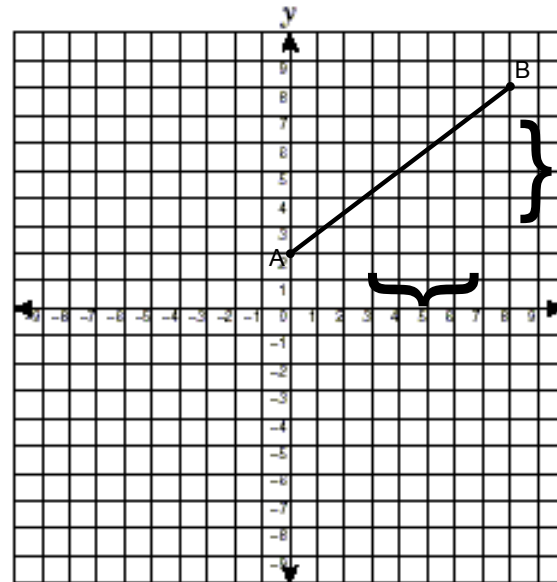


# 8.1 Midpoint and Distance Formula

Objective: Students will be able to apply the pythagorean theorem and the distance formula.

## How to find the midpoint on the coordinate plane



This is the midpoint of the x - coordinates

$$\frac{\quad + \quad}{2} = \underline{\quad}$$

This is the midpoint of the y - coordinates

$$\frac{\quad + \quad}{2} = \underline{\quad}$$

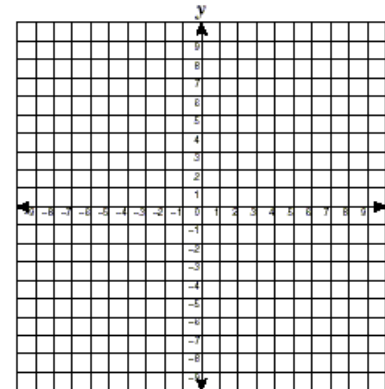
Midpoint of  $\overline{AB}$

(  $\quad$  ,  $\quad$  )

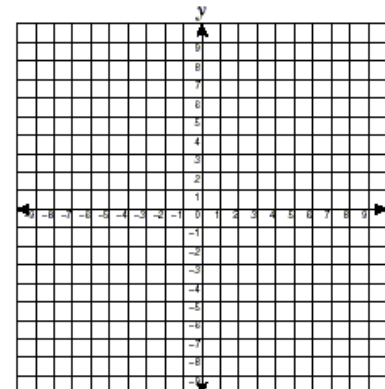
Find the coordinate of the midpoint MN with the endpoints of M(1,2) and N(7,9)

Midpoint Formula

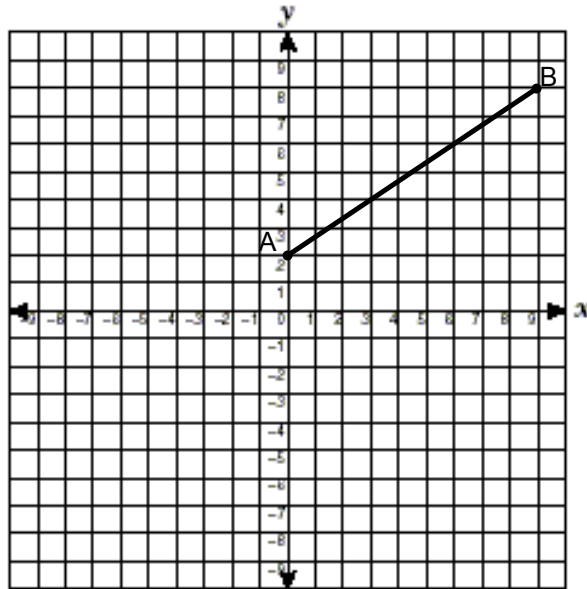
$$M = \left( \frac{x_1 + x_2}{2} , \frac{y_1 + y_2}{2} \right)$$



The endpoints of the diameter of circle O are (-3,4) and (5,-6). Find the center of the circle.



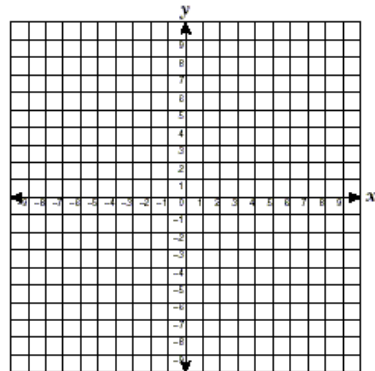
## How to find the distance between two points on the coordinate plane



### Distance Formula

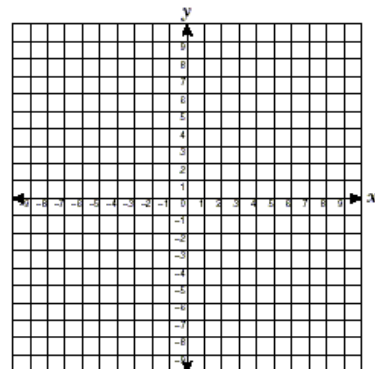
$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

What is the length of the line segment whose endpoints are (-2, 4) and (5, 1)?



Radical: \_\_\_\_\_    Decimal: \_\_\_\_\_  
nearest tenth

Rectangle GHIJ G(1,1), H(5,3), I(4,5) and J(0,3) has points. Find the length of the diagonals of the rectangle.



Radical: \_\_\_\_\_    Decimal: \_\_\_\_\_  
nearest tenth

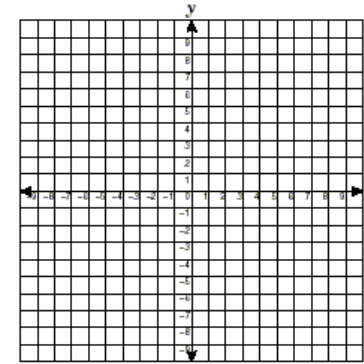
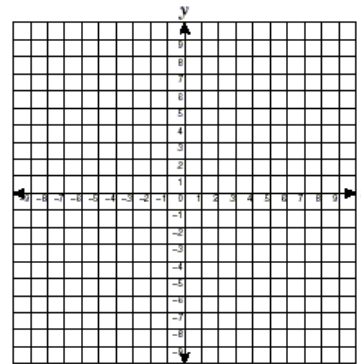
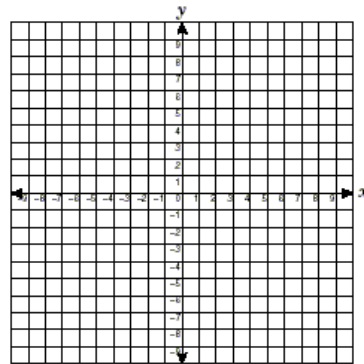
# Independent Practice

Find the midpoint of the following sets of point. Graph each set of points and midpoint to check your answers

a.  $A(-3, 4), B(-3, 8)$

b.  $C(-1, -3), D(5, -3)$

c.  $E(3, -5), F(7, 9)$



Find the distance between the following sets of points. Round answers to the nearest tenth.

1.  $(3, 2)$  and  $(-4, 2)$

2.  $(-3, -1)$  and  $(-3, -5)$

Find the length of the segment joining the following sets of points. Round answers to the nearest tenth.

3.  $(4, -5)$  and  $(1, -1)$

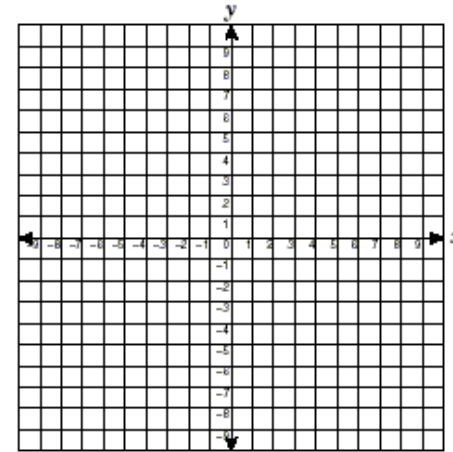
4.  $(5, 4)$  and  $(-3, 4)$

### Applications of Midpoint and Distance Formulas

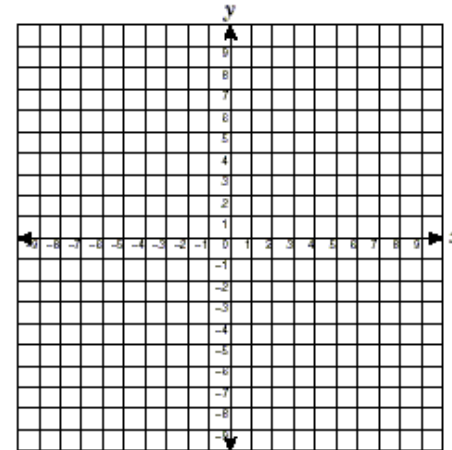
The endpoints of the diameter AB are  $A(-8,-4)$  and  $B(3,6)$ .

1. Find the center of the circle

2. Find the radius of the circle



Prove that ABC, with points  $A(4,-1)$ ,  $B(5,6)$ , and  $C(1,3)$  is a isosceles triangle by showing that two of its side lengths are congruent.



Show that the diagonals of the rectangle  $A(0,5)$   $B(3,4)$   $C(0,-5)$   $D(-3,-4)$  are congruent

