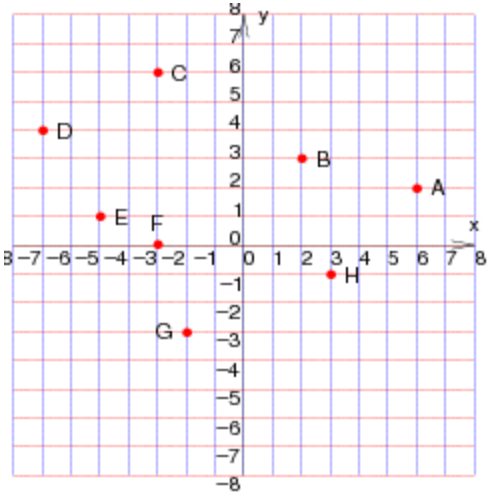
2.1
The Coordinate Plane

- coordinate plane (or Cartesian plane) - link between algebra and geometry



- Identify the quadrants, the origin, and the ordered pair (x, y) for point C

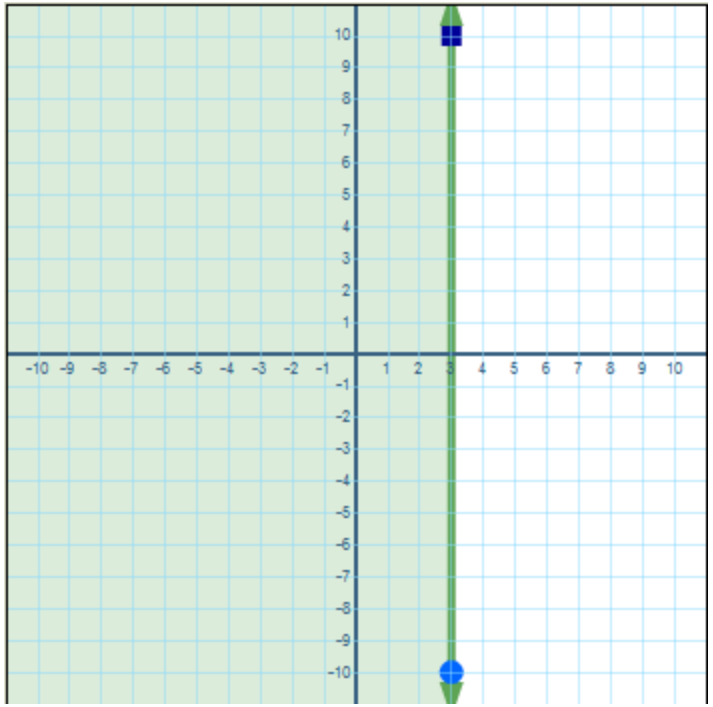
Terminology

- a point P in the coordinate plane is located by a unique ordered pair

- ordered pair (a,b)
  - ❖ a is called the x-coordinate
  - ❖ b is called the y-coordinate

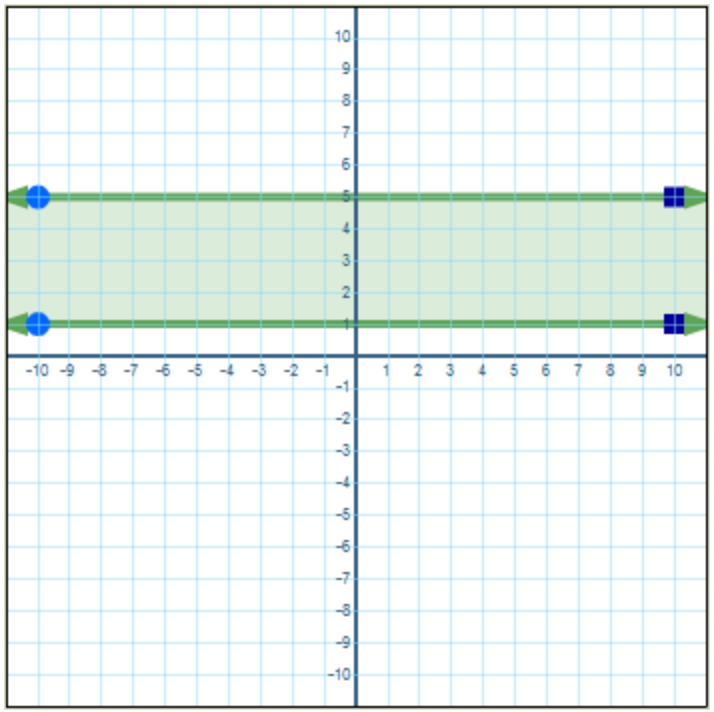
Graphing Regions

- What is the meaning of $\{(x, y)|x \leq 3\}$
- Sketch the region



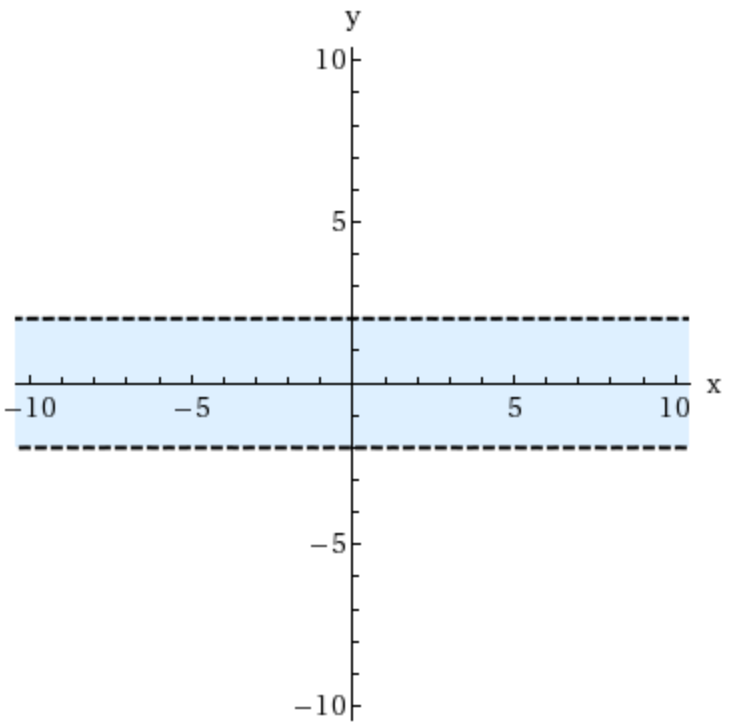
Graphing Regions

- What is the meaning of $\{(x, y)|1 \leq y \leq 5\}$
- Sketch the region



Graphing Regions

- What is the meaning of $\{(x, y)|\ |y| \leq 2\}$
- Sketch the region



Problem

- Sketch the graph of $\{(x, y)||x| > 3\}$

Distance Formula

- The distance between any two points A(x1,y1) and B(x2, y2) is $d(A,B) where$

$$d(A,B) =$$

- Where did this formula come from?

Midpoint Formula

- The midpoint of the line segment from A(x1,y1) to B(x2,y2) is

$$\left(\frac{x1+x2}{2}, \frac{y1+y2}{2}\right)$$

Problem

1. Consider the following: $\{(x, y)||x| > 4\}$
   a) Translate the mathematical notation to English

   b) Sketch the region

Problem

2. Which of the points A(6,7) or B(-5,8) is closer to the origin?

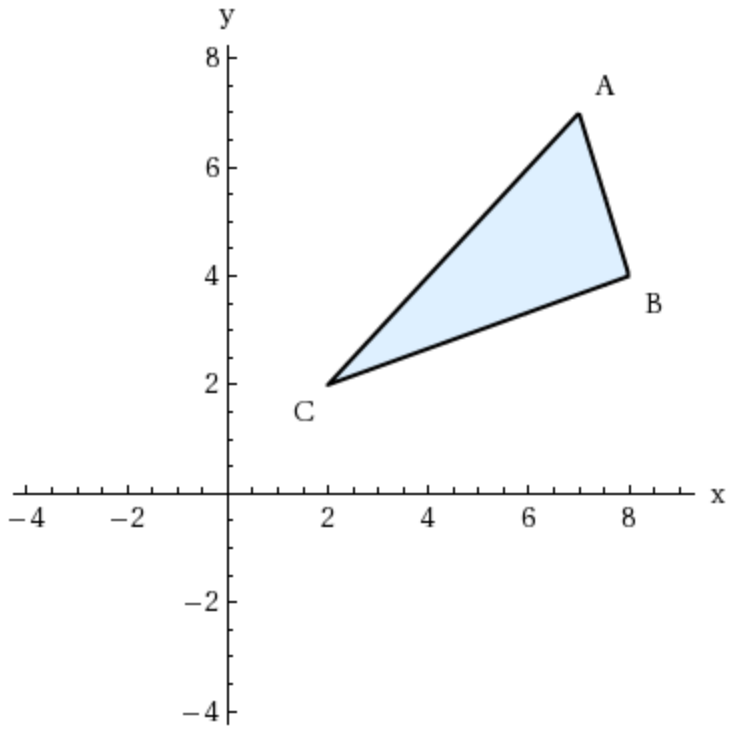
Problem

- For a right triangle with legs a and b and hypotenuse c, the Pythagorean Theorem states that $a^2 + b^2 = c^2$
- The converse of the Pythagorean Theorem is also true, that is, a triangle ABC is a right triangle if $a^2 + b^2 = c^2$

3. Show that the triangle on the following slide is a right triangle.

Problem

A(7,7), B(8,4), C(2,2)



Problem

4. Find the area of the triangle