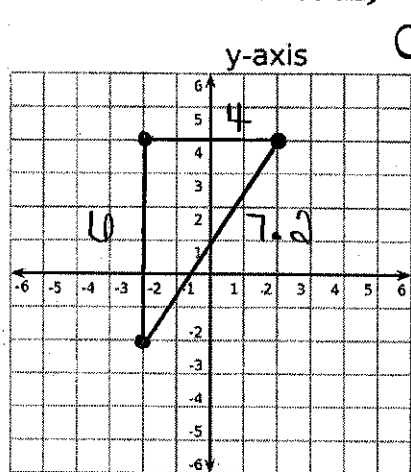


Geometry Study Guide 2019

1. Given a triangle with vertices: $(-2, 4)$, $(-2, -2)$ and $(2, 4)$, what is the approximate perimeter? (Round to the nearest hundredth)



$$a^2 + b^2 = c^2$$

$$(10)^2 + (6)^2 = c^2$$

$$30 + 10 = c^2$$

$$\sqrt{50} = c$$

$$c = 7.2$$

$$P = 17.2$$

2. Given the points $(-4, -7)$ and $(16, -13)$:

A. What is the midpoint?

$$\frac{-4 + 16}{2}, \frac{-7 + (-13)}{2}$$

$$\frac{12}{2}, \frac{-20}{2}$$

$$(10, -10)$$

B. What is the distance between the points?

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

$$d = \sqrt{(16 - (-4))^2 + (-13 - (-7))^2}$$

$$d = \sqrt{(20)^2 + (-6)^2}$$

$$d = \sqrt{400 + 36}$$

$$d = \sqrt{436}$$

$$d = 20.88$$

3. Write the equation of a line parallel to $y = -4x + 5$, that passes through the point $(2, -1)$

$$-1 = -4(2) + b$$

$$-1 = -8 + b$$

$$+8 \quad +8$$

$$7 = b$$

$$m = -4$$

$$y = -4x + 7$$

4. Write the equation of a line that is perpendicular to $y = \frac{3}{4}x - 5$ that passes through the point $(9, 2)$.

$$2 = \frac{-4}{3}(9) + b$$

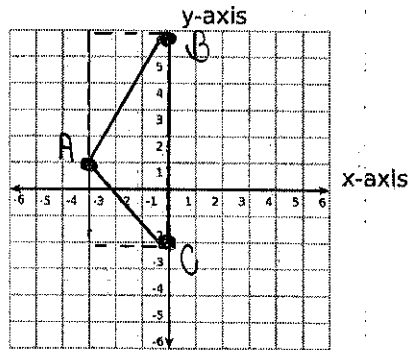
$$2 = -12 + b$$

$$+12 \quad +12$$

$$14 = b$$

$$y = \frac{-4}{3}x + 14$$

5. A triangle has vertices at: $A(-3, 1)$, $B(0, 6)$ and $C(0, -2)$
A. Graph the triangle and find the measurement for all sides of the triangle.



$$AB = 5.83$$

$$BC = 8$$

$$AC = 4.24$$

B. Circle the classification that best describes this triangle:

- Equilateral
- Isosceles
- Scalene

6. Determine if the lines are parallel, perpendicular, or neither. Show all of your work to prove the answer.

Line A: $6x - 5y = 3$ \rightarrow $0x - 5y = 3$

Line B: $6y - 5x = 24$ \rightarrow $-5y = -0x + 3$

$$y = \frac{0}{5}x - \frac{3}{5}$$

These lines are:

- a. Parallel
- b. Perpendicular
- c. Neither
- d. These are the same line.

$$0y - 5x = 24$$

$$+5x \quad +5x$$

$$0y = 5x + 24$$

$$y = \frac{5}{0}x + 4$$

$$AB$$

$$a^2 + b^2 = c^2$$

$$(5)^2 + (3)^2 = c^2$$

$$25 + 9 = c^2$$

$$\sqrt{34} = c$$

$$c = 5.83$$

$$AC$$

$$a^2 + b^2 = c^2$$

$$(3)^2 + (3)^2 = c^2$$

$$9 + 9 = c^2$$

$$\sqrt{18} = c$$

$$c = 4.24$$

7. Simplify $\sqrt{147}$. Leave answer in simplified radical form.

$$\frac{\sqrt{49 \cdot 3}}{\sqrt{49} \cdot \sqrt{3}}$$

$$7\sqrt{3}$$

8. Find the distance between the points given. Leave in simplified radical form.

$$d = \sqrt{(11-4)^2 + (-2-8)^2}$$

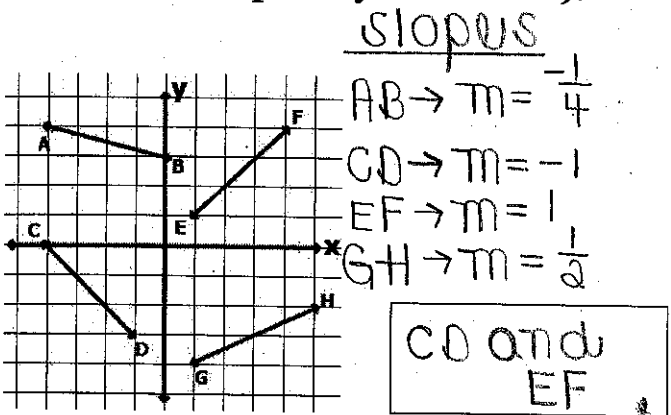
$$d = \sqrt{(7)^2 + (-10)^2}$$

$$d = \sqrt{49 + 100}$$

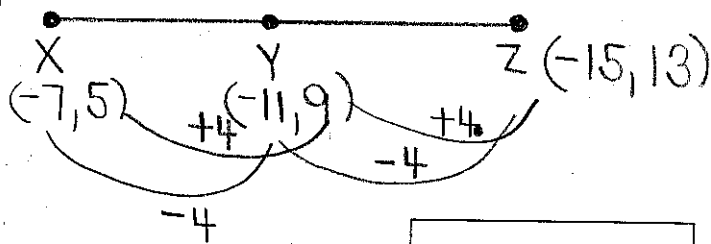
$$d = \sqrt{149}$$

$$d = \sqrt{149}$$

9. Which two line segments are perpendicular? (Show work to prove your answer).

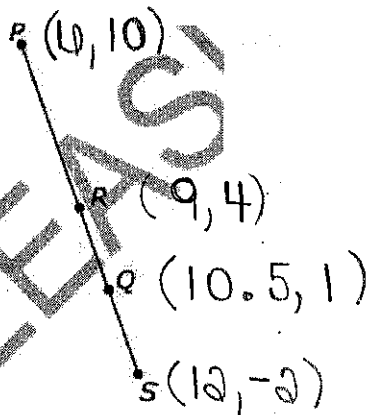


10. Y is the midpoint of XZ. If the coordinates of X are $(-7, 5)$ and the coordinates of Y are $(-11, 9)$, find the coordinates of Z.



$$(-15, 13)$$

11. R is the midpoint of segment PS. Q is the midpoint of segment RS.



P is located at $(6, 10)$ and S is located at $(12, -2)$. What are the coordinates of Q?

$$(10.5, 1)$$

12. A line segment has endpoints J $(3, 8)$ and L $(9, 2)$. The point K is the midpoint of line segment JL.

A. What is the midpoint? (K)

$$\frac{3+9}{2}, \frac{8+2}{2}$$

$$\frac{12}{2}, \frac{10}{2}$$

$$(6, 5)$$

B. What is the equation of a line **perpendicular** to JL that passes through K?

$$m = \frac{2-8}{9-3} = \frac{-6}{6} = -1 \quad \rightarrow \quad m = 1$$

$$5 = 1(6) + b$$

$$5 = 6 + b$$

$$-6 - 6$$

$$-1 = b$$

$$y = x - 1$$

$$-1 = b$$

13. What is the most accurate way to classify a quadrilateral with 2 sets of parallel sides, 4 congruent sides and have congruent opposite angles?

- ~~a) Trapezoid~~
- b) Rectangle
- c) Rhombus
- ~~d) Parallelogram~~

14. Write an equation in slope intercept form for the line that contains $(-6, 5)$ and is perpendicular to the line

$$3x - 4y = -8$$

$$\begin{array}{r} 3x \\ -4y \\ \hline -4y = -3x - 8 \\ \frac{-4y}{-4} = \frac{-3x - 8}{-4} \\ y = \frac{3}{4}x + 2 \end{array}$$

$$m = -\frac{4}{3} \quad 5 = -\frac{4}{3}(-6) + b$$

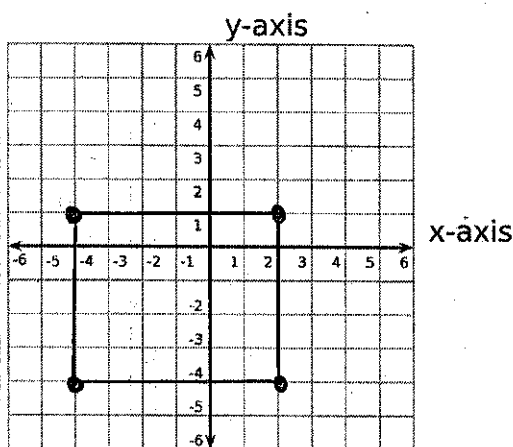
$$5 = 8 + b$$

$$\begin{array}{r} 5 \\ -8 \\ \hline -8 - 8 \end{array}$$

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

15. What is the **area** of a rectangle with vertices at:

$R(-4, 1), S(2, 1), T(2, -4), U(-4, -4)$



$$A = 30 \text{ units}^2$$

16. A construction company is building a new road in a small town. The road must run perpendicular to the existing road, and must pass through the coordinate $(-8, -10)$ on a map. If the equation for the existing road is $y = 4x + 1$, what will be the equation of the new road?

$$y = mx + b$$

$$-10 = -\frac{1}{4}(-8) + b$$

$$-10 = 2 + b$$

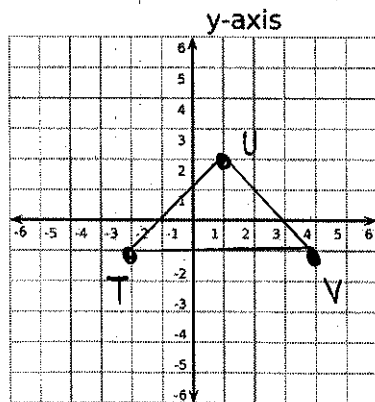
$$\begin{array}{r} -10 \\ -2 \\ \hline -12 = b \end{array}$$

$$m = -\frac{1}{4}$$

$$y = -\frac{1}{4}x - 12$$

17. What is the area of the triangle with vertices at:

$T(-2, -1), U(1, 2), V(4, -1)$



$$A = \frac{1}{2}bh$$

$$A = \frac{1}{2}(6)(3)$$

$$A = 9$$

$$A = 9 \text{ units}^2$$

18. Veronica and Sarah live in the same neighborhood. Veronica's house is located at $(-10, -7)$ and Sarah's house is located at $(-8, 1)$ on a grid of their neighborhood.

A). What is the distance between Veronica and Sarah's homes? **Round your answer to the nearest hundredth.**

$$d = \sqrt{(-10 - (-8))^2 + (-7 - 1)^2}$$

$$d = \sqrt{(-2)^2 + (-8)^2}$$

$$d = \sqrt{68}$$

$$d = 8.25$$

B). Their friend Stephanie lives exactly halfway between Veronica and Sarah homes. What is the coordinate of the location of Crystal's home?

$$\frac{-8 + (-10)}{2}, \frac{1 + (-7)}{2}$$

$$-18/2, -6/2$$

$$(-9, -3)$$

19. A line, $y = mx + b$, passes through the point (2, 8) and is parallel to $2x + 4$. What is the value of b ?

$$m = 2 \quad (2, 8) \quad 8 = 2(2) + b$$

$$\begin{array}{cc} \downarrow & \downarrow \\ x & y \end{array} \quad \begin{array}{l} 8 = 4 + b \\ -4 \quad -4 \end{array}$$

$$b = 4$$

20. What is the equation of the line, in slope-intercept form, that passes through (-1, 5) and is perpendicular to $3x - 2y = 12$?

$$3x - 2y = 12 \quad 5 = -\frac{2}{3}(-1) + b$$

$$\begin{array}{l} -3x \\ -2y \end{array} \quad \begin{array}{l} -3x \\ -2 \end{array} \quad \begin{array}{l} 5 = -\frac{2}{3} + b \\ 5 = \frac{-2}{3} + b \\ b = \frac{13}{3} \end{array}$$

$$\frac{-2y}{-2} = \frac{-3x + 12}{-2} \quad \begin{array}{l} y = \frac{3}{2}x - 6 \\ y = -\frac{2}{3}x + \frac{13}{3} \end{array}$$

21. Calculate the area of the rectangle with vertices at:

$R(-6, 6)$, $S(3, 6)$, $T(3, -1)$ and $U(-6, -1)$

$$RS = 9 \quad A = LW$$

$$ST = 7$$

$$TU = 9$$

$$RU = 7$$

$$A = 63 \text{ units}^2$$

22. What is the **midpoint** of the longest side of the triangle with the following vertices, $(-8, 1)$, $(-8, -8)$ and $(-3, -8)$?

A

B C

$$AB \rightarrow d = 9$$

$$BC \rightarrow d = 5$$

$$AC \rightarrow d = \sqrt{(-3 - (-8))^2 + (-8 - 1)^2}$$

$$d = \sqrt{(5)^2 + (-9)^2}$$

$$d = \sqrt{25 + 81}$$

$$d = \sqrt{106}$$

longest side

$$\left(\frac{-11}{2}, \frac{-7}{2} \right)$$

23. Write the equation of the line that passes through the point (0, -3) and is perpendicular to $y = \frac{1}{2}x + 3$. Select one term from each column to create your equation.

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

$m = -2$

$b = -3$

$y =$

1	2	3
-2x	-	3

1	2	3
$-\frac{1}{2}x$	+	-3
$\frac{1}{2}x$	-	3
-2x		6
3x		-6