Point A (-7,14) Point B (5,-2)

$\overrightarrow{AB}$ (12, -16)

1) Find the slope of $\overline{AB}$	2) Find the length of $\overline{AB}$	3) Find the midpoint of $\overline{AB}$
$\frac{-16}{12} = \frac{-4}{3}$	$12^2 + 16^2$ $144 + 256$ $\sqrt{400} = 20$	$\frac{-2}{2}$ $\frac{12}{2}$ MP $(-1, 6)$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$d = \sqrt{(x - x)^2 + (y - y)^2}$$

$$x_2 - x_1 \text{ or } x_1 - x_2$$

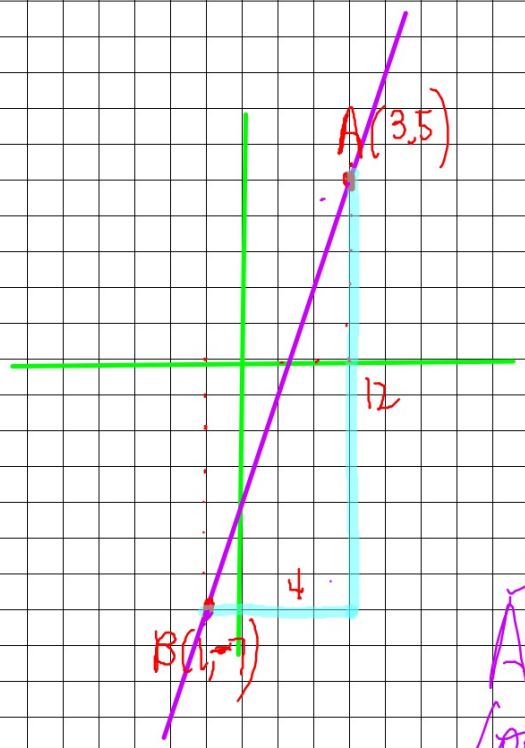
$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

answer is a #, fraction, 0 or undefined

answer is a number

answer is a point (x,y)

Point A (3,5) Point B (-1,-7)



$\sqrt{(x-\bar{x})^2+(y-\bar{y})^2}$

$(-1-3)$

$\vec{AB}$ $-4 \quad -12$

$\vec{BA}$ $-7-5$

$4, 12$

$\vec{AB}$

$\vec{BA}$

$16 + 144$

Point A (-7,14) Point B (5,-2) $-\frac{4}{3}$

4) Find the slope of a line parallel to $\overline{AB}$	5) Find the slope of a line perpendicular to $\overline{AB}$	6) Find $\overrightarrow{AB}$ and $\overrightarrow{BA}$
	$\frac{3}{4}$	$\overrightarrow{AB}$ $5+7, -2-14$ $(12, -16)$

parallel lines have the same slope

perpendicular flip it, change the sign

Find the vector change signs for x and y

Point A (-7,14) Point B (5,-2)

7) Find the equation of the circle with center B that passes through A

$d = \sqrt{(-7-5)^2 + (14-(-2))^2}$

$\sqrt{144 + 256} = \sqrt{400}$

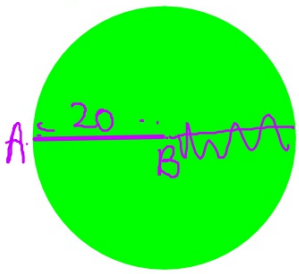
$= 20$

$(x-5)^2 + (y+2)^2 = 20^2 = 400$

8) Find $|\overrightarrow{AB}|$ and $|\overrightarrow{BA}|$

magnitude = length

(a,b) is the center of the circle



Self-Test 1

For each pair of points find (a) the distance between the two points and (b) the midpoint of the segment that joins the two points.

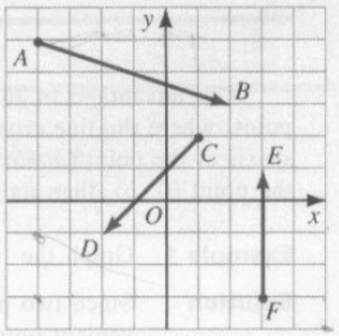
1. (5, 1) and (3, 1)
2. (8, −6) and (0, 0)
3. (−2, 7) and (8, −3)
4. (−3, 2) and (−5, 7)

Write an equation of the circle described.

5. Center at the origin; radius 9
6. Center (−1, 2); radius 5
7. Find the center and the radius of the circle $(x + 2)^2 + (y - 3)^2 = 36$.

Find the slope of the line through the points named.

8. (0, 0) and (7, 4)
9. (−4, 2) and (1, −1)
10. For which is slope *not* defined, a horizontal line or a vertical line?
11. Given $P(3, -2)$ and $Q(5, 2)$, find:
    a. the slope of any line parallel to $\overleftrightarrow{PQ}$
    b. the slope of any line perpendicular to $\overleftrightarrow{PQ}$
12. Name each vector as an ordered pair.
    a. $\overrightarrow{AB}$ b. $\overrightarrow{CD}$ c. $\overrightarrow{FE}$
13. Find the magnitude of each vector in Exercise 12.
14. Complete.
    a. $(-3, 2) + (7, -11) =$?
    b. $3(4, -1) + (-2)(-5, 3) =$?
15. If $M(-3, 7)$ is the midpoint of $\overline{PQ}$, where P has coordinates $(9, -4)$, find the coordinates of Q.



Exs. 12, 13

Homework Worksheet Practice 52 and P547 ST (self test) #1-15

$\frac{x_1 + x_2}{2} = m_x$

$\frac{q + x}{2} = -3$

$\frac{-4 + x}{2}$ 7

Practice 52

Geometry and Algebra

Lessons 13-1 through 1

Complete.

1. The circle with equation $(x + 5)^2 + (y - 8)^2 = 81$ has center _____ and radius _____.

2. If $A = (4, 5)$ and $B = (-2, 6)$, then $\overrightarrow{AB}$ = _____ and $|\overrightarrow{AB}|$ = _____.

3. The vectors $(3, 12)$ and $(2, x)$ are parallel. Find the value of x. _____

4. The vectors $(6, z)$ and $(-2, 4)$ are perpendicular. Find the value of z. _____

Find each vector sum.

5. $(8, 2) + (-6, 5)$ _____

6. $(-5, -4) + (6, 9)$ _____

7. $2(3, 1) + (4, -3)$ _____

8. $3(-1, 4) + 2(3, 2)$ _____

Find the coordinates of the midpoint of the segment that joins the given points.

9. $(-6, 8)$ and $(6, 4)$ _____

10. $(3, -7)$ and $(5, -3)$ _____

11. $(2, 0)$ and $(7, 3)$ _____

12. $(8, -5)$ and $(4, -7)$ _____

Find the coordinates of the midpoint of the segment that joins the given points.

9. $(-6, 8)$ and $(6, 4)$ _____

10. $(3, -7)$ and $(5, -3)$ _____

11. $(2, 0)$ and $(7, 3)$ _____

12. $(8, -5)$ and $(4, -7)$ _____

$(x-a)^2+(y-b)^2=r^2$

(a, b) center

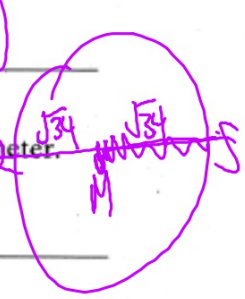
In Exercises 13–17 point R has coordinates $(6, 4)$ and point S has coordinates $(-4, -2)$.

13. Find the coordinates of the midpoint of $\overline{RS}$. $(1,1)$

14. Find the distance from R to S. $\sqrt{136}=2\sqrt{34}$

15. Find an equation of the circle that has $\overline{RS}$ as a diameter.

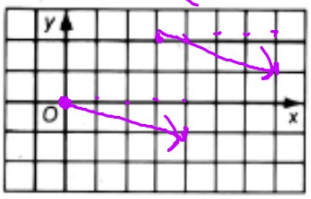
$(x-1)^2+(y-1)^2=34$ $(\sqrt{34})^2$



16. Find the slope of a line perpendicular to $\overleftrightarrow{RS}$. _____

17. Find the slope of a line parallel to $\overleftrightarrow{RS}$. _____

18. Draw an arrow to represent the vector $\frac{1}{2}(8, -2)$. $(4, -1)$



19. Sketch the circle with equation $x^2 + (y - 1)^2 = 1$.

$(x+0)^2$