

Unit 4: Geometry in the Coordinate Plane

<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>
22 Equations of Lines, Parallel and Perpendicular	23 Equations of Circles	24 Quiz Midpoint and Partitioning (in school)	25 Properties with Distance and Perimeter	26 Delta Math Review (not at school)
29 Distance and Area	30 Quadrilaterals and Proving	31 Delta Math Review	1 Review	2 Test



Name: _____ Date: _____

Writing Equations of Lines: $y = mx + b$

Writing an equation of a line given m and b .

- A. Substitute slope for m and y -intercept for b .
- B. Simplify the equation.

1. Slope is -5 and y -intercept is 2 .

2. Slope is $-1/2$ and y -intercept is -2 .

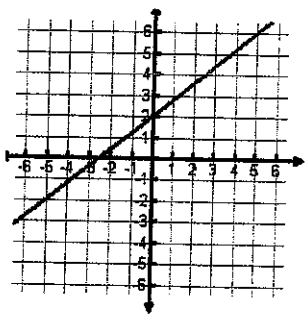
3. Slope is 0 and y -intercept is 3 .

4. Slope is $1/3$ and y -intercept is 0 .

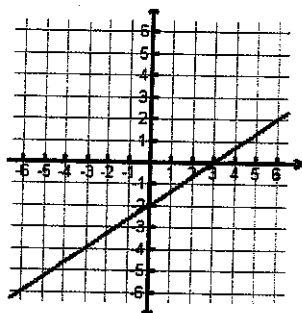
Writing an equation of a line given a graph.

- A. Use any 2 "good" points on the graph to find the slope, m .
- B. Find the y -intercept on the graph, b .
- C. Substitute slope for m and y -intercept for b into the equation $y = mx + b$.

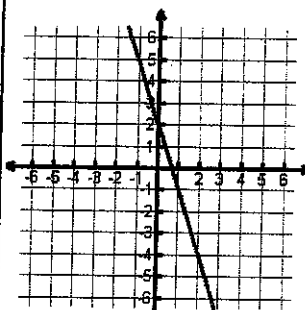
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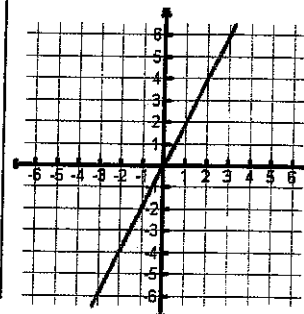
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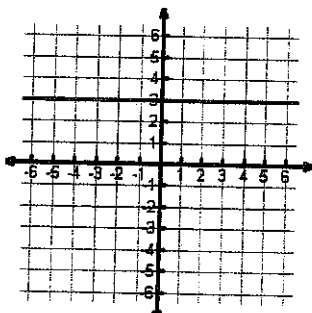
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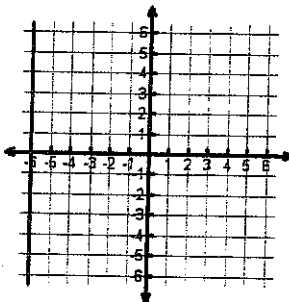
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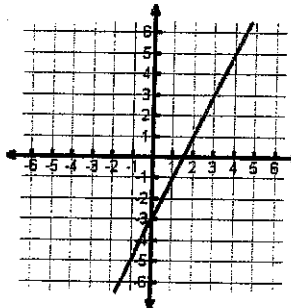
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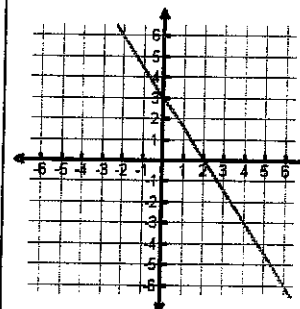
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11.



12.



Geometry in the Coordinate Plane

Writing an equation of a line given m and a point.

- A. Substitute slope for m and the point (x, y) into $y=mx+b$ and solve for b .
- B. Substitute m and b back into the equation.

13. $m = 2$ and Point: $(2, 3)$

14. $m = 1/2$ and Point: $(4, -3)$

15. $m = -2$ and Point: $(-5, 3)$

16. $m = 4$ and Point $(1, 4)$

17. $m = 1/2$ and Point: $(-1, -2)$

18. $m = 2$ and Point $(0, 3)$

19. $m = 3$ and Point: $(3, 0)$

20. $m = \text{undefined}$ and Point $(3, 6)$

Writing an equation of a line given TWO points.

- A. Use the slope formula to find m .
- B. Pick one point, substitute slope for m , the point (x, y) and then solve for b .
- C. Substitute m and b back into the equation.

21. $(2, 3)$ and $(4, 5)$

22. $(2, 3)$ and $(-4, 15)$

23. $(2, 2)$ and $(0, 4)$

24. $(2, 3)$ and $(1, 4)$

25. $(4, 5)$ and $(5, 2)$

Writing Equations of Lines Given Two Points

Name: _____

Date: _____ Block: _____

Find the slope and the y-intercept, and then write the equation of the line.

$m = \frac{y_2 - y_1}{x_2 - x_1}$	Solve for b $y = mx + b$	Write the equation $y = mx + b$
1. (1, 5) and (2, 7) $m =$		$y = mx + b$
2. (0, 1) and (3, -8) $m =$		$y = mx + b$
3. (2, -3) and (4, -2) $m =$		$y = mx + b$
4. (2, 5) and (4, 2) $m =$		$y = mx + b$
5. (-3, -5) and (-1, 3) $m =$		$y = mx + b$

$m = \frac{y_2 - y_1}{x_2 - x_1}$	Solve for b $y = mx + b$	Write the equation $y =$ $mx + b$
6. $(3, -1)$ and $(-6, -4)$ $m =$		$y = mx + b$
7. $(4, 1)$ and $(-4, 7)$ $m =$		$y = mx + b$
8. $(-1, 2)$ and $(3, 4)$ $m =$		$y = mx + b$
9. $(-1, -4)$ and $(2, 0)$ $m =$		$y = mx + b$
10. $(3, -1)$ and $(-3, 5)$ $m =$		$y = mx + b$

Warm up

Write an equation given the following info:

1. $m = \frac{2}{3}$ (-9, -1) 2. (-2, -1) (-2, 3)

3. (-2, 6) (2, 8) 4. $m = 0$ (3, 4)

1

2

PERPENDICULAR LINES

- **Graphs:** Lines Intersect at right angles (90° angles)

- **Equations:**

Opposite (negative) Reciprocal Slopes

With the same or different y-int

3

Are these lines parallel, perpendicular, or neither?

1. $y = -2x + 1$
 $y = -2x - 4$

2. $y = 3x - 4$
 $y = -3x + 1$

3. $y = \frac{1}{5}x + 2$
 $y = -5x + 6$

5

PARALLEL LINES

- **Graphs:** Lines Never Intersect and are in the same plane (coplanar)

- **Equations:**

Same Slopes

Different y-intercepts

Find the Opposite (negative) Reciprocal Slopes

1. $-\frac{2}{3}$

2. $\frac{11}{12}$

3. 7

4. $-\frac{1}{9}$

4

Are these lines parallel, perpendicular, or neither?

4. $y = -2x + 1$
 $y = -\frac{1}{2}x - 4$

5. $y = 3x - 4$
 $y = 1 + 3x$

6. $y = \frac{5}{6}x + 2$
 $y = -\frac{6}{5}x + 6$

6

How to Write an Equation of a Line
PARALLEL to another and given a point

1. Given equation should be solved for y ($y = mx + b$)
2. Write down the slope of that line
3. Substitute m and (x, y) in $y = mx + b$.
4. Solve for b .
5. Write the equation using m and b .

7

Write a line parallel to the line $y = 3x - 5$ and passes through the point $(-5, -2)$.

9

Write a line parallel to the line $y = -x - 7$ and passes through the point $(-4, -4)$.

11

Write a line parallel to the line $2x + y = 3$ and passes through the point $(-2, 5)$.

8

Write a line parallel to the line $y = -4x + 1$ and passes through the point $(2, -1)$.

10

How to Write an Equation of a Line
PERPENDICULAR to another and given a point

1. Given equation should be solved for y ($y = mx + b$)
2. Write down the OPPOSITE RECIPROCAL slope of that line
3. Substitute m and (x, y) in $y = mx + b$.
4. Solve for b .
5. Write the equation using m and b .

12

Write a line perpendicular to the line $y = \frac{1}{2}x - 2$ and passes through the point $(1, 0)$.

13

Write a line perpendicular to the line $y = -3x + 2$ and passes through the point $(6, 5)$. Leave the equation in standard form.

14

Write a line perpendicular to the line $2x + 3y = 9$ and passes through the point $(6, -1)$.

15

Write a line perpendicular to the line $y = 2x - 1$ and passes through the point $(2, 4)$.

16

Write a line perpendicular to the line $y = -\frac{1}{3}x + 2$ and passes through the point $(5, 1)$.

17

Name: _____ Date: _____

Determine if the following equations are parallel, perpendicular, or neither

1. $y = \frac{1}{2}x + 4$

$y = \frac{1}{2}x - 5$

2. $y = 2x + 7$

$y = -2x + 3$

3. $y = \frac{-1}{4}x$

$y = 4x - 3$

4. $2x + 4y = 8$

$3x + 6y = -6$

5. $3x + y = 5$

$x - 3y = -3$

6. $8x + y = 7$

$8x - y = 4$

7. $y = \frac{1}{4}x + 3$

$2x + 8y = -8$

8. $x - 2y = -4$

$y = \frac{1}{2}x + 6$

Write the equation of a line parallel and a line perpendicular to the given equation

9. $y = \frac{1}{3}x + 1$ $(-3, 4)$

10. $y = 4x + 2$ $(-8, -3)$

11. $y = \frac{-2}{3}x + 1$ $(-6, 1)$

12. $y = \frac{-5}{2}x - 3$ $(10, -3)$

Name: _____ Date: _____

Equations of Parallel Lines

A. Determine whether the lines are parallel given the equations.

1) $y = -2x + 5$;

$y = 2x - 3$

2) $3x - 8y = -16$;

$32x + 12y = -18$

3) $9x + 3y = 12$;

$27x + 9y = 40$

4) $3x - 4y = 19$;

$8x + 6y = 12$

B. Determine whether the lines through the pairs of points are parallel.

5) $(2, 5)$ and $(-2, 7)$; $(0, 4)$ and $(1, 6)$

6) $(1, 2)$ and $(5, 4)$; $(0, 3)$ and $(2, 4)$

7) $(0, -5)$ and $(2, -4)$; $(-1, -5)$ and $(1, -6)$

8) $(0, 2)$ and $(-4, 8)$; $(-4, 0)$ and $(4, -12)$

C. Find the equation of a line through the given point A that satisfies the given condition.

9) Point A $(2, 1)$; parallel to the y-axis

10) Point A $(2, -4)$; parallel to the line
 $5x - 2y = 4$.

Graphing and Writing Equations of Circles

1

Standard Form of a Circle

$$(x - h)^2 + (y - k)^2 = r^2$$

Center is at (h, k)



r is the radius of the circle

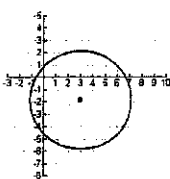
2

General Form of a Circle

$$Ax^2 + By^2 + Cx + Dy + E = 0$$

3

EX 1 Write an equation of a circle with center (3, -2) and a radius of 4.



$$(x - h)^2 + (y - k)^2 = r^2$$

5

General Form of a Circle

- Every binomial squared has been multiplied out.
- Every term is on the left side, equal to 0.
- Squared terms go first in alpha order.

4

EX 2 Write an equation of a circle with center (-4, 0) and a diameter of 10.

$$(x - h)^2 + (y - k)^2 = r^2$$

6

1

EX 3 Write an equation of a circle with center $(2, -9)$ and a radius of $\sqrt{11}$.

$$(x-h)^2 + (y-k)^2 = r^2$$

EX 4 Find the coordinates of the center and the measure of the radius.

$$(x-6)^2 + (y+3)^2 = 25$$

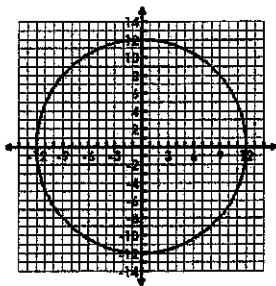
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5. Find the center, radius, & equation of the circle.

The center is

The radius is

The equation is



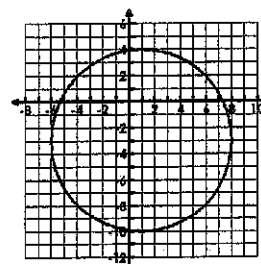
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6. Find the center, radius, & equation of the circle.

The center is

The radius is

The equation is



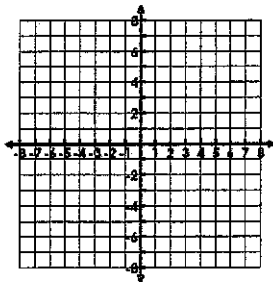
9

7. Graph the circle, identify the center & radius.

$$(x-3)^2 + (y-2)^2 = 9$$

Center

Radius of



11

10

Converting from General to Standard

1. A needs to be 1. Divide if needed.
2. Move the x terms together and the y terms together.
3. Move E to the other side of the equals sign.
4. Complete the square (as needed) for x.
5. Complete the square (as needed) for y.
6. Factor the left & simplify the right.

12

8. Write the **standard** equation of the circle.
State the center & radius.

$$x^2 + y^2 - 8x + 7 = 0$$

13

10. Write the **standard** equation of the circle.
State the center & radius.

$$2x^2 + 2y^2 - 16x + 4y + 20 = 0$$

15

9. Write the **standard** equation of the circle.
State the center & radius.

$$x^2 + y^2 + 4x - 6y - 3 = 0$$

14

11. Write the **general** form of the equation
of the circle.

$$(x - 4)^2 + (y + 3)^2 = 36$$

16

Name: _____ Date: _____

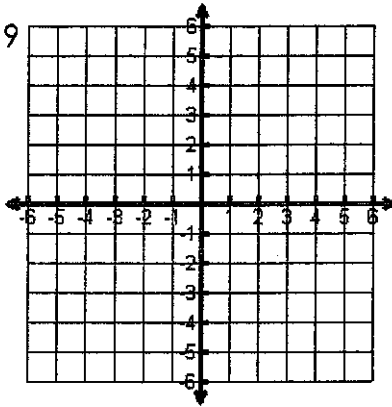
Graphing & Writing Equations of Circles

Graph the following circles. State the center and radius.

1. $x^2 + y^2 = 9$

Center: _____

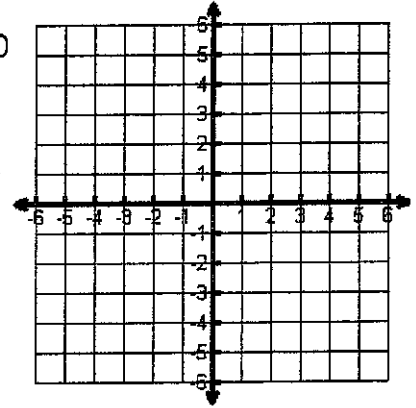
Radius: _____



2. $x^2 + y^2 = 20$

Center: _____

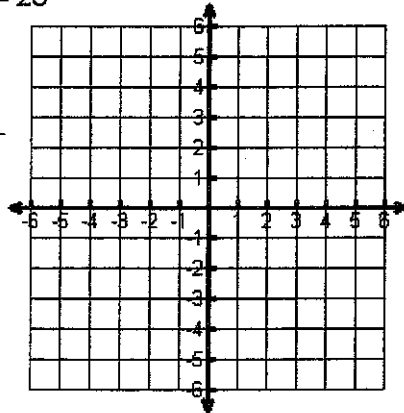
Radius: _____



3. $x^2 + y^2 = 25$

Center: _____

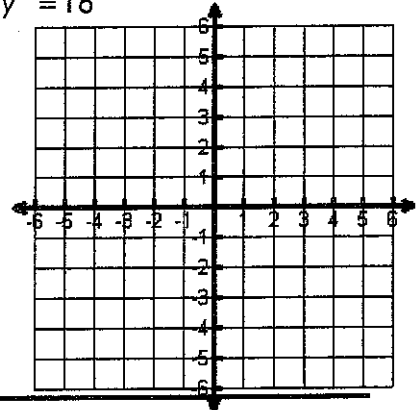
Radius: _____



4. $(x+2)^2 + y^2 = 16$

Center: _____

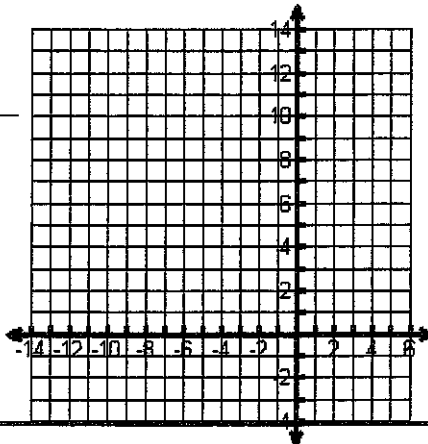
Radius: _____



5. $(x+4)^2 + (y-6)^2 = 64$

Center: _____

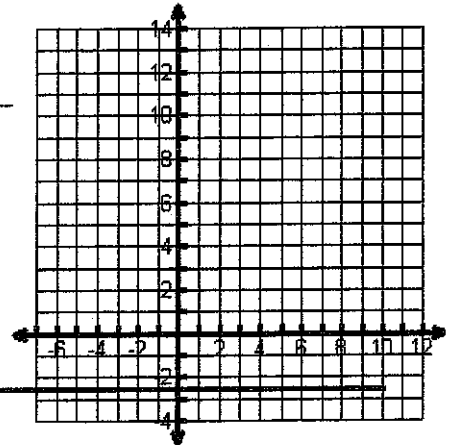
Radius: _____



6. $(x-3)^2 + (y-5)^2 = 50$

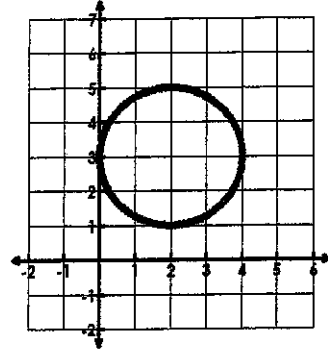
Center: _____

Radius: _____



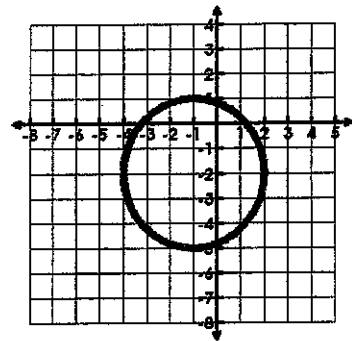
Write the equation of the circle in standard form. Then, convert to the general form.

7. Standard Form: _____



General Form: _____

8. Standard Form: _____



General Form: _____

Write the standard equation for the circle. State the center and radius.

9. $x^2 + 2x + y^2 - 10y + 10 = 0$

10. $x^2 + y^2 - 4x + 6y + 9 = 0$

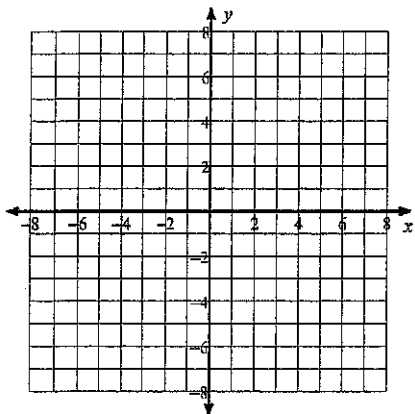
11. $7x^2 + 7y^2 - 28y + 14 = 0$

12. $3x^2 + 3y^2 + 18x + 6y = 0$

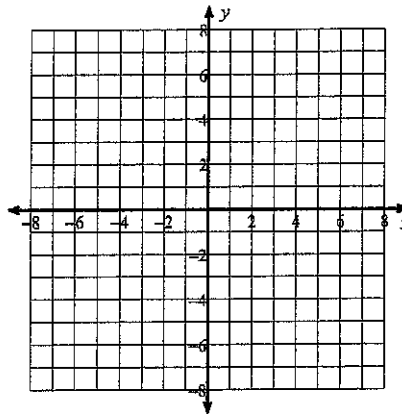
Assignment

Identify the center and radius of each. Then sketch the graph.

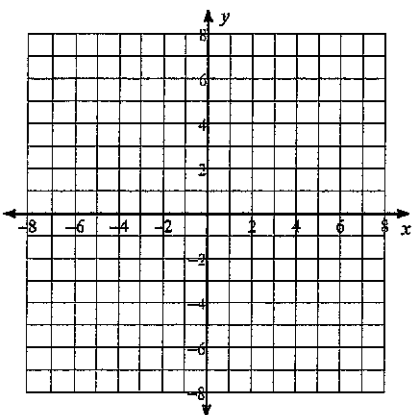
1) $(x + 3)^2 + y^2 = 4$



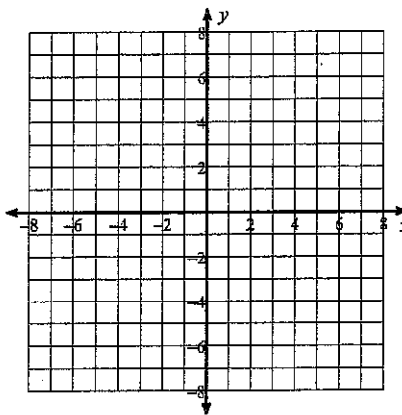
2) $(x + 1)^2 + (y + 2)^2 = 1$



3) $(x + 2)^2 + y^2 = 16$



4) $x^2 + (y - 3)^2 = 9$



Use the information provided to write the equation of each circle.

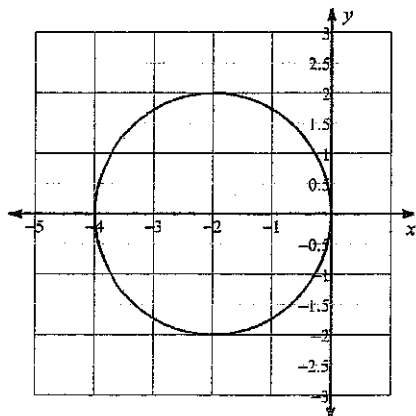
5) Center: $(-3, -6)$
Radius: 8

6) Center: $(2, 9)$
Radius: 5

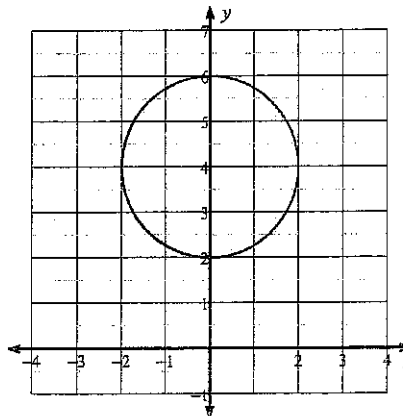
7) Center: $(-11, 13)$
Radius: 3

8) Center: $(-4, 16)$
Radius: 2

9)



10)



Quiz Review

QUIZ REVIEW :)

Write the equation of a line passing through the given point that satisfies the following condition:

1. Parallel to $5x - 2y = 4$
passing through $(-4, 2)$

2. Perpendicular to $-3x + 2y = 7$
passing through $(6, 5)$

Write the standard equation of a circle with the given radius:

3. $r = 4$; $C(0, 0)$

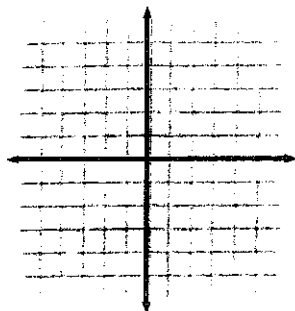
4. $r = 2.5$; $C(-2, 1)$

5. $r = 24$; $C(-3, -3)$

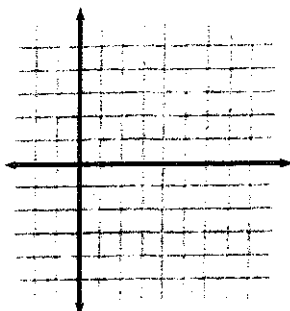
Quiz Review

Graph each circle, labeling the center and radius.

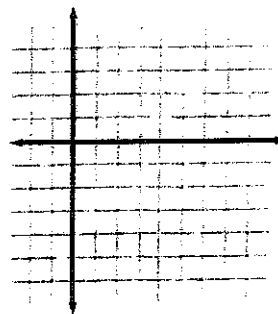
6. $x^2 + y^2 = 9$



7. $x^2 + (y - 5)^2 = 16$



8. $(x - 3)^2 + (y + 3)^2 = 25$



Write the standard equation of each circle. Then state the center and radius.

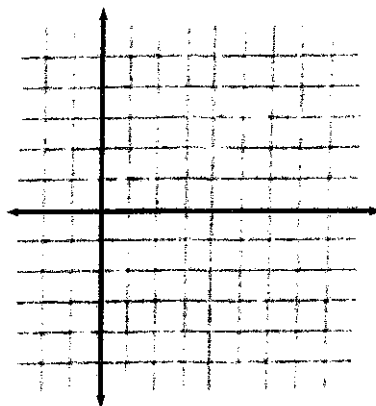
9. $x^2 + y^2 - 10x - 16y + 88 = 0$

10. $x^2 + y^2 + 22x - 2y = -120$

Quiz Review

Graph:

11. $(x - 4)^2 + (y + 2)^2 = 16$



Warm up

Write the equation of the line:

1. Parallel to $8x - 2y = 6$ and goes through $(5, -2)$

1

Midpoint

Given 2 ordered pairs,
it's the
AVG of the x's and
AVG of the y's.

2

Midpoint Formula

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

3

Find the midpoint.

1. $(3, 7)$ and $(-2, 4)$

2. $(5, -2)$ and $(6, 14)$

4

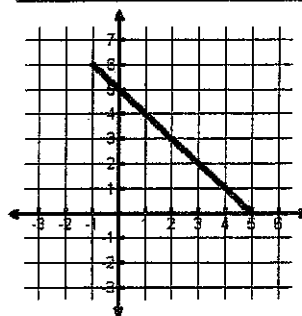
Find the midpoint.

3. $(3, -9)$ and $(14, 16)$

4. $(12, 17)$ and $(-7, 9)$

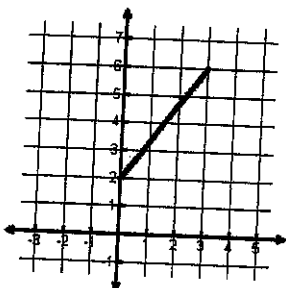
5

Find the midpoint.



6

Find the midpoint.



7

Given the midpt and one endpt, find the other endpt.

7.

Midpt (3, -6)

Endpt (7, -3)

8

Given the midpt and one endpt, find the other endpt.

8

Midpt (-1, 2)

Endpt (3, 0)

Given the midpt and one endpt, find the other endpt.

9

Midpt (-4, 6)

Endpt (2, 1)

9

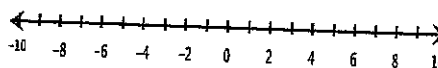
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Partition Line Segments
(1 Dimension)

Partition – 1 Dimension

$$(x_2 - x_1) \left(\frac{a}{a+b} \right) + x_1$$

A is at 1, and B is at 7.
Find the point, T, so that T partitions A to B in a 2:1 ratio.



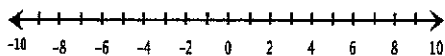
11

12

Partition – 1 Dimension

$$(x_2 - x_1) \left(\frac{a}{a+b} \right) + x_1$$

A is at -6 and B is at 4.
Find the point, T, so that T is A to B in a 2:3 ratio.



13

Partition – 2 Dimension

$$(x_2 - x_1) \left(\frac{a}{a+b} \right) + x_1 \quad (y_2 - y_1) \left(\frac{a}{a+b} \right) + y_1$$

Given the points A(-2,4) and B(7,-2), find the coordinates of the point P on the directed line segment AB that partitions AB in the ratio 1:2.

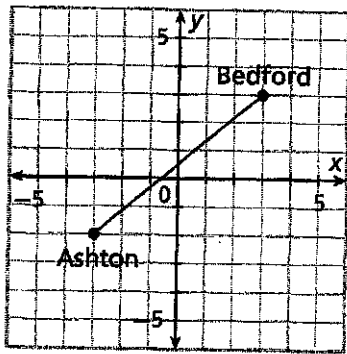
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Name: _____ Date: _____

Partitioning Line Segments in 2 Dimensions Homework

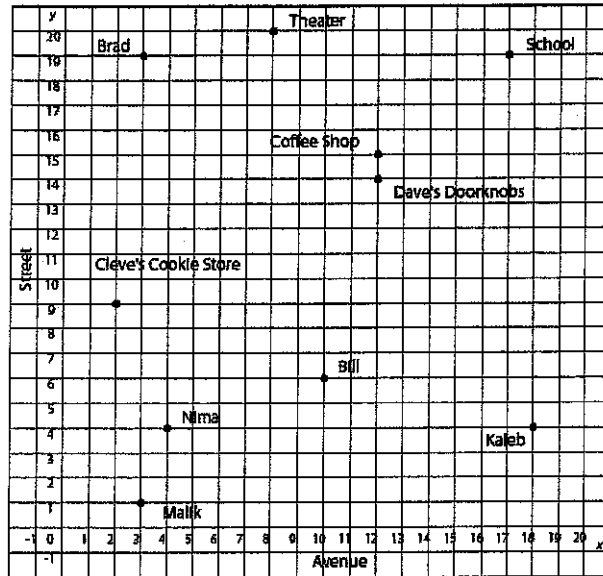
MCC9-12.G.GPE.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.

1. Given the points $A(-1, 2)$ and $B(7, 14)$, find the coordinates of the point P on directed line segment \overline{AB} that partitions \overline{AB} in the ratio 1:3.
2. Given the points $A(-2, 4)$ and $B(7, -2)$, find the coordinates of the point P on directed line segment \overline{AB} that partitions \overline{AB} in the ratio 1:2.
3. Given the points $A(-3, -4)$ and $B(5, 0)$, find the coordinates of the point P on directed line segment \overline{AB} that partitions \overline{AB} in the ratio 2:3.
4. The map shows a straight highway between two towns. Highway planners want to build two new rest stops between the towns so that the two rest stops divided the highway into three equal parts. Find the coordinates of the points at which the rest stops should be built.



Problems #5-9 Adapted from: [Walch Education Resources: CCGPS Coordinate Algebra Teacher Resource Binder](#)

Use the map and the information given to solve each problem that follows.



- Luis works at a theater on 8th Avenue and 20th Street. Kaleb lives at the corner of 18th Avenue and 4th Street. What is a possible location that is midway between them?
- Nima lives at the corner of 4th Avenue and 4th Street. Bill lives at the corner of 10th Avenue and 6th Street. Their favorite bakery is located midway between them. What is one possible of the bakery?
- Cleve's Cookie Store is located at the corner of 2nd Avenue and 9th Street. Dave's Doorknobs is located at the corner of 12th Avenue and 14th Street. Located $\frac{1}{5}$ of the distance from Cleve's Cookie Store is the post office. Where is the post office?
- Malik and Brad both live on 3rd Avenue. Malik lives at the corner of 1st Street, and Brad lives at the corner of 19th Street. $\frac{2}{3}$ the distance from Malik's apartment to Brad's apartment is a market. Where is the market?
- The main entrance to the high school is located at the corner of 17th Avenue and 19th Street. On his way from school to the bank, Luis stops at the coffee shop located at 12th Avenue and 15th Street. The coffee shop is the midpoint of this trip. What is the location of the bank?

Pythagorean Theorem

$$\text{leg}^2 + \text{leg}^2 = \text{hyp}^2$$

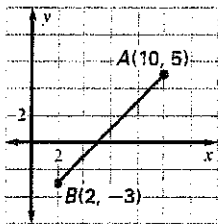


1

Pythagorean Theorem Word Problems

- Ashley travels 42 miles east, then 19 miles south. How far is Ashley from the starting point? Round to the nearest tenths.

3



5

Pythagorean Theorem Word Problems

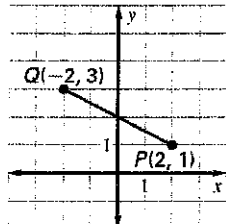
- A square has a diagonal with length of 20 cm. What is the measure of each side? Round to the nearest tenths.

2

Pythagorean Theorem Word Problems

- What is the length of the altitude of an equilateral triangle if a side is 12 cm? Round to the nearest tenths.

4



6

The Distance Formula

$$(x_1, y_1) \quad (x_2, y_2)$$

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

Example

Find the distance between (1, 4) and (-2, 3).
Round to the nearest hundredths.

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

Example

Find the distance between the points, (10, 5) and (40, 45). Round to the nearest hundredths.

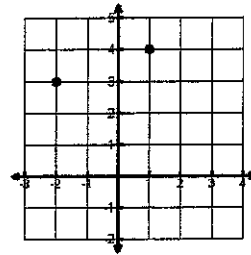
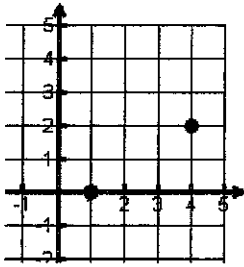
$$D = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

7

8

3. Find the distance between the points.
Round to the nearest tenths.

4. Find the distance between the points.
Round to the nearest tenths.

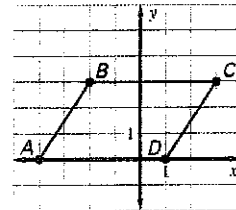
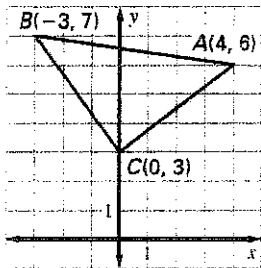


9

10

Find the Perimeter

Find the Perimeter



11

12

Distance, Pythagorean, and Perimeter

Name: _____

Directions: Find the distance between the following set of coordinates.

1. $(7, 3), (-1, -4)$

2. $(3, -5), (-3, 0)$

3. $(6, -7), (3, -5)$

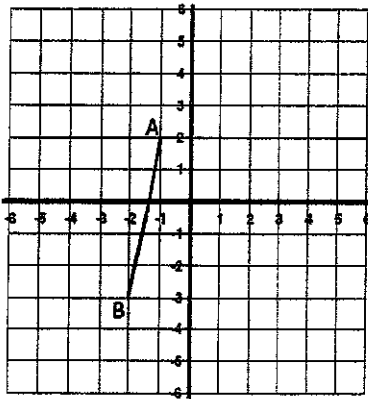
4. $(5, 1), (5, -6)$

5. $(1, 4), (2, 5)$

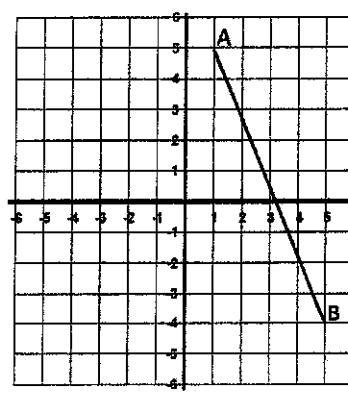
6. $(-2, 1), (1, 8)$

Directions: Find the distance of the segment on each graph by using the Pythagorean Theorem.

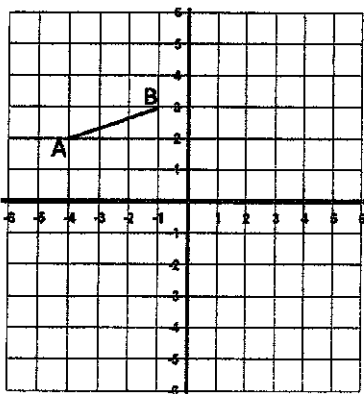
7.



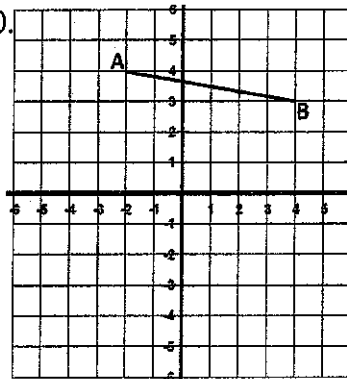
8.



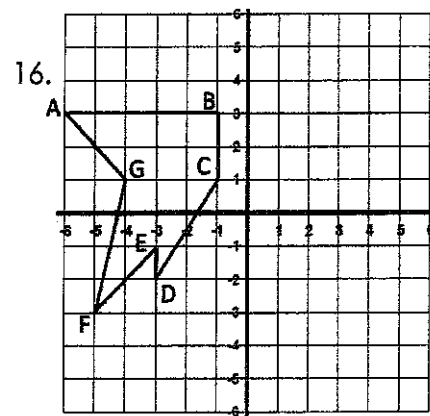
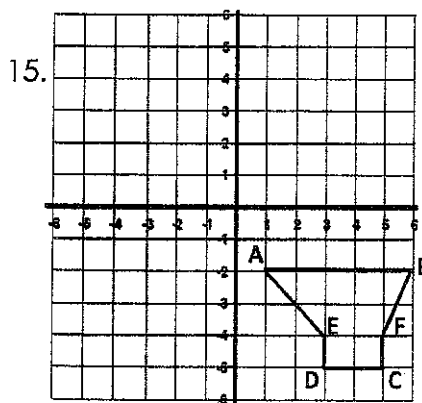
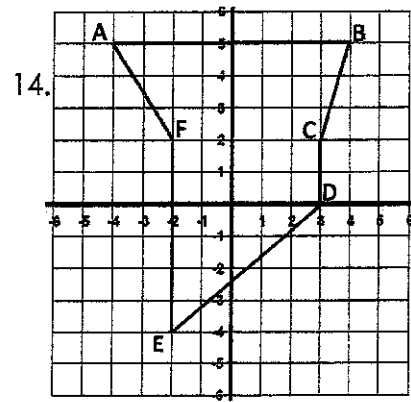
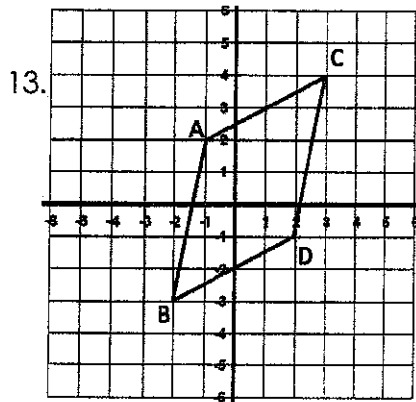
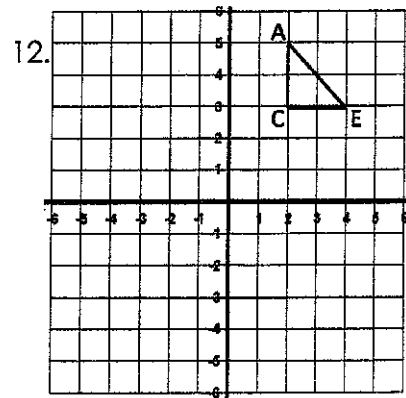
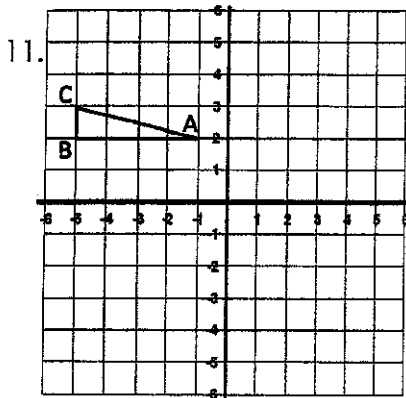
9.



10.



Directions: Find the perimeter of the figure using either the distance formula or the Pythagorean Theorem.



**Area
and
Perimeter**

1

Perimeter

Distance AROUND the shape

2

Area

Amount of space INSIDE the
boundary

3

Area Formulas

- ▶ Triangle: $A = \frac{1}{2} bh$
- ▶ Rectangle: $A = bh$
- ▶ Parallelogram: $A = bh$
- ▶ Trapezoid: $A = \frac{1}{2} (b_1 + b_2)h$

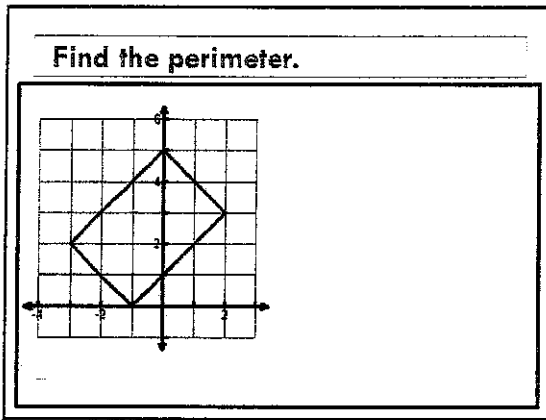
4

**Area & Perimeter
on the
Coordinate Plane**

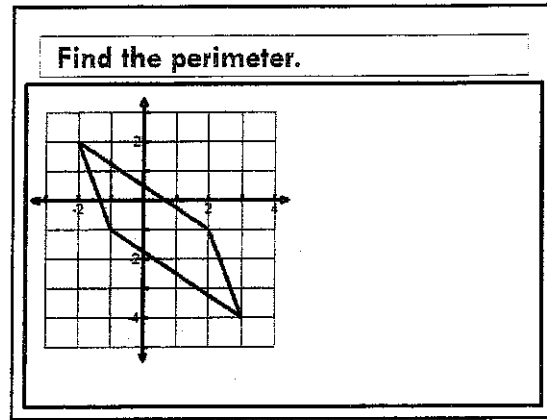
5

Find the area.

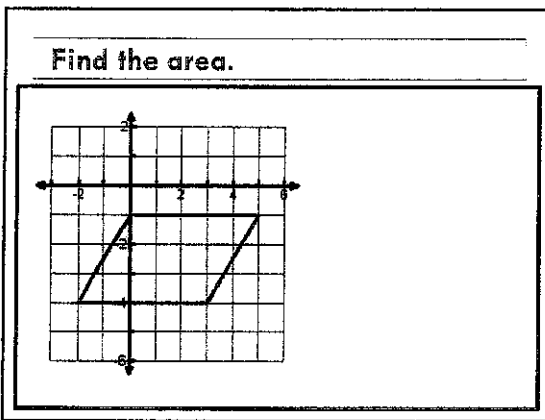
6



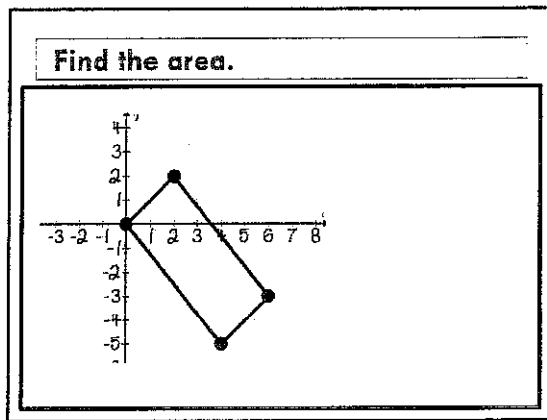
7



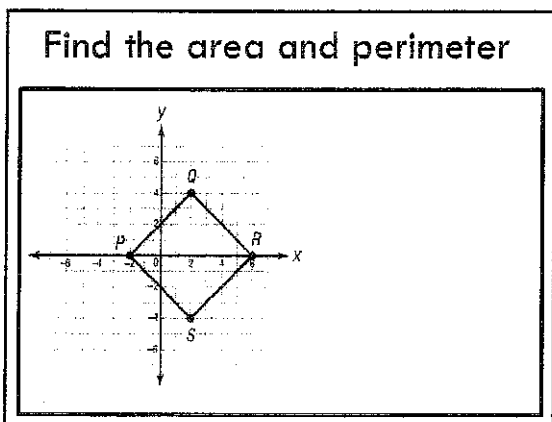
8



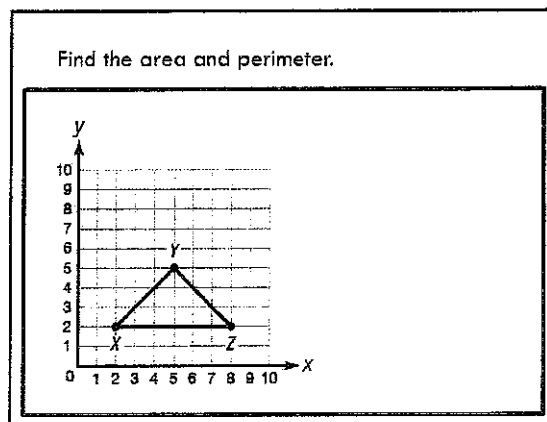
9



10

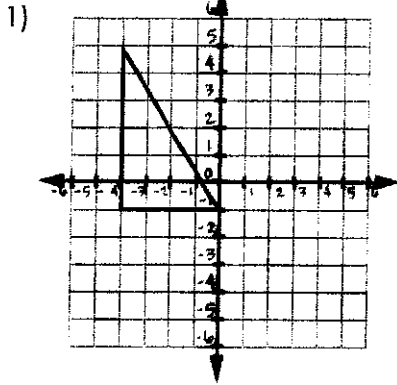


11



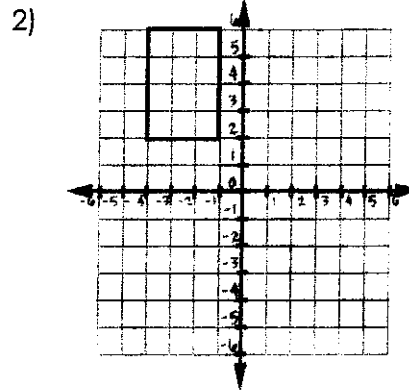
12

Directions: Find the perimeter and area for each figure.



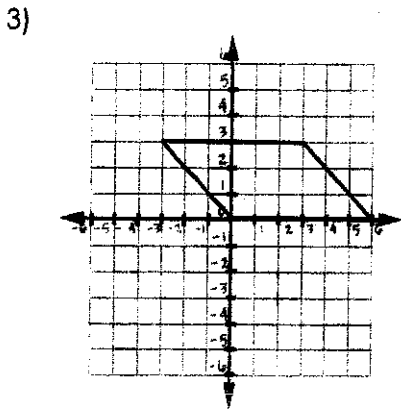
Perimeter: _____

Area: _____



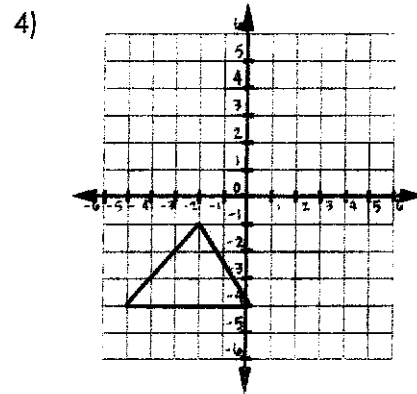
Perimeter: _____

Area: _____



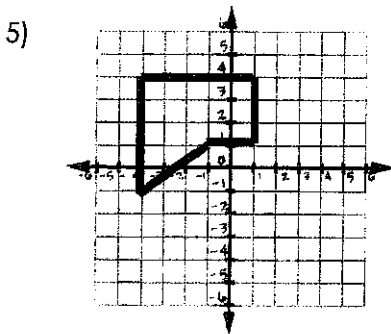
Perimeter: _____

Area: _____



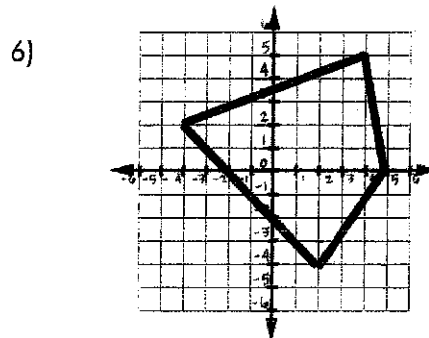
Perimeter: _____

Area: _____



Perimeter: _____

Area: _____



Perimeter: _____

Area: _____

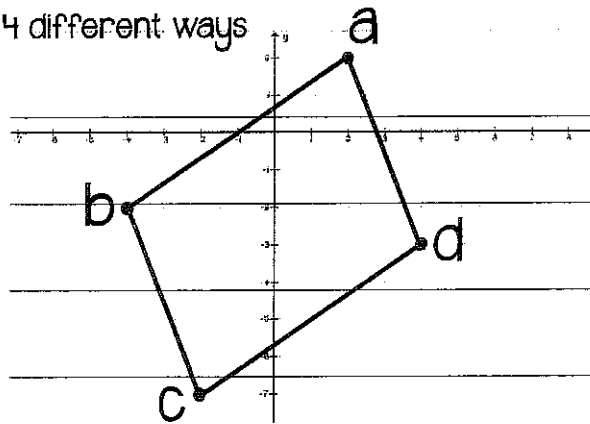
Proofs of Quads in the Coordinate Plane

Ways to Prove a Parallelogram:

1. Prove both pairs of opposite sides are parallel.
2. Prove one pair of opposite sides are parallel and congruent.
3. Prove both pairs of opposite sides are congruent.
4. Prove both pairs of opposite angles are congruent.
5. Prove one angle is supplementary to both of its consecutive angles.
6. Prove the diagonals bisect each other.

Given $A(2,2)$ $B(-4,-2)$ $C(-2,-7)$ & $D(4,-3)$

Prove it's a parallelogram 4 different ways



Proofs of Quads in the Coordinate Plane

To prove a quadrilateral is a rectangle...

1) **First prove it is a parallelogram.** Then prove parallelogram contains at least one right angle.

OR

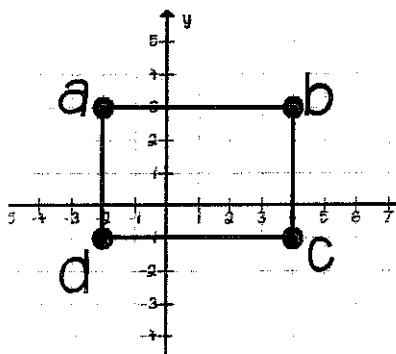
2) **First prove it is a parallelogram.** Then, the diagonals of a parallelogram are congruent.

OR

3) You could prove that all four angles are right angles.

Given $A(-2,3)$ $B(4,3)$ $C(4,-1)$ and $D(-2,-1)$

Prove ABCD is a rectangle 2
different ways



Proofs of Quads in the Coordinate Plane

To prove a quadrilateral is a rhombus...

First, prove the quadrilateral is a parallelogram. Then prove:

- 1) First prove the quadrilateral is a parallelogram. Then, prove it has a pair of consecutive sides that are congruent.

OR

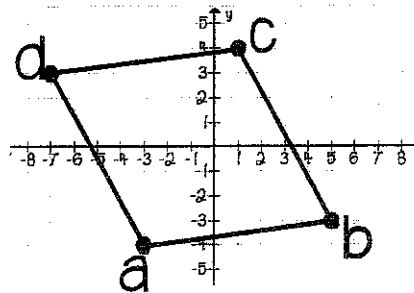
- 2) First prove the quadrilateral is a parallelogram. Then, prove either diagonal bisects two angles of the parallelogram.

OR

- 3) Prove the diagonals are perpendicular bisector of each other.

Given: $A(-3, -4)$ $B(5, -3)$ $C(1, 4)$ and $D(-7, 3)$

Prove it's a Rhombus 2 ways



Proofs of Quads in the Coordinate Plane

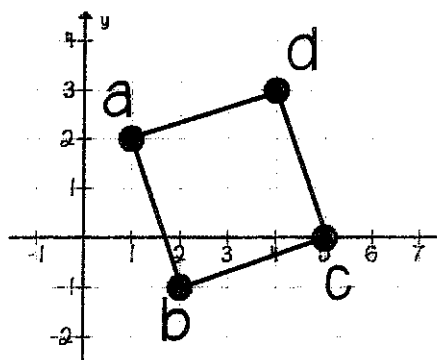
To prove a quadrilateral is a square...

Prove it is both a rectangle and a rhombus!

****HINT...prove 4 right angles & 4 congruent sides....**

Given $A(1,2)$ $B(2,-1)$ $C(5,0)$ $D(4,3)$

Prove ABCD is a Square

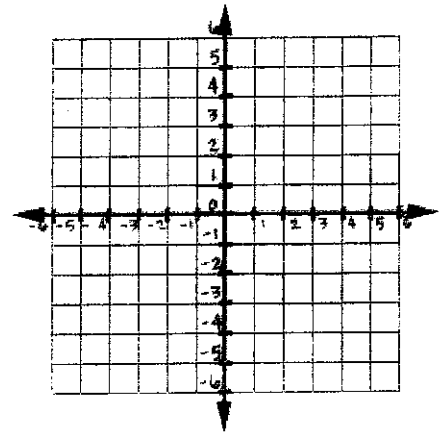


9.15 HW Parallelogram and Rectangle Proofs

Name: _____

Directions: Identify the Quadrilateral PQRS, with the given points. SHOW ALL WORK!!!

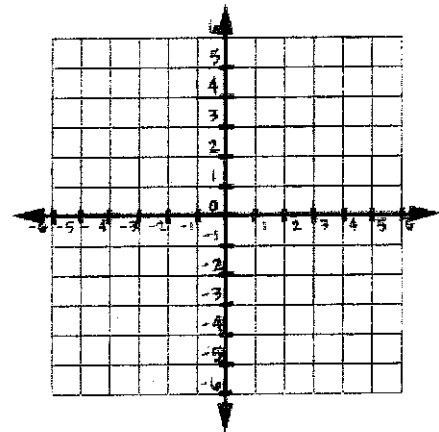
- 1) Plot Quadrilateral PQRS: P (-1, 2) Q (2, 4) R (3, -1) S (0, -3)
- 2) What shape does it appear to be?
- 3) What do you have to show?
- 4) Check off all that apply:



<input type="checkbox"/> opposite sides parallel
<input type="checkbox"/> consecutive sides perpendicular
<input type="checkbox"/> four congruent sides
<input type="checkbox"/> Only 1 pair of opposite sides parallel
<input type="checkbox"/> Congruent legs
<input type="checkbox"/> two pairs of congruent sides (consecutive)

- 5) Which shape is it? _____
- 6) Why?

- 7) Plot Quadrilateral ABCD: A(0, 2), B(6, -2), C(4, -5), D(-2, -1)
- 8) What shape does it appear to be?
- 9) What do you have to show?
- 10) Check off all that apply:

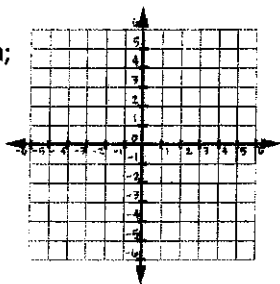


<input type="checkbox"/> opposite sides parallel
<input type="checkbox"/> consecutive sides perpendicular
<input type="checkbox"/> four congruent sides
<input type="checkbox"/> Only 1 pair of opposite sides parallel
<input type="checkbox"/> Congruent legs
<input type="checkbox"/> two pairs of congruent sides (consecutive)

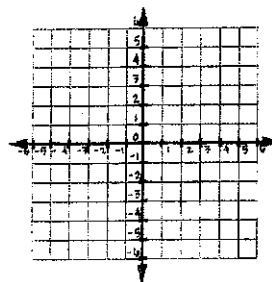
- 11) Which shape is it? _____
- 12) Why?

Directions: State the ordered pair that is needed to make the following figure.

- 13) PQRS will be a parallelogram;
 $P(2, 2)$, $Q(5, 1)$, $S(-1, -2)$

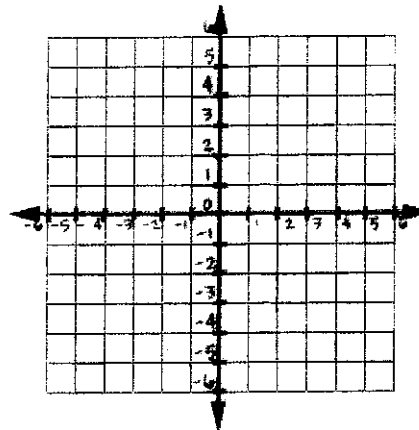


- 14) DEFG will be a rectangle;
 $D(0, 3)$, $E(2, -1)$, $F(0, -2)$

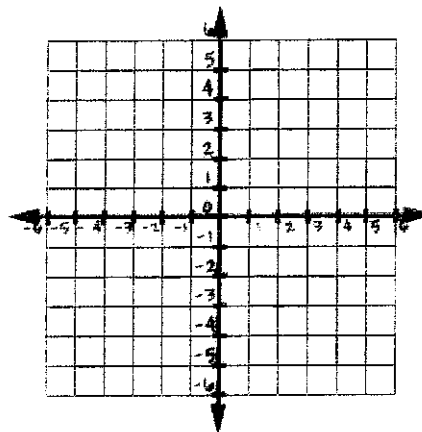


Directions: Solve each problem.

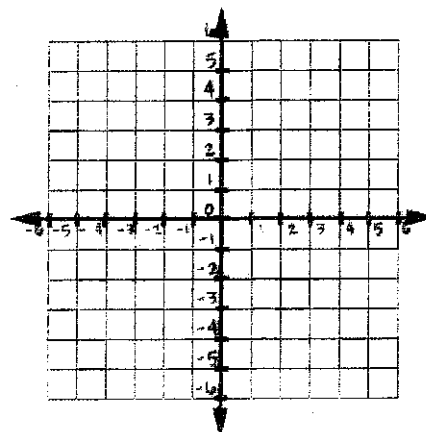
- 15) Prove that ABCD is a parallelogram when $A(-2, 3)$, $B(4, 3)$, $C(2, -2)$, & $D(-4, -2)$



- 16) Prove that RSTV is a rectangle when $R(1, 1)$, $S(2, 4)$, $T(5, 6)$, and $V(4, 3)$



- 17) Determine whether ABCD is a parallelogram, a rectangle, or neither when $A(1, 1)$, $B(2, 4)$, $C(5, 6)$, & $D(4, 3)$.

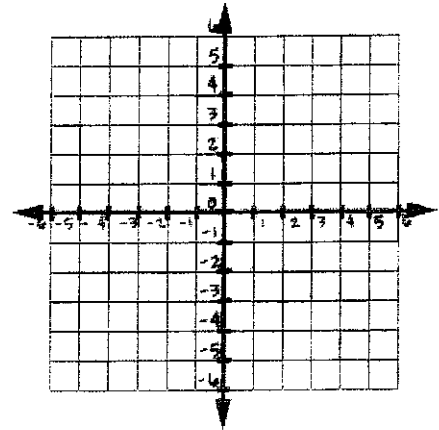


Rhombi and Squares Proofs

Name: _____

Directions: Identify the Quadrilateral PQRS, with the given points. SHOW ALL WORK!!!

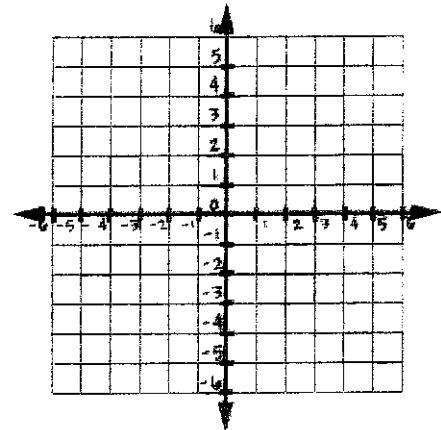
- 1) Plot Quadrilateral PQRS: P(1, 1) Q(4, 3) R(6, 0) S(-3, -2)
- 2) What shape does it appear to be?
- 3) What do you have to show?
- 4) Check off all that apply:



<input type="checkbox"/> opposite sides parallel
<input type="checkbox"/> consecutive sides perpendicular
<input type="checkbox"/> four congruent sides
<input type="checkbox"/> Only 1 pair of opposite sides parallel
<input type="checkbox"/> Congruent legs
<input type="checkbox"/> two pairs of congruent sides (consecutive)

- 5) Which shape is it? _____
- 6) Why?

- 7) Plot Quadrilateral PQRS: P(1, 2), Q(6, 2), R(3, -2), & S(-2, -2).
- 8) What shape does it appear to be?
- 9) What do you have to show?
- 10) Check off all that apply:

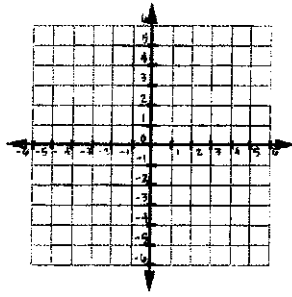


<input type="checkbox"/> opposite sides parallel
<input type="checkbox"/> consecutive sides perpendicular
<input type="checkbox"/> four congruent sides
<input type="checkbox"/> Only 1 pair of opposite sides parallel
<input type="checkbox"/> Congruent legs
<input type="checkbox"/> two pairs of congruent sides (consecutive)

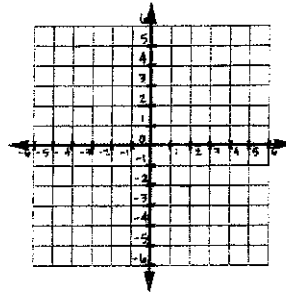
- 11) Which shape is it? _____
- 12) Why?

Directions: State the ordered pair that is needed to make the following figure.

13) Rhombi ABCD when $A(-11, 0)$, $B(-1, 0)$, $C(8, 6)$



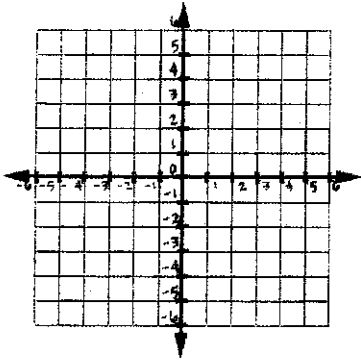
14) Square ABCD when $A(0, 4)$, $B(1, 1)$, $C(4, 2)$



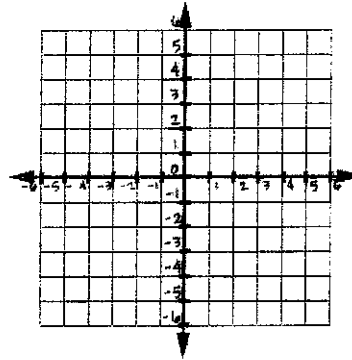
Directions: Complete each proof.

15) Prove 2 different ways that ABCD is a rhombus when $A(1, 3)$, $B(-3, 0)$, $C(0, -4)$, and $D(4, -1)$.

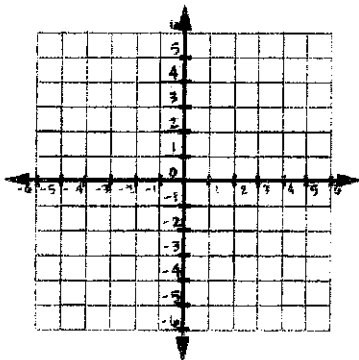
1st Proof:



2nd Proof:



16) Is ABCD in question #15 a square? Justify your answer with an informal proof.



Geometry in the Coordinate Plane

Name: _____ Date: _____

Algebra Proofs

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

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

1. Quadrilateral ABCD has vertices A(-1, 3), B(3, 5), C(4, 3), and D(0, 1). Is ABCD a rectangle?

2. Do these points form a parallelogram? A (3, 1); B (-1, -2); C (-4, -2); D (-2, 1)

3. Circle C has a center of (-2, 3) and a radius of 4. Does point (-4, 6) lie on circle C?

4) Find the point P that partitions the segment between points E (1,7) and F(11,-3) into a 3:2 ratio.

5. Do the points A(-1, 1) , B(1, -4) and C(-4, -4) form an isosceles triangle?

Name: _____ Date: _____

Algebra Proofs Practice

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

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

1. A circle has a diameter with endpoints $(-2, 6)$ and $(4, 0)$. Find the center and radius of the circle.

2. Point C is the **midpoint** between points A and B. If point C is at $(-4, 10)$ and Point A is $(4, 8)$, what is the Point B?

3. Circle C has a center of $(-2, 3)$ and a radius of 4. Does point $(-4, 6)$ lie on circle C?

4. A circle is centered at $(5, 3)$ and has a radius of 4. Does the point $(2.5, 6)$ lie on the circle?

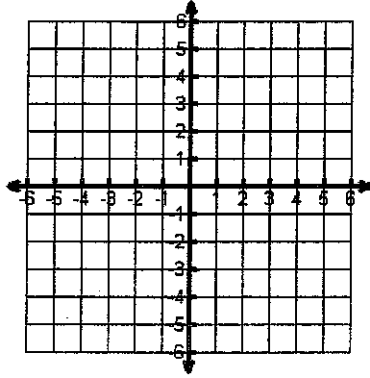
Coordinate Plane Review

Graph the following circles. State the center and radius.

1. $x^2 + y^2 = 24$

Center: _____

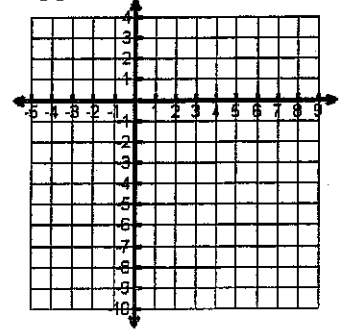
Radius: _____



2. $(x-2)^2 + (y+3)^2 = 30$

Center: _____

Radius: _____



Write the standard equation for the circle.

3. $x^2 + y^2 - 10x - 2y = -10$

Center: _____ and $r =$ _____

Write the general form for circle.

4. $(x-2)^2 + (y+1)^2 = 9$

5. A circular disk drive has a diameter with endpoints at $(-9, 2)$ and $(15, 12)$. Find the center and radius of the disk drive. Write the equation of the circle in standard form.

Center: _____

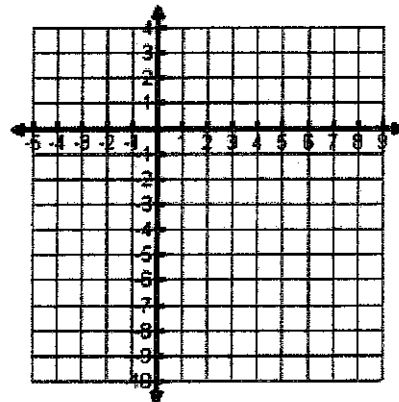
$r =$ _____

Equation: _____

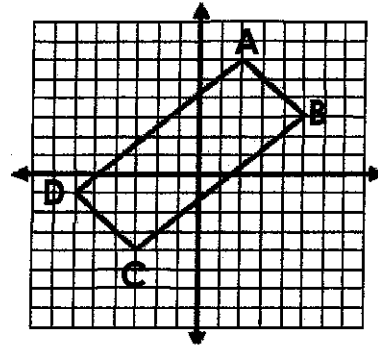
6. State the center and radius:

$(x-3)^2 + (y+5)^2 = 36$

7. Graph: $(x-4)^2 + (y+1)^2 = 16$



8. Determine what type of quadrilateral is shown:



a) Find the perimeter and area of the shape.

9. Find the **midpoint** of the points.

a. $(-5, 3)$ $(2, 6)$

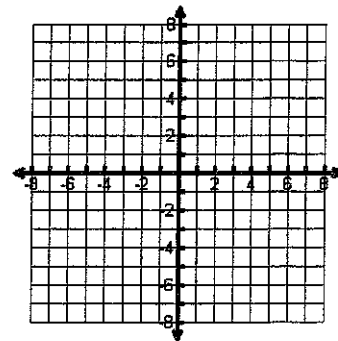
b. $(3, -2)$ $(-1, 5)$

10. Find the coordinates of the **other endpoint** of a segment with an endpoint of $(-1, 5)$ and a midpoint $(2, -3)$.

11. Josh and Drake decide to play catch after school. They start at the same point. Josh walks 50 feet north and 20 feet west. Drake walks 40 feet south and 10 feet east. How far apart are they?

12. Determine whether Point A lies on the circle whose center is Point C and which contains the Point P(0, 4). Justify your answer algebraically showing work.

Point A $(3, \sqrt{7})$; Point C $(0, 0)$; Point P $(0, 4)$



13. Find the equation of the line that is **parallel** to $y = 2x + 8$ that passes through $(-6, 1)$.

14. Find the equation of the line that is **perpendicular** to $y = 3x + 1$ that passes through $(9, 5)$.

15. Find the coordinates of point T so that it partitions AB into a ratio of 1:3.

A $(-8, -1)$ and B $(12, 11)$

