Intro. to Geo. – Day _____

Name: _____

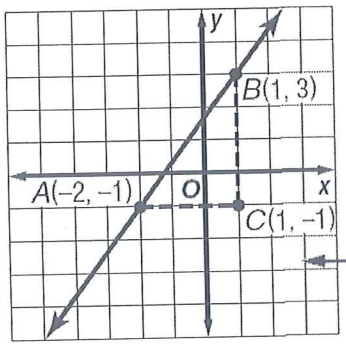
Distance, Midpoint & Slope Instruction

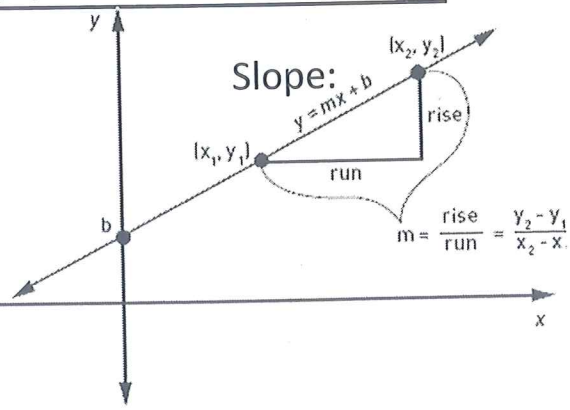
Pythagorean Theorem:

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

Distance Formula:

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





Midpoint on a Coordinate Plane	If a segment has endpoints with coordinates (x_1, y_1) and (x_2, y_2), then the coordinates of the midpoint of the segment are $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$.

Let's Practice!

Directions: Use the Pythagorean Theorem or Distance Formula to find the distance of each then find the slope. and midpoint

Ex 1. L (-2, -3), M (4, 0)

distance: $3^2 + 6^2 = c^2$

$9 + 36 = c^2$

$\sqrt{45} = \sqrt{c^2}$

$\sqrt{45}$

$\sqrt{9}$ $\sqrt{5}$

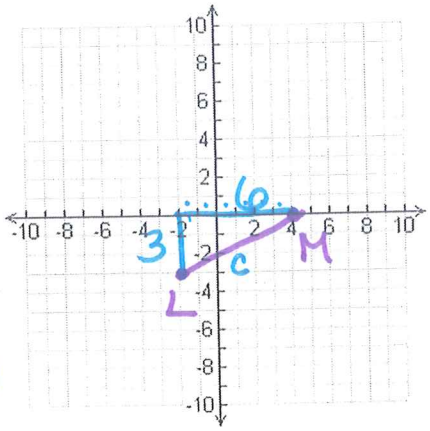
3

dist. $= 3\sqrt{5}$

midpoint: $\left(\frac{-2+4}{2}, \frac{-3+0}{2}\right)$

$\left(\frac{2}{2}, \frac{-3}{2}\right)$

$= \left(1, -\frac{3}{2}\right)$



slope: $\frac{-3-0}{-2-4} = \frac{-3}{-6} = \frac{1}{2}$

Directions: M is the midpoint of $\overline{AB}$. Find the missing coordinates based on the given information.

EX2. M(-1,6), B(2,8) Find A(x,y).

$\left(\frac{2+x}{2}, \frac{8+y}{2}\right) = (-1, 6)$

$\frac{2+x}{2} = -1$ $\quad \frac{8+y}{2} = 6$

$2 + x = -2$ $\quad 8 + y = 12$

$x = -4$ $\quad y = 4$

A(-4, 4)

EX3. M(-5,10), A(-8,6) Find B(x,y)

$\left(\frac{x+(-8)}{2}, \frac{y+6}{2}\right) = (-5, 10)$

$\frac{-8+x}{2} = -5$ $\quad \frac{y+6}{2} = 10$

$-8 + x = -10$ $\quad y + 6 = 20$

$x = -2$ $\quad y = 14$

B(-2, 14)

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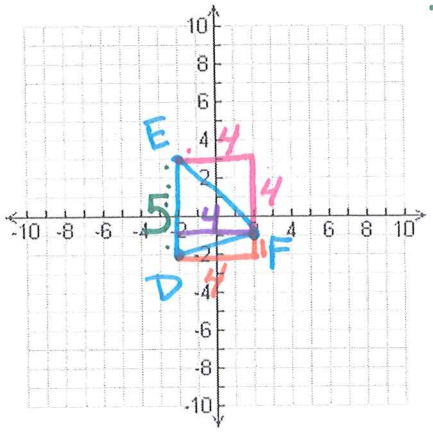
Find the perimeter and area of each figure with the given verticies.

20.) D(-2,-2), E(-2,3), and F(2,-1)



$DE = 5$

$EF = 4^2+4^2 = c^2$

$16+16 = c^2$

$\sqrt{32} = \sqrt{c^2}$

$\sqrt{4}\ \sqrt{8}$

$\sqrt{4}\ \sqrt{2}$

$EF = 4\sqrt{2}$

$DF = 1^2+4^2 = c^2$

$1+16 = c^2$

$\sqrt{17} = \sqrt{c^2}$

$DF = \sqrt{17}$

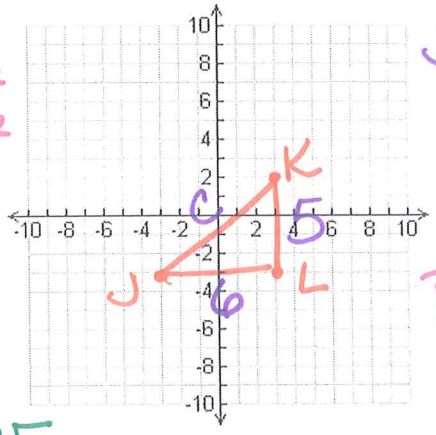
Perimeter = $5+4\sqrt{2}+\sqrt{17}$ units

Area: $A = \frac{1}{2}b\cdot h$

$= \frac{1}{2}(5)(4)$

$= 10 \text{ units}^2$

21.) J(-3,-3), K(3,2), and L(3,-3)



$JK = 5^2+6^2 = c^2$

$25+36 = c^2$

$\sqrt{61} = \sqrt{c^2}$

$P = 6+5+\sqrt{61}$

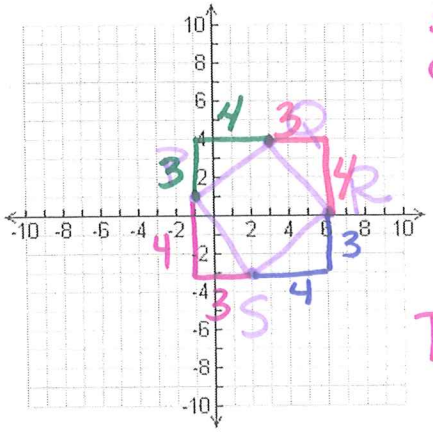
$= 11+\sqrt{61}$ units

$A = \frac{1}{2}b\cdot h$

$= \frac{1}{2}(5)(6)$

$= 15 \text{ units}^2$

22.) P(-1,1), Q(3,4), R(6,0) and S(2,-3)



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

$9+16 = c^2$

$25 = c^2$

$5 = c$

$P = 5+5+5+5$

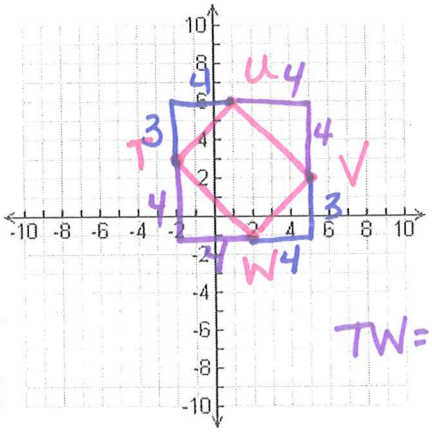
$= 20 \text{ units}$

Area = $l\cdot w$

$= (5)(5)$

$= 25 \text{ units}^2$

23.) T(-2,3), U(1,6), V(5,2), and W(2,-1)



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

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

$TU = 3\sqrt{2}$

$VW = 3\sqrt{2}$

$TW = UV = 4^2+4^2 = c^2$

$UV = 4\sqrt{2}$

$TW = 4\sqrt{2}$

$P = 3\sqrt{2}+4\sqrt{2}+3\sqrt{2}+4\sqrt{2}$

$P = 14\sqrt{2}$ units

$A = 3\sqrt{2} \times 4\sqrt{2} = 12\sqrt{4} = 12\cdot 2$

$A = 24 \text{ units}^2$