Notes 2-2 Linear Relations & Functions Name _____
Algebra II Period _____

Linear Equations

$4x - 5y = 16$

$x = 10$

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

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

Have no:
1. exponents other than 1
2. no square roots
3. no abs. value bars
4. no variables in denominator
5. no variables mult. together

Non-Linear Equations

$2x + 6y^2 = -25$ no: y^2

$y = \sqrt{x} + 2$ no: $\sqrt{x}$

$x + xy = -\frac{5}{2}$ no: xy

$y = \frac{1}{x}$ no: $\frac{1}{x}$

A linear function is any equation that can be written in the form: $y = mx + b$

State whether each function is linear. Write yes or no & explain why.

a) $f(x) = 8 - \frac{3}{4}x$ yes!

b) $f(x) = \frac{2}{x}$ no! variable is in the denominator

c) $g(x, y) = 3xy - 4$ no! 2 variables being multiplied together

Standard Form of a Linear Equation

$$Ax + By = C$$

A, B & C are integers.
A, B & C have greatest common factor of One.
A is not negative.
A & B are not both zero.

Write each equation in standard form. Identify A, B & C

Ex: $-\frac{3}{4}y = 2x + 11$

$+\frac{3}{4}y \quad +\frac{3}{4}y$

$-11 = 2x + \frac{3}{4}y$

$4[2x + \frac{3}{4}y = -11]$

$8x + 3y = -44$

A = 8
B = 3
C = −44

1) $\frac{3(6x-1)}{3} = 4y \cdot 3$

$6x - 1 = 12y$

$-12y \quad -12y$

$6x - 12y - 1 = 0$

$+1 \quad +1$

$6x - 12y = 1$

A = 6
B = −12
C = 1

Graphing Using Intercepts

X intercept: The point where a line crosses the x axis.

Points = (x, 0); solve for "x" by plugging in "0" for y!

Y intercept: point where a line crosses the y axis; points = (0, y)

Find y intercepts by plugging in "0" for x.

Find the x & y intercepts for the x & y intercepts and graph the function using those points.

Ex: $6y = 3x + 24 \Rightarrow 3x - 6y = -24$

x int: $3x - 6(0) = -24$

$\frac{3x}{3} = \frac{-24}{3}$

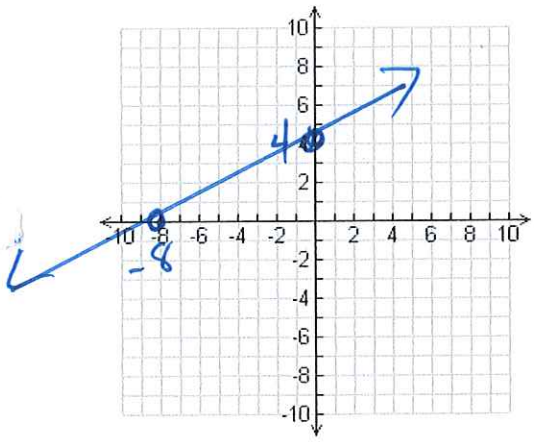
$x = -8$ $(-8, 0)$

y int: $3(0) - 6y = -24$

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

$y = 4$

$(0, 4)$



2) $2x + 3y + 12 = 0$

$2x + 3y = -12$

$2x + 3(0) = -12$

$2x = -12$

$x = -6$

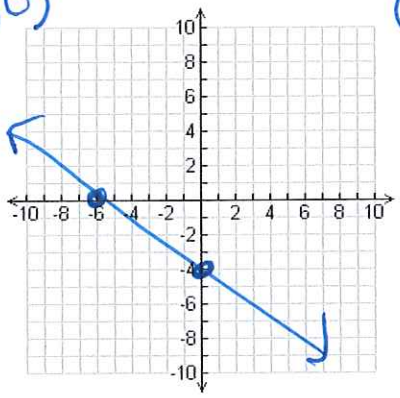
$(-6, 0)$

$2(0) + 3y = -12$

$\frac{3y}{3} = \frac{-12}{3}$

$y = -4$

$(0, -4)$



Paul charges people $25 to test the air quality in their homes. The device he uses to test air quality cost him $500. Write an equation that describes Paul's net profit as a function of the number of clients he gets.

$P = 25x - 500$

$y = 25x - 500$

Rewrite the equation in standard form.

$25x - y = +500$

Find the x & y intercepts and graph.

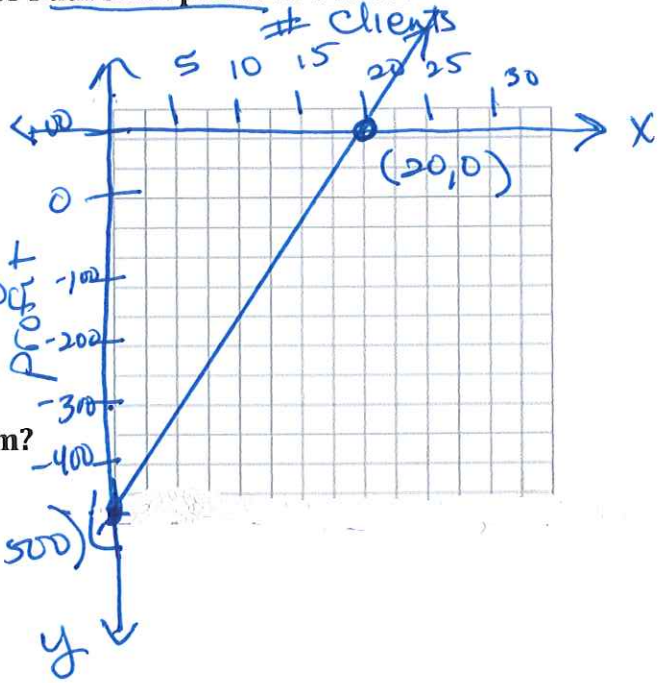
$25x - 0 = 500$

$25x = 500$ $x = 20$

$25(0) - y = 500$

$-y = 500$

$y = -500$



What do the intercepts mean in the context of this problem?

Paul starts off owing $500. After 20 clients he begins to make a profit.