Name:_____ Date:_____

Period:____ Mr. Valentino

Unit 10 Review Sheet

Test Topics!

- Slope
- Midpoint
- Distance
- Quadrilateral Proofs
- Triangle Proofs

Slope

SLOPE FORMULA:

- To decide if lines are parallel or perpendicular, first write the lines in _____ form, which is _____.
- Parallel lines have slopes that are _____.
- Perpendicular lines have slopes that are _____.

State whether the lines are parallel, perpendicular, or neither.

1. $y = 6x - 3$, $y = -\frac{1}{6}x - 7$

2. $y = 3x + 2$, $2y = 6x - 6$

3. $3x - 2y = 5$, $3y + 2x = -3$

4. What is the slope of the line passing through the points (-5, 6) and (4, -3)?

5. What is the slope of the line parallel to the line in question 4? _____

6. What is the slope of the line perpendicular to the line in question 4?_____

7. A line u passes through (6, 1) and (8, p). A line v passes through (2, –3) and (10, –6). The lines u and v are parallel. Find the value of p.

8. What is the equation of the line passing through the points A(4, -5) and B(-2, -2)?

$\longrightarrow y = 3x + 3$

$\longrightarrow (1, 1)$

$y = mx + b$

$1 = 3(1) + b$

$1 = 3 + b$

$b = -2$

Slope formula

$y = 3x - 2$

point slope

$y - 1 = 3(x - 1)$

$y - 1 = 3x - 3$

$+1 \quad +1$

$y = 3x - 2$

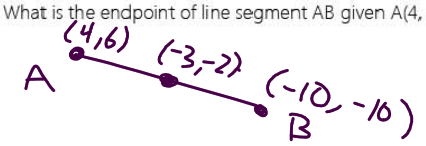
Midpoint

MIDPOINT FORMULA: $\left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}\right)$

1. What is the midpoint of line segment AB with A(11, -5) and B(1, -10)?

2. What is the midpoint of line segment AB with A(14, 18) and B(-6, 10)?

3. What is the endpoint of line segment AB given A(4, 6) and midpoint M(-3, -2)?



$\frac{4+x}{2} = -3$ $4+x=-6$ $-4 \quad -4$ $x=-10$

4. What is the equation of the perpendicular bisector of line segment AB with endpoints A(-4, -2) and B(8, 4)?

$\frac{\Delta y}{\Delta x} = \frac{4+2}{8+4} = \frac{6}{12} = \frac{1}{2}$ → neg. reciprocal → -2

$y=-2x$

$y=mx+b$
$1=-2(2)+b$
$1=-4+b$
$+4 \quad +4$
$6=5$

5. What is the equation of the perpendicular bisector of line segment AB with endpoints A(-9, 11) and B(-15, 19)?

$\left(\frac{-9-15}{2}, \frac{11+19}{2}\right)$

$\left(\frac{-24}{2}, \frac{30}{2}\right)$

→ $(-12, 15)$

$\frac{\Delta y}{\Delta x} = \frac{19-11}{-15+9} = \frac{8}{-6} = -\frac{4}{3} \rightarrow \frac{3}{4}$

$y=mx+b$
$15=\frac{3}{4}(-12)+b$
$15=-9+b$
$+9 \quad +9$
$b=24$

$y=\frac{3}{4}x+24$

$y-15=\frac{3}{4}(x+12)$
$y-15=\frac{3}{4}x+9$
$y=\frac{3}{4}x+24$

Distance

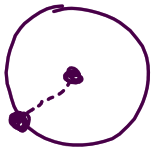
DISTANCE FORMULA: $\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}$

1. Where does the distance formula originate from? _____

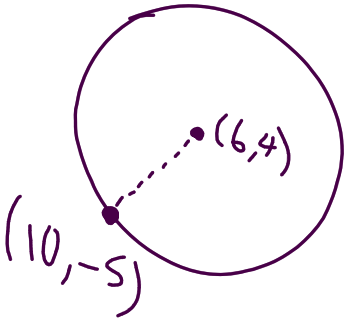
2. What is the length of the line segment connecting A(5, 9) and B(-7, -7)?

3. What is the length of the line segment connecting A(3, 8) and B(9, 10)?

4. The point (-3,-6) lies on a circle. What is the length of the radius of this circle if the center is located at (9,-2)?



5. The point (10,-5) lies on a circle. What is the length of the diameter of this circle if the center is located at (6,4)?



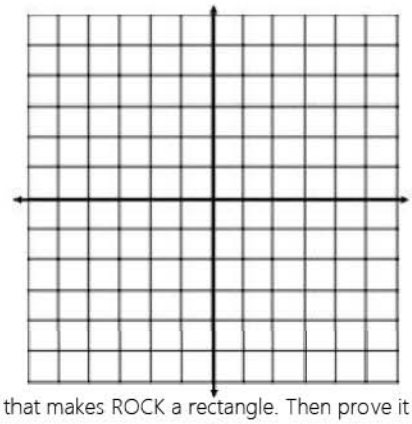
$\sqrt{(6-10)^2+(4--5)^2}$

$\sqrt{(-4)^2+(9)^2} = \sqrt{97}$

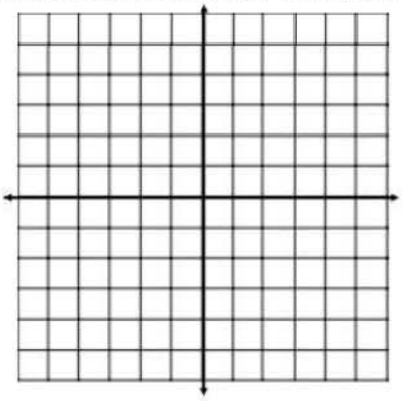
$\sqrt{97}$

Quadrilateral Proofs

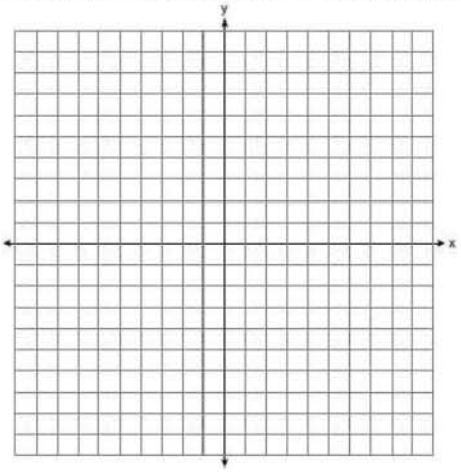
1. Prove that the quadrilateral with the coordinates L(-2,3), M(4,3), N(2,-2) and O(-4,-2) is a parallelogram.



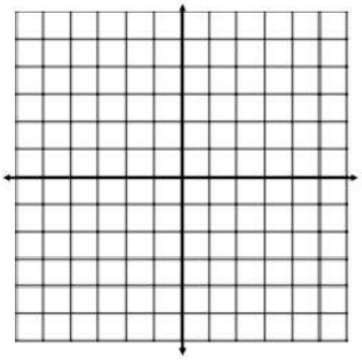
2. Given the points R(-1, 0), C(-3, -4) and K(0, -1), find the point O that makes ROCK a rectangle. Then prove it is a rectangle.



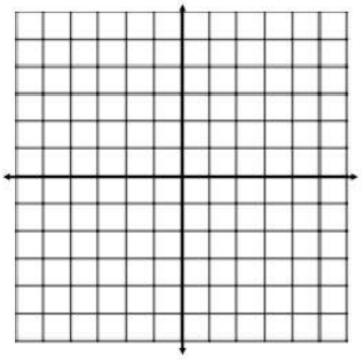
3. Given Rhombus GHJK with G(-5, 5), H(0, 3) and K(-7, 0). Find the coordinates of J. Then prove GHJK is a rhombus.



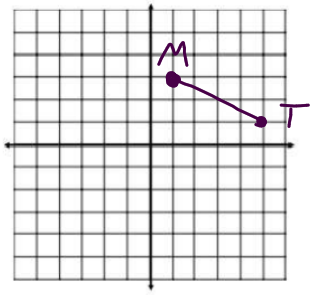
4. Prove that the quadrilateral with vertices A(-1,0), B(3,3), C(6,-1) and D(2,-4) is a square.



5. Prove that quadrilateral MILK with the vertices M(1,3), I(-1,1), L(-1, -2), and K(4,3) is an isosceles trapezoid.



★6 In parallelogram MATH, the coordinates of the endpoints of the diagonal MT are M (1, 3) and T (5, 1). Which of the following equations contains diagonal AH and would prove MATH is a rhombus?

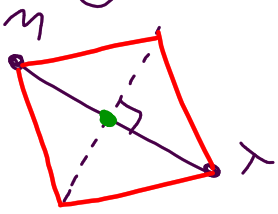


1) $y = -\frac{1}{2}x + 2$

2) $y = 2x - 4$

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

4) $y = 2x + 3.5$



- midpoint
- slope

$\left(\frac{1+5}{2}, \frac{3+1}{2}\right)$

$(3, 2)$

$y = mx + b$

$2 = 2(3) + b$

$-6 \quad -6$

$-4 = b$

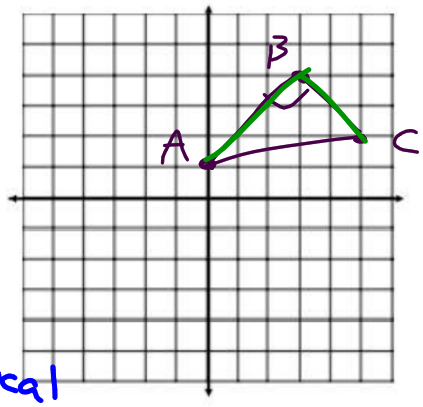
$\frac{\Delta y}{\Delta x} = \frac{3-1}{1-5} = \frac{2}{-4} = -\frac{1}{2}$

$y = 2x - 4$

2

Triangle Proofs

7. Prove that $A(0, 1)$, $B(3, 4)$, $C(5, 2)$ is a right triangle.



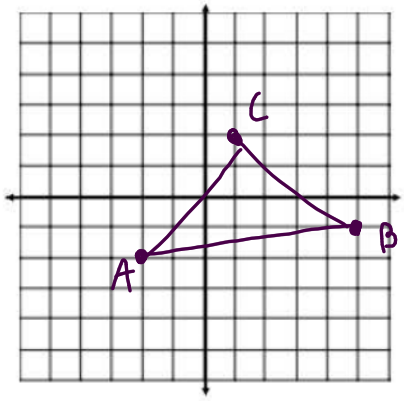
$AB = \frac{4-1}{3-0} = \frac{3}{3} = 1$

$AC = \frac{2-1}{5-0} = \frac{1}{5}$

$BC = \frac{4-2}{3-5} = \frac{2}{-2} = -1$

$AB \perp BC$ b/c they have neg. reciprocal slopes.

8. Prove that $A(-2, -2)$, $B(5, -1)$, $C(1, 2)$ is an isosceles triangle.



$AC = \sqrt{(1+2)^2 + (2+2)^2}$

$= 5$

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

$= \sqrt{25} = 5$

$AC \cong BC$ b/c they have the same length.

$\triangle ABC$ is an isosceles $\triangle$ b/c it has 2 $\cong$ sides.