

### Bridge – Length on a Coordinate Graph

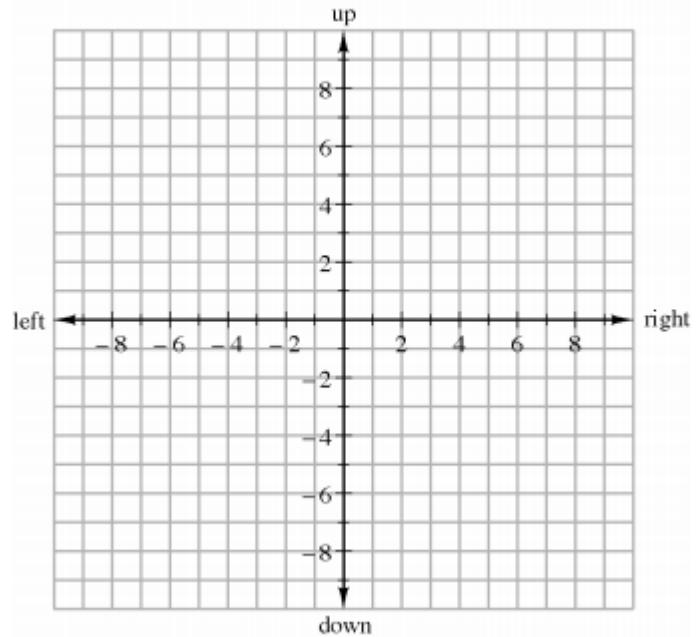
Name: \_\_\_\_\_

You have worked with movement along a one-dimensional number line, but what if the movement is two-dimensional? This kind of movement can be represented on a **coordinate graph** like the one shown below. Imagine a grid overlaying the Calaveras County Frog Jumping Contest, with the center of the grid as the spot where the frogs begin jumping. The center of the grid is also called the **origin**, or  $(0, 0)$ . A coordinate point on the grid could represent the landing point of each frog's jump. How can you use this information to find the distance that the frog jumped? Think about this as you work on today's problems.

#### 3-123.

Elliot is adding a two-dimensional element to his game. He now wants his frogs to hop both left and right, as well as up and down. All frogs start at the origin,  $(0, 0)$ . He will write the two numbers to give the jump lengths. Left/right jumps will be the first number. Up/down jumps will be the second number. For example,  $(4, -3)$  means to start at  $(0, 0)$  and go right 4, then down 3.

#### Two-Dimensional Hops



- Frog A hopped 3 units to the right and 4 units up. Frog B hopped 5 units to the left and 4 units up. Name the coordinates where each frog landed. How far apart were they?
- Frog C hopped 2 units to the right and 6 units down. Frog D hopped 2 units to the right and 7 units up. Name the coordinates where each frog landed. How far apart were they?
- Flibbitz lands at  $(-7, -4)$  while Kermie lands at  $(0, -4)$ . How far apart are Flibbitz and Kermie?

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#### 3-126.

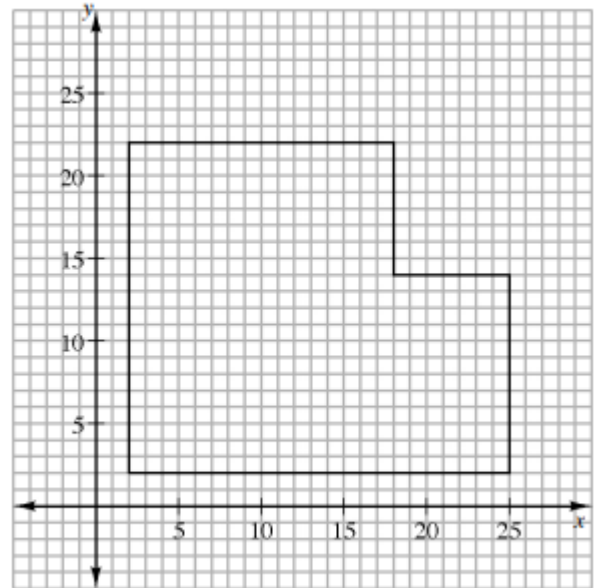
Think about how you can use absolute value notation to express the distance between two points on a coordinate graph. For each pair of points below, find the distance between the given points and express your work using absolute value symbols.

- $(4, 9)$  and  $(-5, 9)$
- $(7, -1)$  and  $(7, -4)$
- $(0, 9)$  and  $(0, -7)$
- $(4, -8)$  and  $(-10, -8)$

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**3-124.**

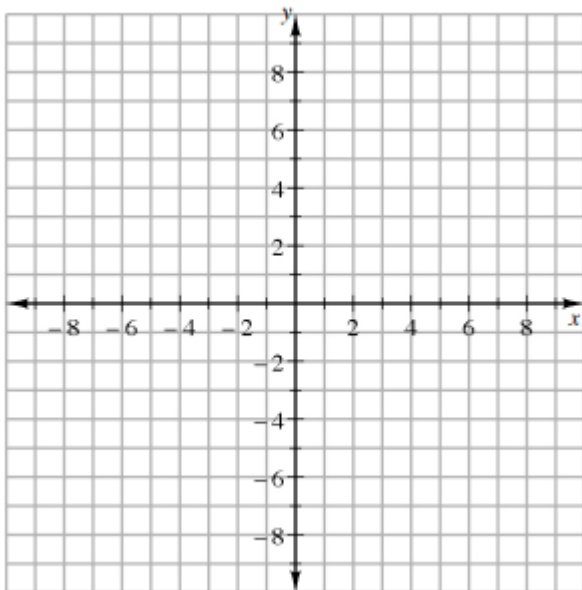
Suzie has decided it is time to improve the recreation room in her house. She wants to estimate the cost of her improvement project. To help her visualize the room, she started by creating a **scale drawing** of the room, shown at right. The drawing is an accurately drawn smaller version of the room. Each unit represents 1 foot.



- Why do you think Suzie created her scale drawing on a coordinate graph instead of on plain paper?
- The flooring will cost \$2 per square foot. How much will it cost Suzie to lay this flooring so it fully covers the floor of room?
- Now Suzie wants to install new baseboards along the bottom of all of the walls. The baseboard will cost \$0.75 per foot. How much will this cost Suzie?

**3-125.**

Suzie’s cousin, Antwon, was impressed with her scale drawing and cost estimate. He wanted her help to figure out a problem.



a. Antwon lived in a different state, so he called Suzie and gave her the coordinates to the scale drawing he made for his room. The points were  $A(-4, 6)$ ,  $B(6, 6)$ ,  $C(6, -10)$ ,  $D(2, -10)$ ,  $E(2, -2)$ , and  $F(-4, -2)$ . Sketch Antwon’s room to the left.

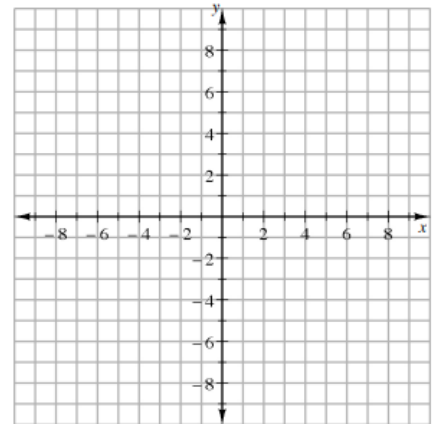
b. Is there a way to find the length of the sides using just the coordinates and without actually plotting the diagram? For example, can you determine the length of the side from point  $D$  to point  $E$  using the points  $(2, -10)$  and  $(2, -2)$ ?

c. Without looking at your graph, use your reasoning from part (b) to find the length of the remaining sides. Then, check your work using your graph.

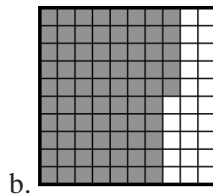
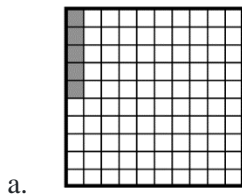
# Reflection

## 1. HOW DO THE LOCATIONS COMPARE?

- a. For each set of coordinates listed below in part (b), what do you notice?
  
- b. Plot each set of coordinates below on a coordinate graph. Explain what you noticed about the location of pairs of coordinates on the graph.
  - i.  $(8, 1)$  and  $(-8, 1)$
  - ii.  $(5, -7)$  and  $(5, 7)$
  - iii.  $(-4, -3)$  and  $(-4, 3)$
  - iv.  $(3, -5)$  and  $(-3, 5)$
- c. Explain how what you noticed about the sets of ordered pairs in part (a) relates to the locations of the pairs of points in part (b).



2. The following representations have been drawn to represent portions of a 100% block. **Write each of the portions in at least two different forms.**



3. Evaluate each absolute value expression below.

- a.  $|2| + |4|$
  
- b.  $|-3| + |5|$
  
- c.  $|-7| + |-1|$
  
- d.  $-|6|$

4. Write your own question, including the directions, about rounding and / or place value. Please answer your question as well.

5. How do you feel about the work completed in this section? Explain why. Write at least two sentences.