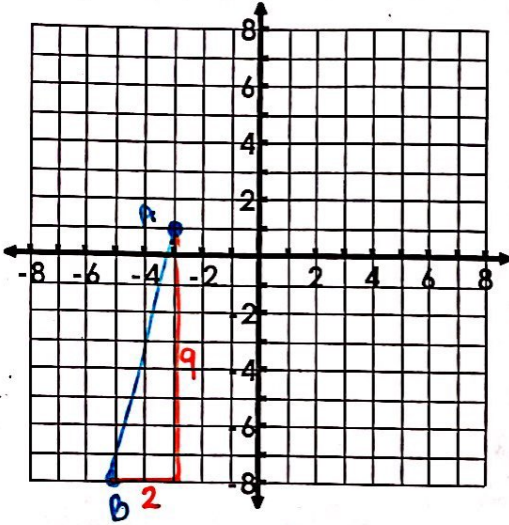


Unit 10 Coordinate Geometry Review Guide

1. Use the distance formula to calculate the distance between two points.

a. Find the distance between the given points:
A(-3, 1) & B(-5, -8)

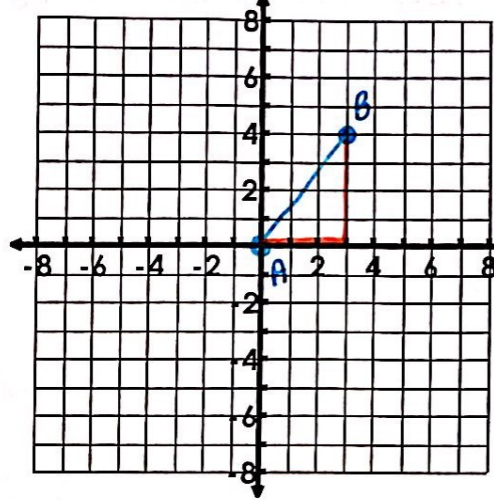


$$2^2 + 9^2 = c^2$$

$$85 = c^2$$

$$\sqrt{85} = c$$

b. Find the length of the segment that has the endpoints (0, 0) and (3, 4).



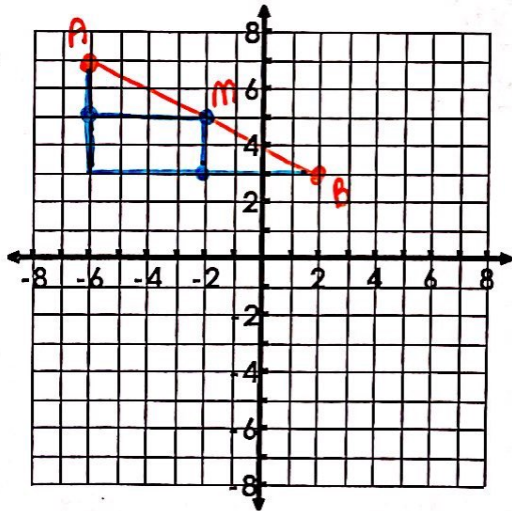
$$3^2 + 4^2 = c^2$$

$$25 = c^2$$

$$5 = c$$

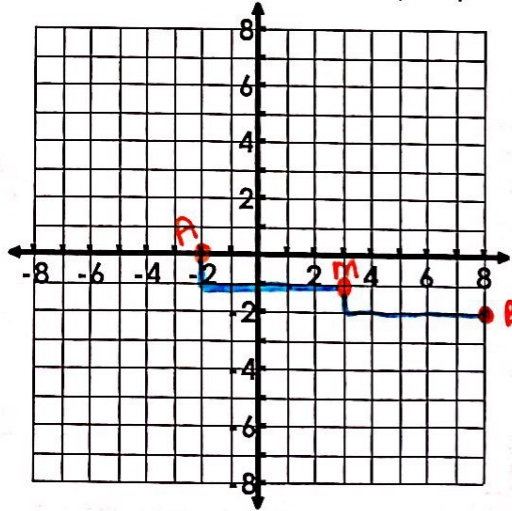
2. Use the midpoint formula to calculate the midpoint or an endpoint when given the midpoint.

a. Find the midpoint of the segment that has the endpoints (-6, 7) and (2, 3).



$$M(-2, 5)$$

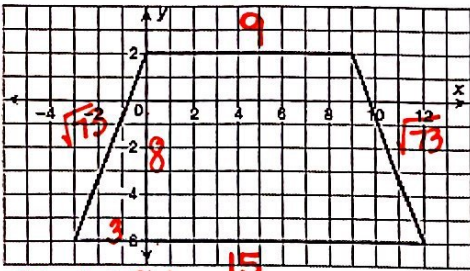
b. Find the coordinates of the other endpoint of a segment with an endpoint of A(-2, 0) and a midpoint $M(3, -1)$.



$$B(8, -2)$$

3. Find the area and perimeter of a figure in the coordinate plane. Leave all answers in simplified radical form.

a. Find the area & perimeter of the following figure:



Slanted Side
 $3^2 + 8^2 = c^2$
 $73 = c^2$
 $\sqrt{73} = c$

$P = 15 + 9 + \sqrt{73} + \sqrt{73}$

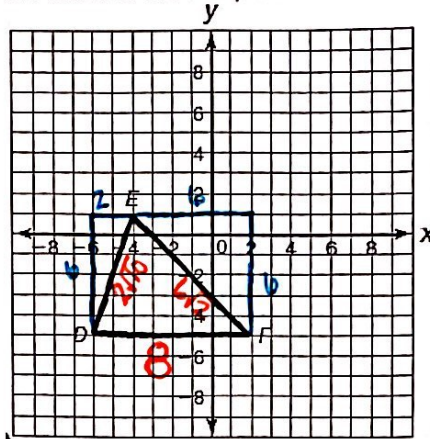
$P = 24 + 2\sqrt{73}$ units

$A = \frac{1}{2}(8)(9 + 15)$

$A = \frac{1}{2}(8)(24)$

$A = 96$ units²

b. Find the area & perimeter of the following figure:



$ED = 6^2 + 2^2$
 $= 40$
 $= 2\sqrt{10}$

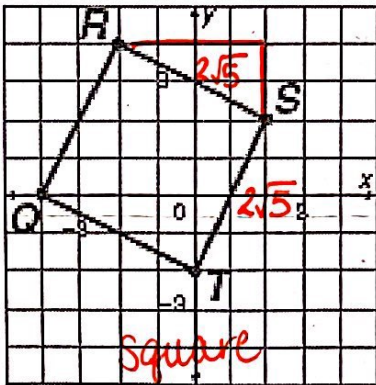
$EF = 6^2 + 6^2$
 $= 72$
 $= 6\sqrt{2}$

$P = 2\sqrt{10} + 6\sqrt{2} + 8$ units

$A = \frac{1}{2}(8)(6)$

$A = 24$ units²

c. Find the area and perimeter of the following figure:



Each side = $2^2 + 4^2$
 $= 20$
 $= 2\sqrt{5}$

$P = 2\sqrt{5} + 2\sqrt{5} + 2\sqrt{5} + 2\sqrt{5}$

$P = 8\sqrt{5}$ units

$A = 2\sqrt{5} \cdot 2\sqrt{5}$

$A = 4\sqrt{25}$

$A = 20$ units²

4. Determine if a pair of lines are parallel, perpendicular, or neither. Explain why.

$$y = -2x + 4$$

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

Perpendicular - slopes are negative reciprocals

b.
 $2x + 4y = 8$
 $3x + 6y = -6$

$$2x + 4y = 8$$

$$4y = -2x + 8$$

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

$$3y + 6y = -6$$

$$6y = -3y - 6$$

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

Parallel - same slopes

5. Given the slope and a point on a line, determine the equation of a line parallel or perpendicular to the original line

a. Write an equation of a line that is parallel to $y = 2x - 8$ and passes through the point $(3, 10)$.

→ same slope

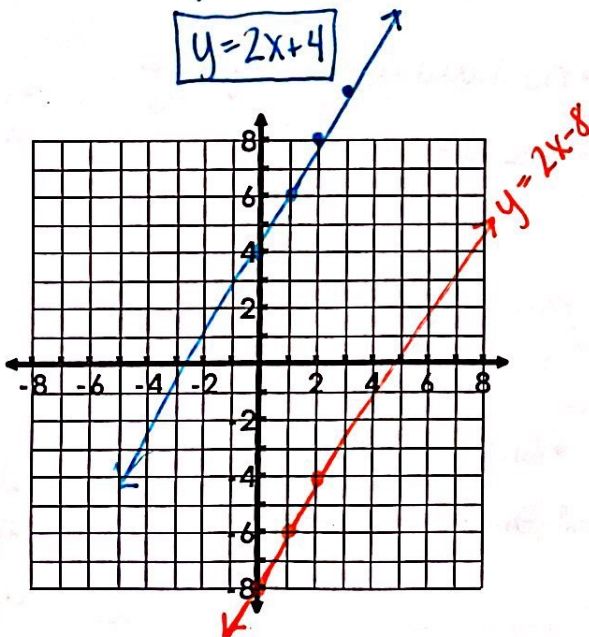
$$y = mx + b$$

$$10 = 2(3) + b$$

$$10 = 6 + b$$

$$4 = b$$

$$y = 2x + 4$$



b. Write an equation of a line that is perpendicular to $y = \frac{1}{3}x - 1$ and passes through the point $(6, 3)$.

→ negative reciprocals

New Slope: -3

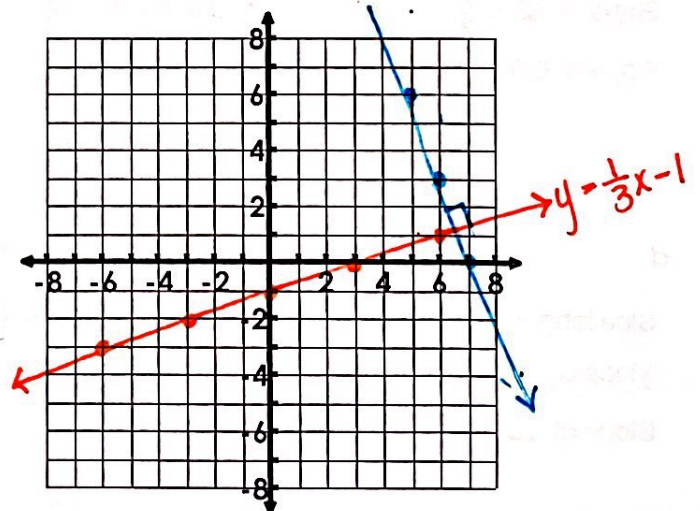
$$y = mx + b$$

$$3 = -3(6) + b$$

$$3 = -18 + b$$

$$21 = b$$

$$y = -3x + 21$$



6. Determine if the quadrilateral ABCD can best be described as a parallelogram, square, rectangle, rhombus, or trapezoid. Then explain why using coordinate geometry concepts.

a.

Side lengths: $AB = \sqrt{20}$, $BC = \sqrt{45}$, $CD = \sqrt{20}$, $DA = \sqrt{45}$

Slope of \overline{AB} is -2

Slope of \overline{BC} is $\frac{1}{2}$

Slope of \overline{CD} is -2

Slope of \overline{DA} is $\frac{1}{2}$

- opposite sides are congruent
- slopes are negative reciprocals \rightarrow right \angle 's

Rectangle

b.

Side lengths: $AB = \sqrt{13}$, $BC = \sqrt{13}$, $CD = \sqrt{13}$, $DA = \sqrt{13}$

Slope of \overline{AB} is $-\frac{3}{2}$

Slope of \overline{BC} is 1

Slope of \overline{CD} is $-\frac{3}{2}$

Slope of \overline{DA} is 1

- sides are congruent
- slopes are not the same or opposite reciprocals

Rhombus

c.

Side lengths: $AB = \sqrt{13}$, $BC = \sqrt{17}$, $CD = \sqrt{52}$, $DA = \sqrt{10}$

Slope of \overline{AB} is $\frac{2}{3}$

Slope of \overline{BC} is $-\frac{1}{4}$

Slope of \overline{CD} is $\frac{2}{3}$

Slope of \overline{DA} is -3

- no sides are congruent
- one set of parallel sides (same slopes)

Trapezoid

d.

Side lengths: $AB = \sqrt{14}$, $BC = \sqrt{14}$, $CD = \sqrt{14}$, $DA = \sqrt{14}$

Slope of \overline{AB} is $\frac{1}{8}$

Slope of \overline{BC} is -8

Slope of \overline{CD} is $\frac{1}{8}$

Slope of \overline{DA} is -8

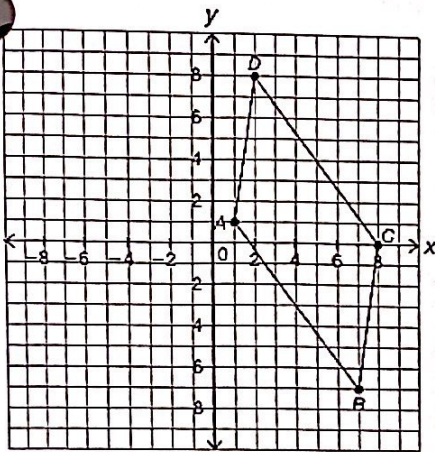
- sides are congruent
- slopes are negative reciprocals \rightarrow right angles

Square

7. Use the following graphs to complete coordinate proofs:

a. Prove or disprove the following figure is a parallelogram:

↳ opposite sides are parallel



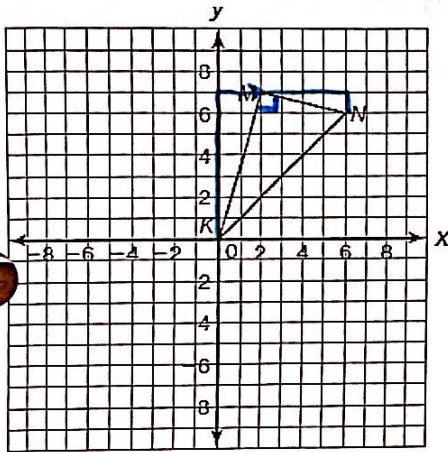
Slope of DA : 7
CB : 7

Slope of DC : $-\frac{8}{6} = -\frac{4}{3}$
AB : $-\frac{8}{6} = -\frac{4}{3}$

Opposite sides have same slopes, so they are parallel

b. Prove or disprove that the following figure is a right triangle:

↳ slopes are negative reciprocals

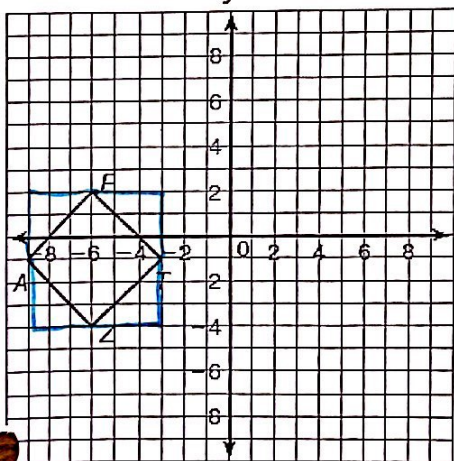


Slope of MN : $-\frac{1}{4}$
MK : $\frac{7}{2}$

\overline{MN} is not perpendicular to \overline{MK} , so $\triangle MKN$ is not a right triangle.

c. Prove or disprove the following figure is a square:

↳ 4 congruent sides
4 right angles



• Each side is $3\sqrt{2}$ units, so they are all congruent

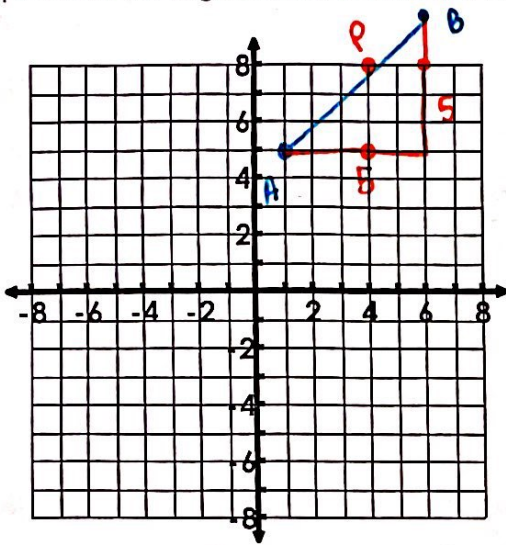
• Slope of FT : -1
TZ : 1
ZA : -1
AF : 1

Slopes are negative reciprocals of each other, so they are all right angles.

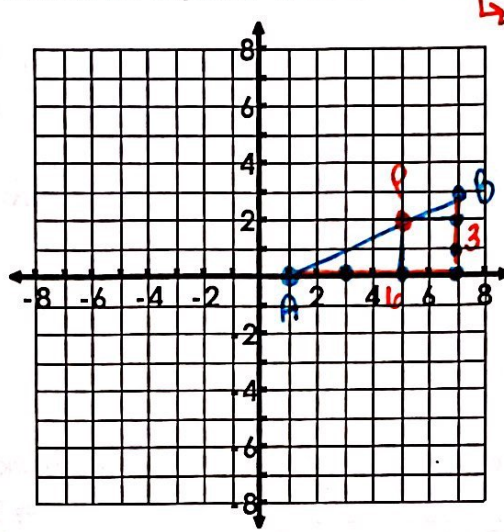
8. Partition a line segment on the coordinate plane.

a. Find the coordinate of point P that lies along the directed line segment from A(1, 5) to B(6, 10) and partitions the segment in the ratio of 3 to 2.

b. Find the coordinates of the point P that lies along the directed segment from A(1, 0) to B(7, 3) and partitions the segment in the ratio of 2:1.



P(4, 8)



P(5, 2)