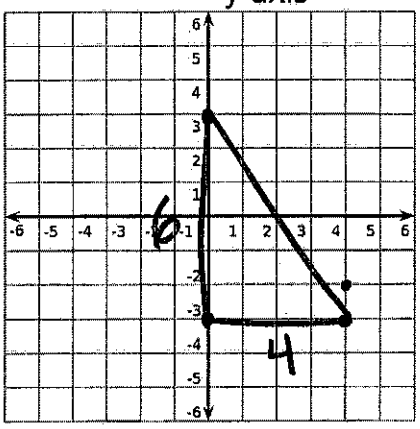
Name SINGLETON Block _____ Date _____

Unit 3: Geometry Unit STUDY GUIDE

Directions: Answer each question completely. Show ALL work in the space provided. If necessary, you may attach a separate sheet of paper.

1.) Given a triangle with vertices: $(0,3), (0,-3)$ *and* $(4,-3)$, what is the approximate perimeter? (Round to the nearest hundredth)



$4^2+6^2=c^2$

$16+36=c^2$

$c^2=52$

$c=\sqrt{52}$

$4+6+\sqrt{52}$

P = 17.21

2.) Given the points:

$(11,4)$ *and* $(17,-6)$

A. Determine the midpoint.

$\left(\frac{11+17}{2}, \frac{4+-6}{2}\right)$. (14, -1)

B. Determine the distance.

$\sqrt{(17-11)^2+(-6-4)^2}$

$\sqrt{(6)^2+(-10)^2}$

$\sqrt{36+100}=\sqrt{136}$

$\sqrt{4}\cdot\sqrt{34}$

$2\sqrt{34}$

D= 11.66

3.) Write the equation of a line **parallel** to $y=-4x+5$ that passes through the point $(-8,11)$.

$y-11=-4(x+8)$

$y-11=-4x-32$

$+11 \quad +11$

$y=-4x-21$

4.) What equation represents the line that is **perpendicular** to the graph of $x-3y=21$ and passes through the point $(12,5)$. $y=\frac{1}{3}x-7$

A. $3x-y=41$

B. $3x+y=41$

C. $3x+y=6$

D. $3x-y=6$

$m=-3$

$(12,5)$

$y-5=-3(x-12)$

$y-5=-3x+36$

$+5 \quad +5$

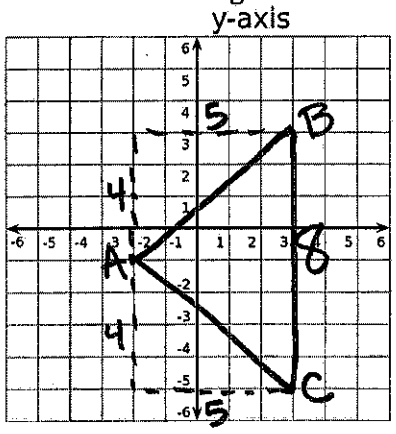
$y=-3x+41$

$y=-3x+41$

$+3x \quad +3x$

$3x+y=41$

5.) A triangle has vertices at: $A(-2,1)$, $B(3,3)$ *and* $C(3,-5)$. Using the coordinate grid, graph the triangle and determine the lengths of all three sides.



$4^2+5^2=c^2$

$16+25=c^2$

$c^2=41$

$c=\sqrt{41}$

AB $\sqrt{41}$

BC 8

AC $\sqrt{41}$

Circle the classification that **best** describes the triangle:

A. Scalene

B. Equilateral

C. Isosceles

6.) Circle the term that best describes the lines. PROVE by showing your work!

Line A: $6x - 4y = 2$

Line B: $6y - 4x = 20$

A

$\frac{-4y}{-4} = \frac{-6x}{-4} + \frac{2}{-4}$

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

B

$\frac{6y}{6} = \frac{4x}{6} + \frac{20}{6}$

$y = \frac{2}{3}x + \frac{10}{3}$

A. Parallel B. Perpendicular

C. Neither D. These are the same line.

7.) Find the distance between the given points: Write your answers as a simplified radical.

$(-5, 5), (1, 9)$

$d = \sqrt{(1+5)^2 + (9-5)^2}$

$\sqrt{6^2 + 4^2}$

$\sqrt{36 + 16}$

$\sqrt{52}$

$\sqrt{4} \cdot \sqrt{13}$

$2\sqrt{13}$

8.) Y is the midpoint of XZ. If the coordinates of X are $(-4, 7)$ and the coordinates of Y are $(2, -9)$, find the coordinates of Z.

(-4,7) (2,-9) (,)

X Y Z

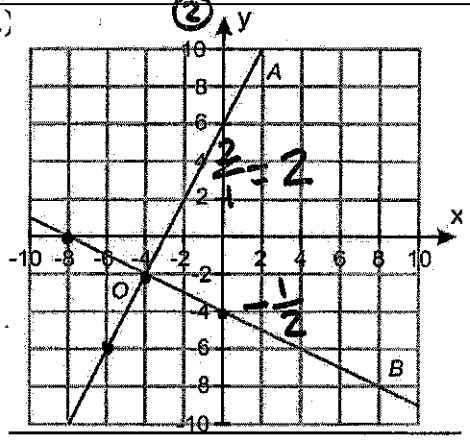
-16 -16

-4,7 2,-9 (8,-25)

+6 +6

(8,-25)

9.) (2)



Which statement is true?

COMPARE THE SLOPES

A. Line A is parallel to Line B

(B) Line A is perpendicular to Line B

C. Line A & Line B are neither parallel or perpendicular

$m = 2$ $m = -\frac{1}{2}$

opposite reciprocals → PERPENDICULAR

10.) Use the information below to fill in the blanks:

L is the midpoint of GM.

$GL = 6y + 20$ and $LM = 12y - 4$

G L M

6y+20 12y-4

$6y + 20 = 12y - 4$

$-12y \quad -12y$

$-6y + 20 = -4$

$-20 \quad -20$

$\frac{-6y}{-6} = \frac{-24}{-6}$ $y = 4$

Y= 4

LM= 44

GL= 44

GM= 88

(GL) $6(4) + 20$

$24 + 20$

44

(LM) $12(4) - 4$

$48 - 4$

44

(GM) $44 + 44$

88

11.) What is the midpoint of the longest side of the triangle with vertices (2, 5), (4, 5), and (4, 7)?

A B C

AB $d = \sqrt{(4-2)^2+(5-5)^2} = \sqrt{2^2} = \sqrt{4} = 2$

BC $d = \sqrt{(4-4)^2+(7-5)^2} = \sqrt{2^2} = \sqrt{4} = 2$

AC $d = \sqrt{(4-2)^2+(7-5)^2} = \sqrt{2^2+2^2} = \sqrt{4+4} = \sqrt{8}$ ↑ longest side

Midpoint of AC

$\left(\frac{2+4}{2}, \frac{5+7}{2}\right)$

$\boxed{(3,6)}$

12.) A line segment has endpoints $J(9,7)$ *and* $L(11,5)$. The point K is the midpoint of line segment JL.

$m = \frac{5-7}{11-9}$

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

A.) What is the midpoint? (K)

$\left(\frac{9+11}{2}, \frac{7+5}{2}\right)$

$\boxed{(10,6)}$

B.) What is an equation of a line **perpendicular** to JL and passing through K?

(10,6)

$m = 1$

$y-6 = 1(x-10)$

$y-6 = x-10$

$+6 \quad +6$

$y = x-4$

$\boxed{y = x-4}$

13.) What is the most accurate way to classify a quadrilateral with two pairs of parallel sides?

A. Trapezoid — 1 pair //

B. Rectangle — Has to have 2 pairs ≅ sides, 4 ∟'s

C. Rhombus — Has to have 4 ≅ sides

D. Parallelogram

14.) Drew and Joseph live in the same neighborhood. On a coordinate grid, Drew's home is at (1, 1) and Joseph's home is at (9, −3).

How many yards apart are Drew's and Joseph's homes? Round your answer to the nearest hundredth.

$d = \sqrt{(9-1)^2+(-3-1)^2}$

$\sqrt{(8)^2+(-4)^2} = \sqrt{64+16}$

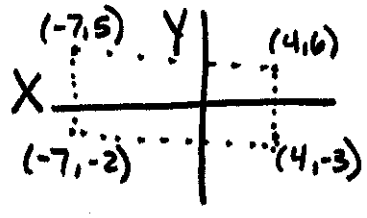
$\sqrt{80}$

$\boxed{8.94 \text{ yd.}}$

15.) Calculate the **area** of the rectangle with vertices at:

DRAW A SKETCH TO HELP VISUALIZE

(−7,5), (4,6), (4, −3) *and* (−7, −2)



side X

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

$\sqrt{(0)^2+(-7)^2}$

$\sqrt{49} = 7$

side Y

$d = \sqrt{(4+7)^2+(6-5)^2}$

$\sqrt{(11)^2+(1)^2}$

$\sqrt{121+1}$

$\sqrt{122}$

$A = 7(\sqrt{122})$

$\boxed{77.32}$

16.) A construction company is adding a new road in a small town. This road must run perpendicular to the existing road, and must pass through the coordinate (4,8) on a map. If the equation for the existing road is $y = 5x + 8$, what will the equation for the new road be?

$m = -\frac{1}{5}$

(4,8)

$y-8 = -\frac{1}{5}(x-4)$

$y-8 = -\frac{1}{5}x+\frac{4}{5}$

$+8 \quad +8$

$y = -1/5x + \frac{44}{5}$

$\boxed{y = -\frac{1}{5}x + \frac{44}{5}}$

17.) Place one option from each of the lists below into its corresponding box to create an equation of the line that passes through the point (2,-7) and is perpendicular to $y = -\frac{1}{5}x + 9$

1	2	3
$-\frac{1}{5}x$	+	-3
$-\frac{1}{3}x$	-	3
$3x$		-17
$5x$		17

1	2	3
y = 5x	-	17

$m = 5$ (2,-7)

$y + 7 = 5(x - 2)$

$y + 7 = 5x - 10$

$-7 \quad -7$

$y = 5x - 17$

18.) A line, y= mx + b, passes through the point (2, 11) and is parallel to y=3x + 18. What is the value of b?

$m = 3$

$y - 11 = 3(x - 2)$

$y - 11 = 3x - 6$

$+11 \quad +11$

$y = 3x + 5$

b

b = 5

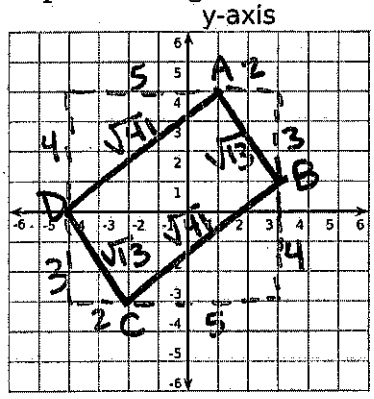
19.) Simplify the following radicals.

A. $\sqrt{98}$ → $\sqrt{49} \cdot \sqrt{2}$ → 7 → **$7\sqrt{2}$**

B. $\sqrt{32}$ → $\sqrt{16} \cdot \sqrt{2}$ → 4 → **$4\sqrt{2}$**

C. $\sqrt{27}$ → $\sqrt{9} \cdot \sqrt{3}$ → 3 → **$3\sqrt{3}$**

19.) A rectangle is a quadrilateral with two pairs of parallel congruent opposite sides, and consecutive sides that are perpendicular. Quadrilateral *ABCD* as vertices *A* (1, 4), *B* (3, 1), *C* (-2, -3), and *D* (-4, 0). Use the slopes and lengths of sides to determine if this quadrilateral is a rectangle. **Clearly label your work.**



AD ≅ BC

$4^2 + 5^2 = c^2$

$16 + 25 = c^2$

$c^2 = 41$

$c = \sqrt{41}$

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

$4 + 9 = c^2$

$c^2 = 13$

$c = \sqrt{13}$

2 sets of ≅ sides

AD → m = 4/5

AB → m = -3/2

CB → m = 4/5

DC → m = -3/2

2 sets of // sides

BUT not any ⊥ sides

(No sets of opposite reciprocal slopes)

Quadrilateral ABCD is not a rectangle because:

1.) No sets of perpendicular sides

2.) to give the needed 90° right angles

3.)