

Name: key

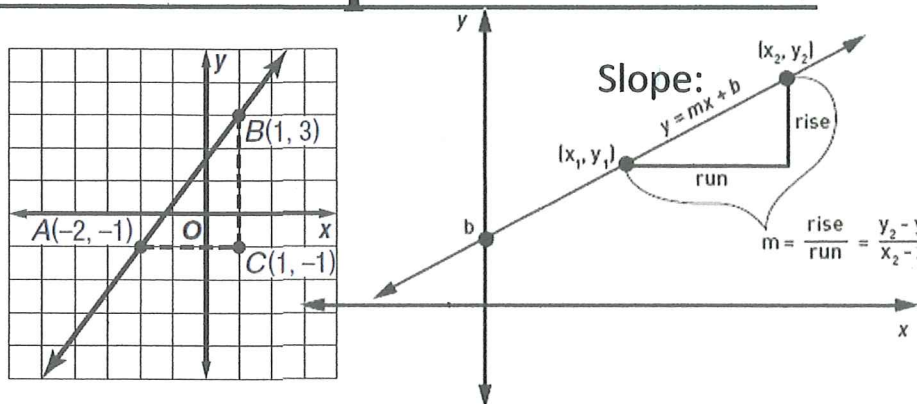
# Distance, Midpoint & Slope Instruction

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  $(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2})$ .

## Let's Practice!

**Directions:** Use the Pythagorean Theorem or Distance Formula to find the distance of each then find the slope. (And midpt)

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

distance:  $3^2 + 6^2 = d^2$   
 $9 + 36 = d^2$   
 $45 = d^2$

$\sqrt{45}$   
 $\sqrt{9} \sqrt{5}$   
 $3\sqrt{5} = d$

slope:

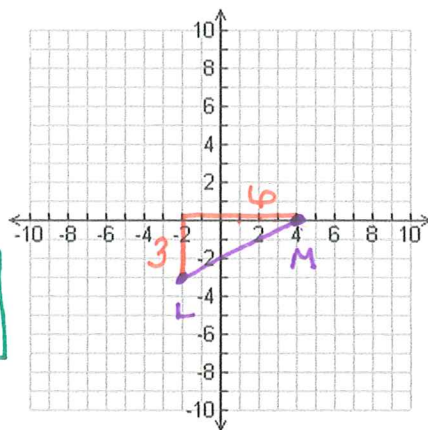
$\frac{0 + 3}{4 - -2} = \frac{3}{6} = \frac{1}{2} = \text{slope of LM}$

MIDPOINT

$(\frac{-2+4}{2}, \frac{-3+0}{2})$

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

Midpt:  $(1, -\frac{3}{2})$   
 or  $(1, -1.5)$



**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).

Solve using Algebra!

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

$\therefore A(-4, 4)$

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

$2+x = -2$   
 $x = -4$

$\frac{8+y}{2} = 6$

$8+y = 12$   
 $y = 4$

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

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

$\frac{-8+x}{2} = -5$

$-8+x = -10$   
 $x = -2$

$\frac{6+y}{2} = 10$

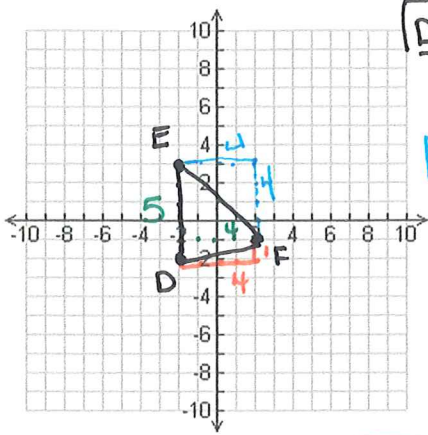
$6+y = 20$   
 $y = 14$

$B(-2, 14)$

Pg. 55 #20-23

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

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

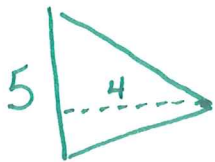


$DE = 5$   
 $EF^2 = 4^2 + 4^2$   
 $EF = 4\sqrt{2}$   
 $4^2 + 1^2 = DF^2$   
 $\sqrt{17} = DF$

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

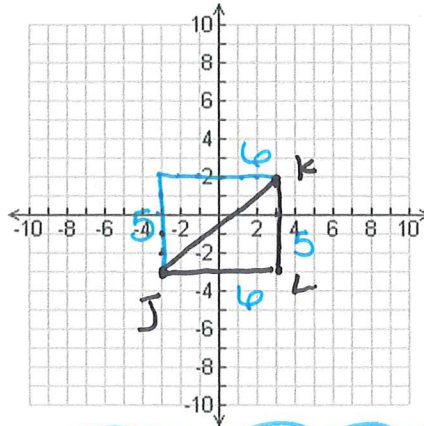
Area:  $A = \frac{1}{2} b \cdot h$

$A = \frac{1}{2} 5 \times 4$



$A = 10$  units<sup>2</sup>

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



$KL = 5$   
 $JL = 6$   
 $6^2 + 5^2 = KJ^2$   
 $36 + 25 = KJ^2$   
 $61 = KJ^2$   
 $KJ = \sqrt{61}$

Perimeter:  $11 + \sqrt{61}$  units

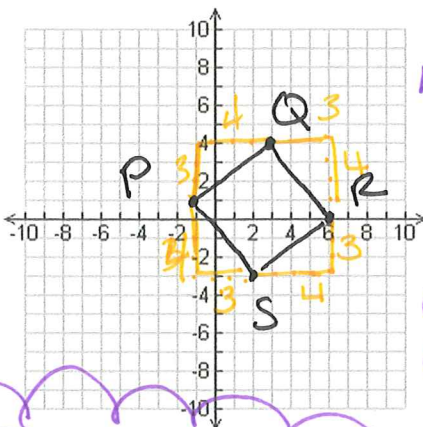
Area:  $A = \frac{1}{2} b \cdot h$

$A = \frac{1}{2} 5 \cdot 6$

$A = 15$  units<sup>2</sup>

Just Perimeter is needed really:

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

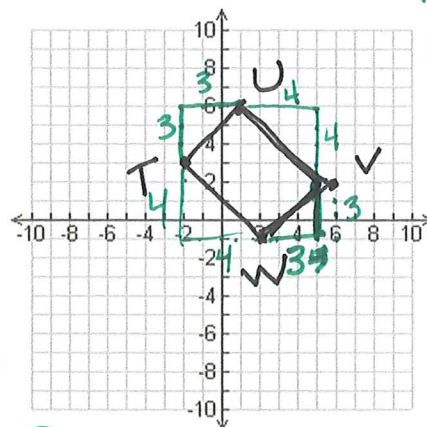


$4^2 + 3^2 = c^2$   
 $16 + 9 = c^2$   
 $25 = c^2$   
 $5 = c$

all sides are 5 units

$P = 20$  units  
 $A = 25$  units<sup>2</sup>

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



$TU = 3\sqrt{2}$   
 $VW = 3\sqrt{2}$   
 $WV = 4\sqrt{2}$   
 $TW = 4\sqrt{2}$

$P = 3\sqrt{2} + 3\sqrt{2} + 4\sqrt{2} + 4\sqrt{2}$   
 $P = 14\sqrt{2}$  units

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

$A = 24$  units<sup>2</sup>