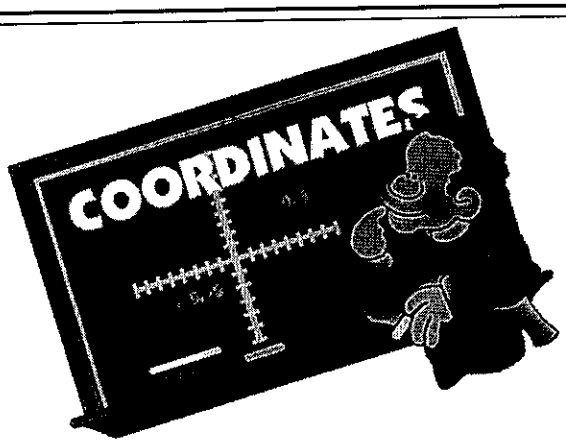



# Geometry

## Unit 3-11 Coordinate Geometry

Date _____ Geometry CC
Unit 11 Lesson 1 Distance WORKSHEET

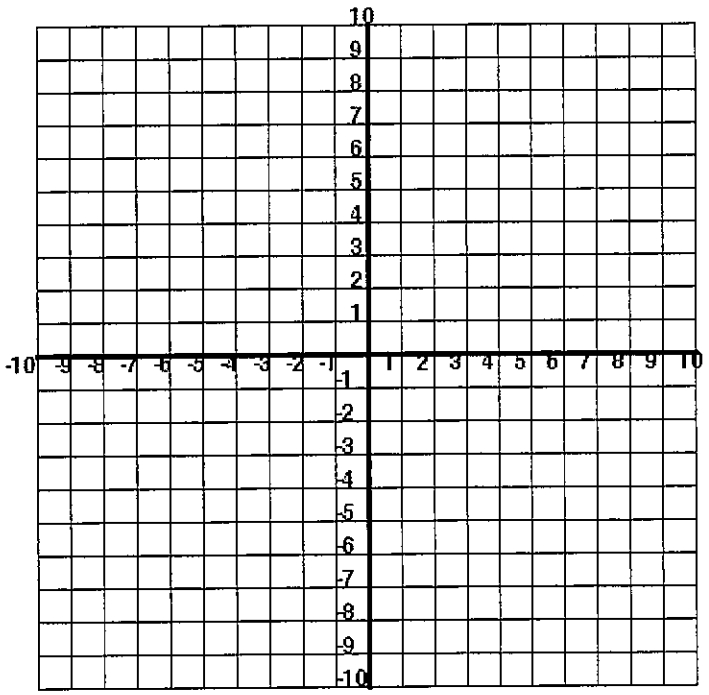
DISTANCE FORMULA:

1. If the endpoints of $\overline{AB}$ are $A(-4,5)$ and $B(2,-5)$, what is the length of $\overline{AB}$ to the nearest tenth?

2. The endpoints of $\overline{PQ}$ are $P(-3,1)$ and $Q(4,25)$. Find the length of $\overline{PQ}$.

3. The coordinates of the endpoints of $\overline{FG}$ are $(-4,3)$ and $(2,5)$. Find the length of $\overline{FG}$ in simplest radical form.

4. Find, in simplest radical form, the perimeter of $\triangle PQR$ with vertices P(4.6), Q(0,9), and R(-4,-9).



Date _____
Unit 11 Lesson 2

Geometry CC
Midpoint and Slope Worksheet

| Midpoint Formula | Slope Formula |
|---|---|
| | |

1. Line segment $AB$ has endpoints $A(2,-3)$ and $B(-4,6)$. What are the coordinates of the midpoint of $\overline{AB}$?

2. What are the coordinates of the center of a circle if the endpoints of its diameter are $A(8,-4)$ and $B(-3,2)$?

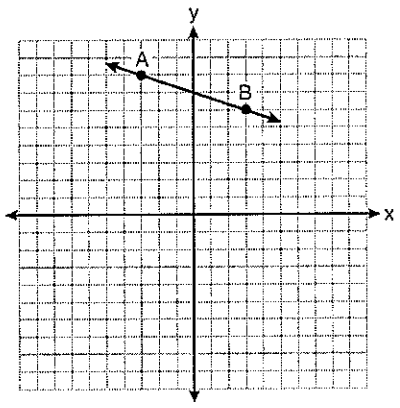
3. Point M is the midpoint of $\overline{AB}$. If the coordinates of $A$ are $(-3,6)$ and the coordinates of $M$ are $(-5,2)$, what are the coordinates of $B$?

4. Line segment $AB$ is a diameter of circle $O$ whose center has coordinates $(6,8)$. What are the coordinates of point $B$ if the coordinates of point $A$ are $(4,2)$?

5. What is the slope of a line that passes through the points $(-2,-7)$ and $(-6,-2)$?

6. What is the slope of a line passing through points $(-7,5)$ and $(5,-3)$?

7. What is the slope of the line passing through the points $A$ and $B$, as shown on the graph below?

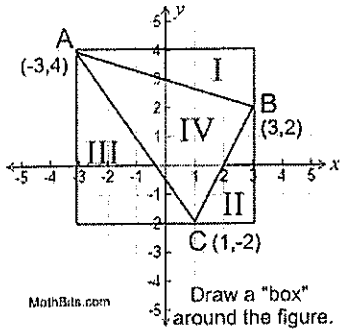


# Unit 11 Lesson 3
# Area of Polygons on a Grid

If the sides of a polygon lie on the grids of the graph paper (horizontal or vertical), the lengths of the sides of the polygon can be found by simply counting. You have used this counting method in the past to find such lengths.

Unfortunately, not all polygons are positioned so their sides lie on the grids of the graph paper. When this happens we need to use more sophisticated techniques to find the lengths of the sides.

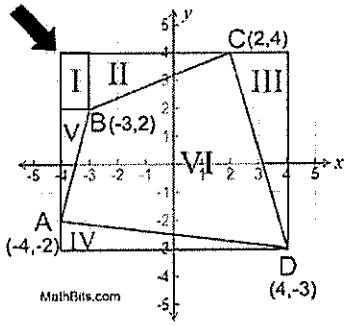
Find the area of $\Delta ABC$.




Draw a "box" around the figure.

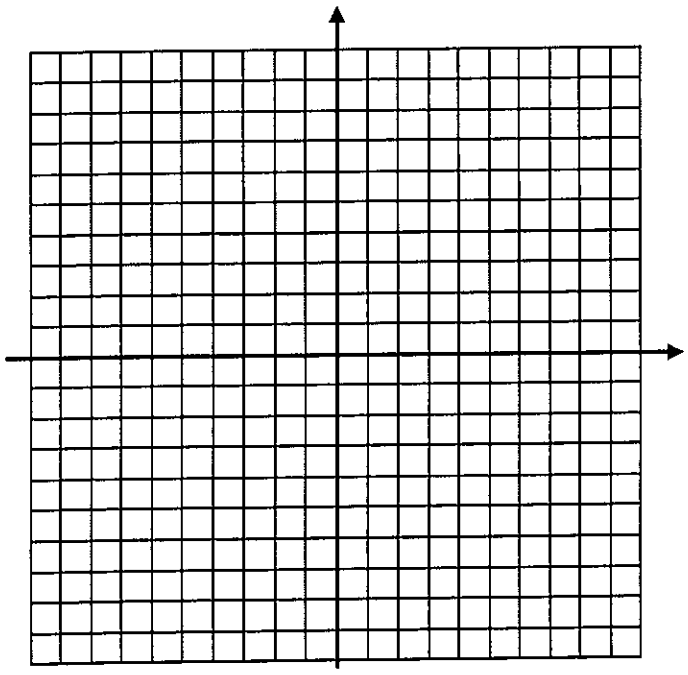
Dealing with odd shaped pieces:

Find the area of ABCD.



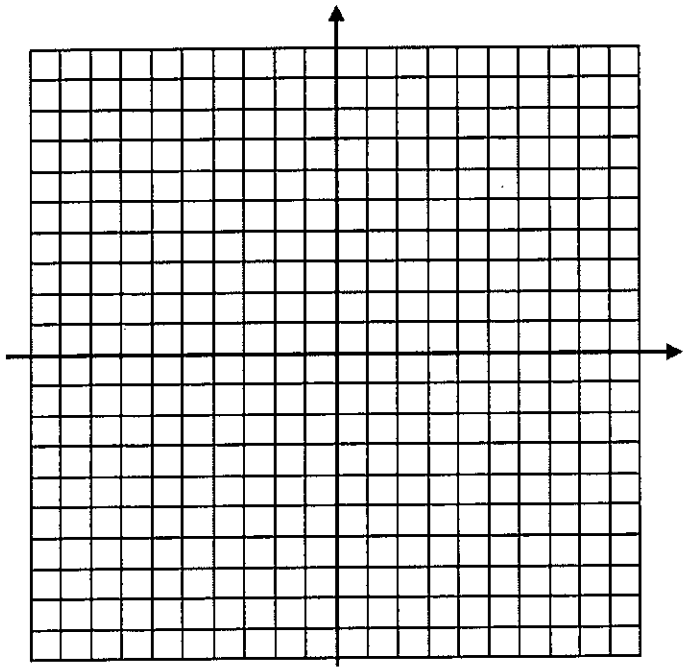

## Example 1

Find the area of quadrilateral ABCD with vertices A(-1,1), B(3,4), C(8,5), and D(5,-3).



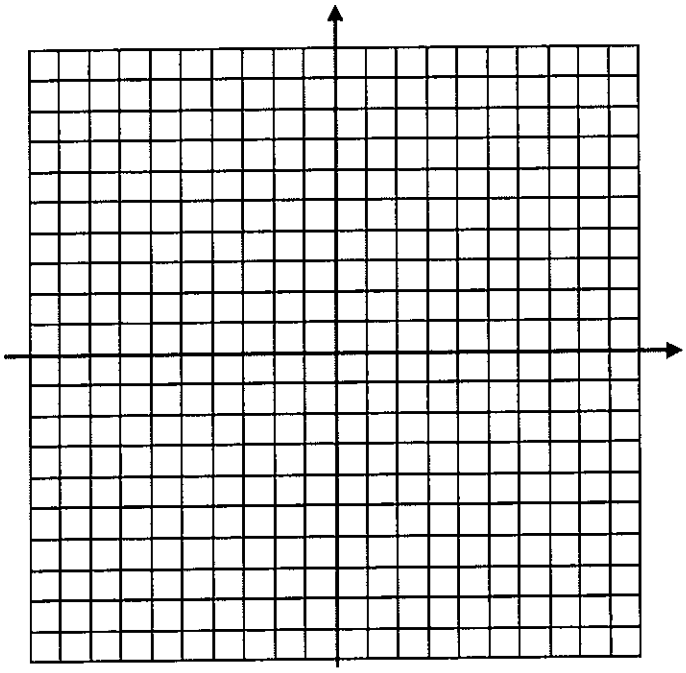
## Example 2

Find the area of quadrilateral ABCD with vertices A(-4,2), B(0,5), C(3,3), and D(1,-5).



## Example 3

Find the area of pentagon ABCDE whose vertices are A(-2,-5), B(-2,2), C(2,4), D(5,2), and E(4,-2).



# Unit 11 Lesson 4

## Writing Equations of Parallel and Perpendicular Lines

**Slope Intercept Form**

$$y = mx + b$$

**Strengths of this form:**
- Graphing a line
- Determining the y-intercept
- Determining the slope

**Point Slope Form**

$$y - y_1 = m(x - x_1)$$

**Strengths of this form:** Easy to create an equation.

## Parallel and Perpendicular Lines

Parallel lines have _____ slopes.

Perpendicular lines _____ slopes.

**Example 1:**

Given the line with equation $y = 3x + 4$.
What is the slope of a line parallel to the line?
What is the slope of a line perpendicular to the line?

**Example 2:**

Given the line with equation $5x + 3y = 8$.
What is the slope of a line parallel to the line?
What is the slope of a line perpendicular to the line?

Parallel, Perpendicular or Neither (just intersecting)

Examples

3. $x + 2y = 4$ and $4y - 2x = 12$.

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

Writing Equations

Example 5

Write an equation represents the line that is perpendicular to $2y = x + 2$ and passes through the point (4, 3).

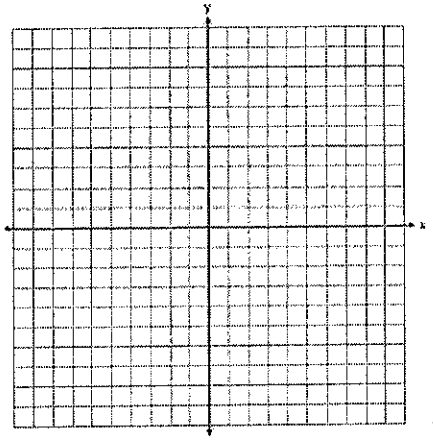
Example 6

Write an equation of the line that passes through the point (6, -5) and is parallel to the line whose equation is $2x - 3y = 11$.

## Writing Equations of Perpendicular Bisectors

### Example 7

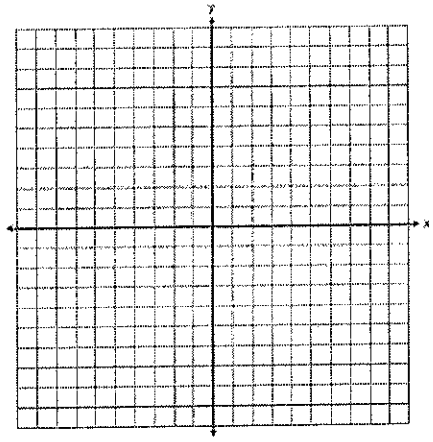
Write an equation of the line that is the perpendicular bisector of the line segment having endpoints (3, -1) and (3, 5).
[The use of the grid below is optional]



## Writing Equations of Perpendicular Bisectors

### Example 8

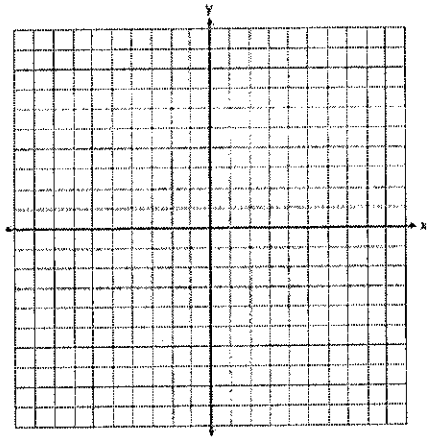
Write an equation of the line that is the perpendicular bisector of the line segment having endpoints (-1, -3) and (5, 5).
[The use of the grid below is optional]



## Writing Equations of Perpendicular Bisectors

### Example 9

Write an equation of the line that is the perpendicular bisector of the line segment having endpoints (-1, 1) and (7, -5).
[The use of the grid below is optional]



Date _____ Geometry CC

Lesson 4 HW: Writing Equations of Parallel and Perpendicular Lines

**1. Determine whether the given equations of lines are Parallel (||), Perpendicular (⊥) or Intersecting (×).**

a) $2x+4=y$, $y=-2x-3$ || or ⊥ or ×

b) $y=\frac{5}{4}x$, $y=-\frac{4}{5}x+4$ || or ⊥ or ×

c) $3x+5y=15$, $3x+5y=10$ || or ⊥ or ×

d) $y=4x-3$, $2y+12=8x$ || or ⊥ or ×

**2. Write the equation of the line that is...**

a) parallel to y = -3x + 2 and goes through (1,5) in slope intercept form.

b) parallel to $y=\frac{1}{5}x-4$ and goes through (10,-2) in slope intercept form.

c) perpendicular to y = 5x + 4 through (-2,-3) in slope intercept form.

d) perpendicular to y = -2x – 1 through (-5,2) in the slope intercept form.

**3. Write the equation of the perpendicular bisector of $\overline{AB}$, A (-4,4) B (4,8) in slope intercept form.**

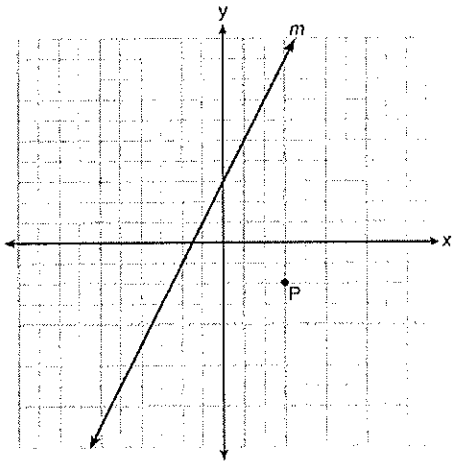
**4. Write the equation of the perpendicular bisector of $\overline{AB}$, A (-2,7) B (4, 11) in slope intercept form.**

**5.** The slope of $\overline{QR}$ is $\frac{x-1}{4}$ and the slope of $\overline{ST}$ is $\frac{8}{3}$. If $\overline{QR} \perp \overline{ST}$, determine and state the value of $x$.

6. Two lines are represented by the equations $-\frac{1}{2}y = 6x + 10$ and $y = mx$. For which value of $m$ will the lines be parallel?

1) –12
2) –3
3) 3
4) 12

7. Line $m$ and point $P$ are shown in the graph below.

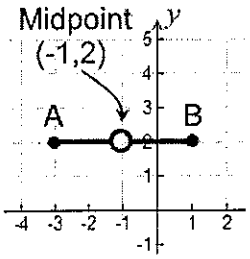


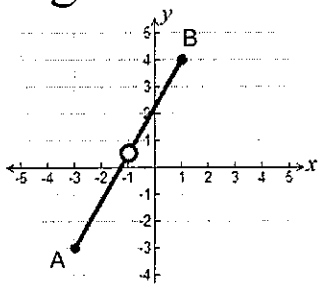

Which equation represents the line passing through $P$ and parallel to line $m$?

1) $y - 3 = 2(x + 2)$
2) $y + 2 = 2(x - 3)$
3) $y - 3 = -\frac{1}{2}(x + 2)$
4) $y + 2 = -\frac{1}{2}(x - 3)$

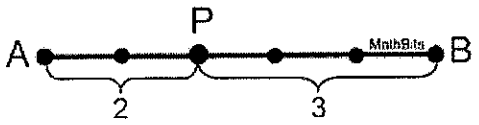
# Unit 9 Lesson 5
# Partitioning a Directed Segment

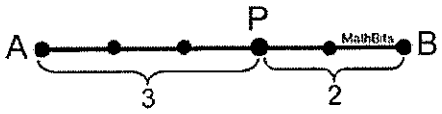
## A midpoint partitions a segment into a 1:1 ratio



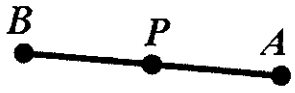

**Definition:** Partition means to separate or to divide. A line segment can be partitioned into smaller segments which are compared as ratios.

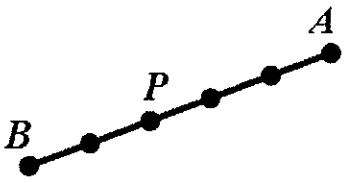



## Example 1:

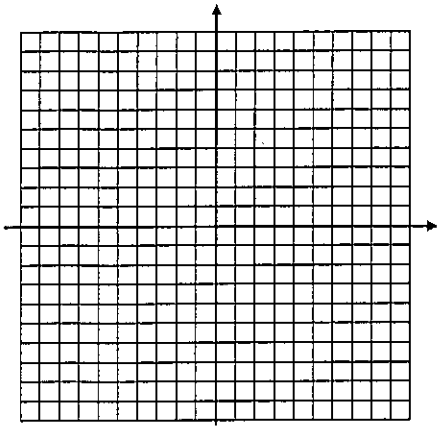
Determine the ratio of the directed line segment AB when partitioned by point P. Let A be the initial point.

# Example 2:

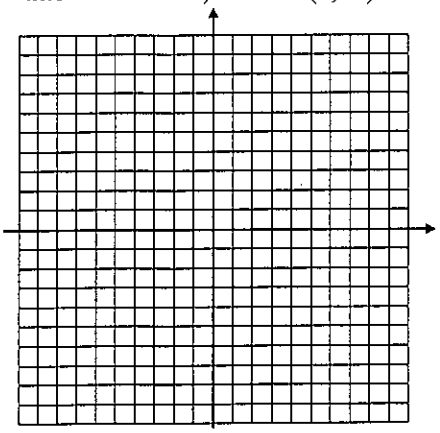
**Determine the point P that partitions the directed line segment $\overline{AB}$ into a ratio of 1:2, where A (1,4) and B (4,10).**



If you want to partition a segment into an a:b ratio, divide rise and run by a+b and count!

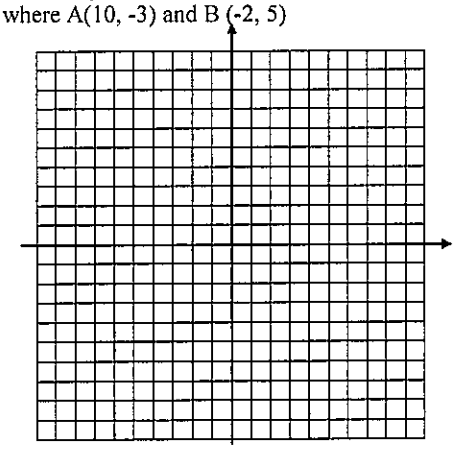
# Example 3:

Determine the point P that partitions the directed segment $\overline{AB}$ into the ratio 2:3, where A(4, -5) and B (-1, 10)



# Example 4:

Determine the point P that partitions the directed segment $\overline{AB}$ into the ratio 1:3, where A(10, -3) and B (-2, 5)



## Using the PARTITION FORMULA:

$$\left(x_1+\left(\frac{a}{a+b}\right)\cdot\overset{run}{(x_2-x_1)},\ y_1+\left(\frac{a}{a+b}\right)\cdot\overset{rise}{(y_2-y_1)}\right)$$

### Example 5:

Determine the point P that partitions the directed line segment AB into a ratio of 3:1 where A(1, -5) and B (9, -1)

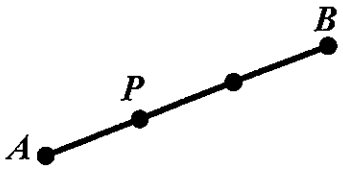
### Example 6: Using the partition formula

The coordinates of the endpoints of $\overline{AB}$ are $A$(-6,-5) and $B$(4,0). Point $P$ is on $\overline{AB}$. Determine the coordinates of point $P$ such that $AP:PB$ is 2:3.

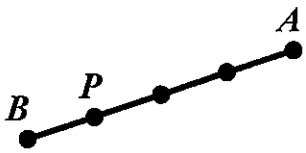
### Example 7: Using the partition formula

Point $P$ partitions directed segment $\overline{AB}$ in the ratio of 3:4. If $A$(-9,-9) and $B$(5,-2), find the coordinates of $P$.

**1. Determine the ratio of the directed line segment $\overline{AB}$ when partitioned by point P.** (Hint: A is the initial point)




a) _____ : _____



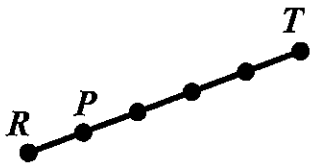

b) _____ : _____


c) _____ : _____

**2. Determine the ratio of the directed line segment when partitioned by point P.**


a) Directed Line Segment $\overline{DC}$

_____ : _____




b) Directed Line Segment $\overline{RT}$

_____ : _____


c) Directed Line Segment $\overline{HG}$

_____ : _____

**3. Determine the point P that partitions the directed line segment $\overline{AB}$ into a ratio of 4:5, where A (5,-4) and B (14,5).**

**4. Determine the point P that partitions the directed line segment $\overline{AB}$ into a ratio of 1:3, where A (8,6) and B (0,10).**

**5. Determine the point P that partitions the directed line segment $\overline{AB}$ into a ratio of 2:1, where A (0,5) and B (3,11).**

Date _____ Geometry CC

**Review: Unit 3-11 Test Coordinate Geometry**

1. What is the slope of a line that is parallel to the line whose equation is $3x - 2y = 7$?

2. The lines $3y + 1 = 6x + 4$ and $2y + 1 = x - 9$ are
   1) parallel
   2) perpendicular
   3) the same line
   4) neither parallel nor perpendicular

3. Given directed line segment $\overline{AB}$, where A(0,0) and B(12,0). Determine the point P that partitions the segment into a 1:2 ratio.

4. The two lines represented by the equations below are graphed on a coordinate plane.

$$x + 6y = 12$$

$$3(x - 2) = -y - 4$$

Which statement best describes the two lines?
   1) The lines are parallel.
   2) The lines are the same line.
   3) The lines are perpendicular.
   4) The lines intersect at an angle other than 90°.

5. In circle $O$, diameter $\overline{RS}$ has endpoints $R(3a, 2b - 1)$ and $S(a - 6, 4b + 5)$. Find the coordinates of point $O$, in terms of $a$ and $b$. Express your answer in simplest form.

6. If $\overline{BC}$ has endpoints $B(6,8)$, and $C(8,4)$. Write an equation that represents the perpendicular bisector of $\overline{BC}$?

7. 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. USE THE FORMULA.

8. Directed line segment $\overline{AB}$ is partitioned by point P into a ratio of 2:3. Which of the following represent this relationship?

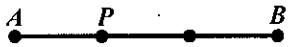
1)



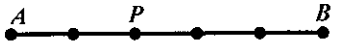

3)




2)




4)




9. The midpoint of $\overline{AB}$ is $M(4,2)$. If the coordinates of $A$ are $(6,-4)$, what are the coordinates of $B$?

10. What is the slope of the line containing the points (3, 4) and (-5, 10)?

11. Which equation represents the line that passes through the point $(-2,2)$ and is parallel to $y = \frac{1}{2}x + 8$?

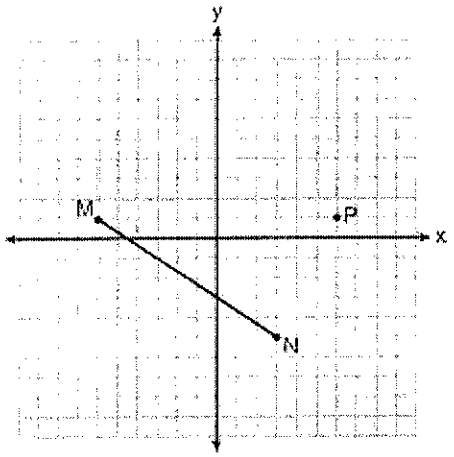
1 $y = \frac{1}{2}x$

2 $y = -2x - 3$

3 $y = \frac{1}{2}x + 3$

4 $y = -2x + 3$

12. Given $\overline{MN}$ shown below, with $M(-6,1)$ and $N(3,-5)$, what is an equation of the line that passes through point $P(6,1)$ and is parallel to $\overline{MN}$?



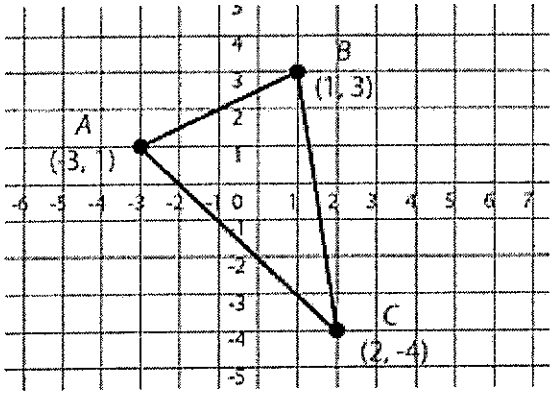

1 $y = -\frac{2}{3}x + 5$

2 $y = -\frac{2}{3}x - 3$

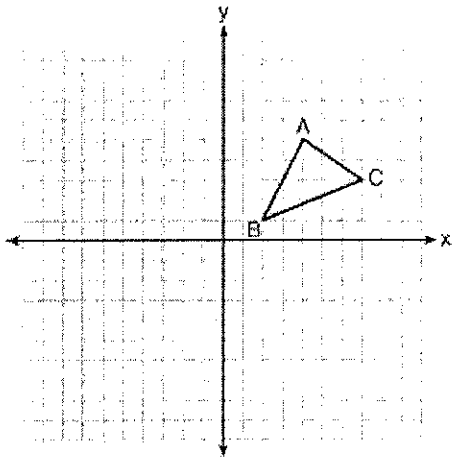
3 $y = \frac{3}{2}x + 7$

4 $y = \frac{3}{2}x - 8$

13. Find the area AND perimeter of ΔABC with vertices A (-3, 1), B(1, 3), C(2, -4). Round values to the nearest tenth.




14. In the diagram below, $\triangle ABC$ has vertices $A(4,5)$, $B(2,1)$, and $C(7,3)$.




What is the slope of the altitude drawn from $A$ to $\overline{BC}$?

1 $\frac{2}{5}$

2 $\frac{3}{2}$

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

4 $-\frac{5}{2}$