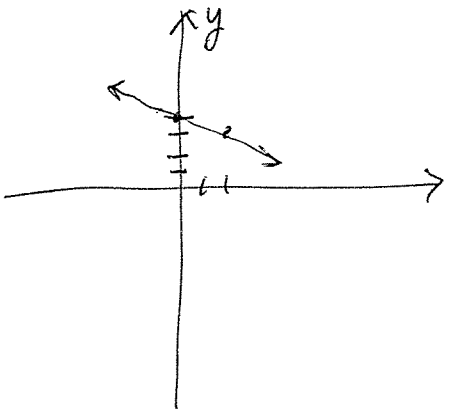
Geometry (H) Name: KEY

– Equations of Lines

Last year in algebra you spent quite a bit of time discussing lines. Let's see what you remember!

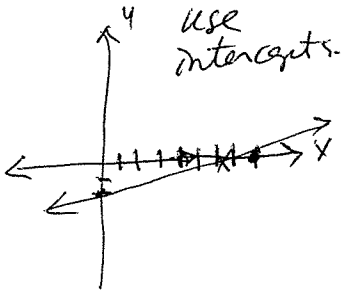
1. Draw an axis and graph the following lines.

a. $y = -\frac{1}{2}x + 4$




b. $x - 4y = 8$

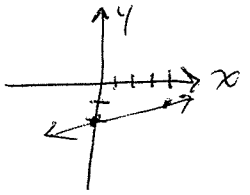
use intercepts.




use slope intercept

$-4y = -x + 8$

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




2. Find the x and y-intercepts of the line $2x - 3y = 12$.

x-int

$2x = 12$

$x = 6$

$(6, 0)$

y-int

$-3y = 12$

$y = -4$

$(0, -4)$

3. Write $2x - 3y = 12$ in slope intercept form. What is the slope? y-intercept?

$-3y = -2x + 12$

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

slope $= \frac{2}{3}$ y-int $= -4$

4. Solve the system algebraically, then sketch a graph of the lines and label the point of intersection P.

$x + 2y = 10$

$3x - 2y = 6$

$4x = 16$

$x = 4$

$4 + 2y = 10$

$2y = 6$

$y = 3$

Solution $(4, 3)$

$x + 2y = 10$

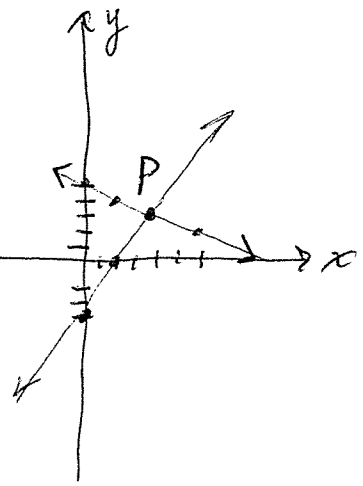
$2y = -x + 10$

$y = -\frac{1}{2}x + 5$

$3x - 2y = 6$

$-2y = -3x + 6$

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



$m = \frac{-A}{B}$ ?

5. Find an equation of the line described

a. through (-1,6) and parallel to $3x + 4y = 12$

$3x + 4y = 12$

$4y = -3x + 12$

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

$m = -\frac{3}{4}$

$y = mx + b$ or $y - y_1 = m(x - x_1)$

$6 = -\frac{3}{4}(-1) + b$

$6 = \frac{3}{4} + b$

$5\frac{1}{4} = b$

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

b. through (-1,6) and perpendicular to $3x + 4y = 12$

$3x + 4y = 12$

$m = -\frac{3}{4}$

$m_{\perp} = \frac{4}{3}$

$y = mx + b$

$6 = \frac{4}{3}(-1) + b$

$6 = -\frac{4}{3} + b$

$7\frac{1}{3} = b$

$y = \frac{4}{3}x + 7\frac{1}{3}$

c. through (3,-2) and (4,1)

$m = \frac{-2-1}{3-4} = \frac{-3}{-1} = 3$

(4, 1)

$1 = 3(4) + b$

$-11 = b$

$y = 3x - 11$

d. with x-intercept 5 and y-intercept -3

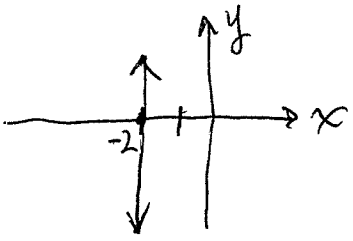
(5, 0) (0, -3)

$m = \frac{-3}{-5} = \frac{3}{5}$

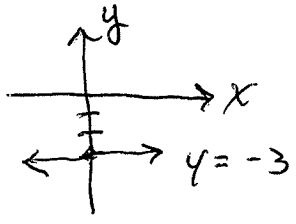
$y = \frac{3}{5}x - 3$

6. Graph

a. $x = -2$




b. $y = -3$



Geometry (H) Name: _____

Use the distance, slope, and midpoint formulas to solve the following problems.

1. In an isosceles triangle, at least two sides of a triangle are congruent. Show that the following triangle is isosceles.

A(-3,4), M(3,1), Y(0,-2)

$d_{AM} = \sqrt{(-3-3)^2+(4-1)^2}$

$= \sqrt{36+9}$

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

$d_{MY} = \sqrt{(3)^2+(1+2)^2}$

$\sqrt{9+9}$

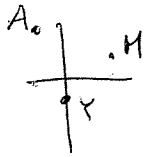
$\sqrt{18}$

$3\sqrt{2}$

$d_{AY} = \sqrt{(-3)^2+(4+2)^2}$

$\sqrt{9+36}$

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




Since $AM = AY$, $\triangle AMY$ is an isosceles $\triangle$.

2. Find n so that the line containing A(2,-7) and B(n,9) has a slope of 5.

$5 = \frac{9--7}{n-2}$

$5n-10 = 16$

$5n = 26$

$n = \frac{26}{5}$

3. M is the midpoint of $\overline{AB}$. Find the coordinate of B using the midpoint formula.

M(2,1) A(-5,-3)

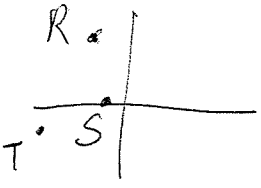
$2 = \frac{-5+x}{2}$ $\quad 1 = \frac{-3+y}{2}$

$4 = -5+x$ $\quad 2 = -3+y$

$9 = x$ $\quad 5 = y$

B(9, 5)

4. R(-2,3), S(-1,0) and T(-4,-1). Show $\angle S$ is right using slope.




$m_{RS} = \frac{0-3}{-1--2} = \frac{-3}{1} = -3$

$m_{TS} = \frac{-1-0}{-4--1} = \frac{-1}{-3} = \frac{1}{3}$

$m_{TR} = \frac{3--1}{-2--4} = \frac{4}{2} = 2$

Since $m_{\overline{RS}}$ & $m_{\overline{TS}}$ are negative reciprocals, $\overline{RS} \perp \overline{TS}$. Therefore, $\overline{RS}$ & $\overline{TS}$ form a rt $\angle$.