Notes on Distance and Midpoint Formula – (on level)
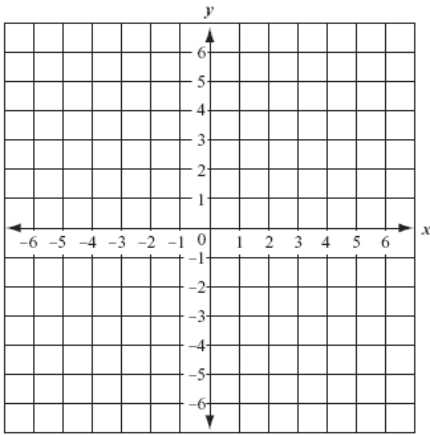
Finding the Distance between 2 points

* Plot the points (-2, 5), (0, -4) and (5, 3).

* Find the distance between each set of points.

(-2, 5) & (0, -4) =

(0, -4) & (5, 3) =

(5, 3) & (-2, 5) =

The **Distance Formula** allows you to find the <u>distance</u> between two points. The subscripts (x_1, y_1) only indicate that there is a first and second point. However, whichever point is first or second is up to you.

$$\text{Distance Formula: } d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$
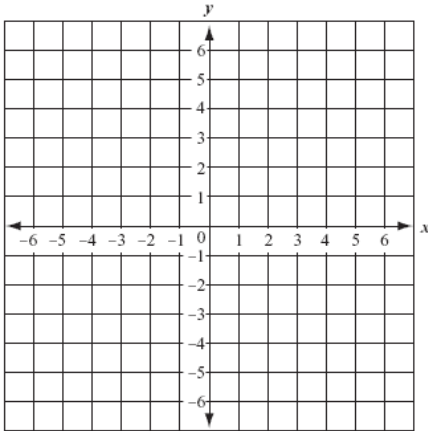
1. Find the distance between (1, -2) and (-3, 6).

2. Find the distance between (-2, -3) & (-4, 4).

3. Use the distance formula to find the value of x if the distance between (1, 2) and (x, 5) is 5 units.

4. Use the distance formula to find the value of y if the distance between (-1, 4) & (5, y) is 10 units.

Finding the Midpoint

* Once again, plot the points (-2, 5), (0, -4) and (5, 3).

* Place a dot where you think the halfway point is between each set of points.

The **Midpoint Formula** allows you to find the **midpoint** or **center** between two points.

Midpoint Formula: $\left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2} \right)$

5. Find the midpoint between (1, -2) and (-3, 6).   **6.** Find the midpoint between (6.4, 3) and (-10.7, 4).

7. M is the midpoint of segment AB. The coordinates of A are (-2, 3) and the coordinates of M are (1, 0).   Find the coordinates of B.

8. B is the midpoint of segment AC. The coordinates of A are (-10, 4) and the coordinates of B are (-2,4).   Find the coordinates of C.
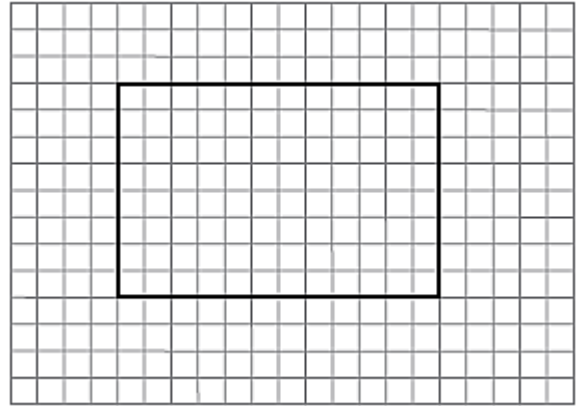
Perimeter and Area with the Distance Formula

Now that you have learned how to calculate the distance between two points, you can use the distance formula to help you calculate the area and perimeter of figures on a coordinate plane.

Perimeter: Sum of the length of each side of a shape
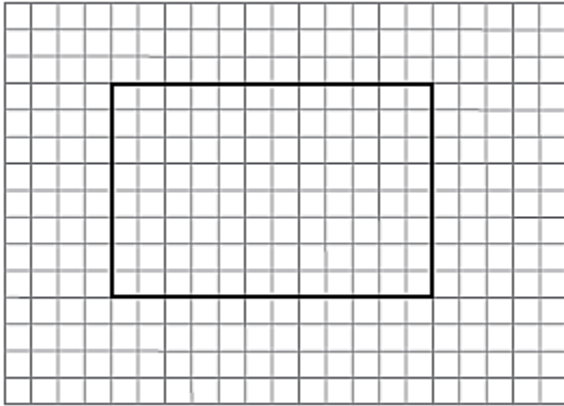
| **Area:** Amount of square units or space inside of a shape |
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In order to calculate the perimeter or area of a shape, you have to know the length of certain sides and heights. If those sides or heights lie along the grid lines, you can just count the number of squares from one end of the side to the other.

However, if the figured is rotated or slanted, the sides or heights may not lie along the grid lines because they are diagonal. It is not enough to estimate the side lengths; you must be accurate in determining the lengths of the necessary sides and heights.

What formula can you use if the sides are slanted/diagonal to find the lengths? _____

Practice: Calculate the perimeter of the following figures. Think about which sides you need to calculate the lengths.
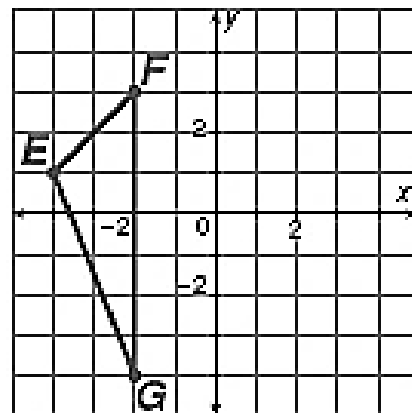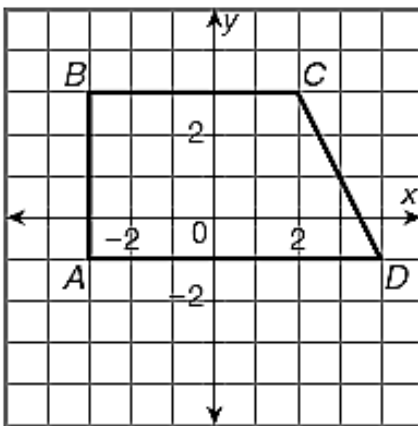
Practice: Calculate the AREA of the following figures. Think about which sides you need to calculate the lengths.