$Ax+By=C$

3.5 – Standard Form

* - **Standard Form** → uses the form $Ax+By=C$ where A, B, and C are Integers and A and B cannot be zero AT THE SAME TIME. (whole #'s and their opposites.)

- linear equations in standard form have NO FRACTIONS and NO DECIMALS; must turn into Integers
- linear equations in standard form have "x" and "y" are on the same side (Left)
- linear equations in standard form have a value for "A" that is POSITIVE
- linear equations in standard form can be easily graphed by finding the x- and y-intercepts
- linear equations in standard form can be easily graphed by transforming the equation into Slope-Intercept Form "y=mx+b"

Example 1: Which equations are in standard form? Circle YES or NO. If NO, explain why.

a.) $-4x+y=3$ → YES (NO) b/c "A" negative

b.) $2x-4y=1$ → (YES) NO

c.) $x+y=-6$ → (YES) NO

d.) $3x+\frac{1}{2}y=2$ → YES (NO) b/c there is a Fraction.

e.) $y=2x-1$ → YES (NO) b/c it is in Slope Intercept Form ($y=mx+b$)

f.) $4x=12$ → (YES) NO $4x+0y=12$ B=0, so 0(y)=0!

g.) $5y+3x=0$ → YES (NO) b/c "Ax" is not first!

h.) $y=\frac{1}{3}$ → YES (NO) $0x+y=\frac{1}{3}$ b/c there is a fraction!

i.) $0x+0y=-4$ → YES (NO) b/c "A" and "B" are both zero!

j.) $2y-x=1$ → YES (NO) b/c "Ax" is not first and "Ax" is negative

* - **x-intercept** → is the point on the graph that crosses x-axis and written as $(x,0)$; $x=\#$
* - **y-intercept** → is the point on the graph that crosses y-axis and written as $(0,y)$; $y=\#$

$Ax+By=C$

- To find x-intercept and y-intercept when an equation is in standard form, do the following…

1.) to find x-intercept → substitute 0 for y and solve for x

2.) to find y-intercept → substitute 0 for x and solve for y

3.) plot both intercepts and connect the points

Ex: $2x-\frac{1}{3}y=10$

x-int let y=0

$2x-\frac{1}{3}y=10$

$2x-\frac{1}{3}(0)=10$

$2x=10$

$x=5$ (5,0)

y-int Let x=0

$2x-\frac{1}{3}y=10$

$2(0)-\frac{1}{3}y=10$

$(-3)-\frac{1}{3}y=10(-3)$

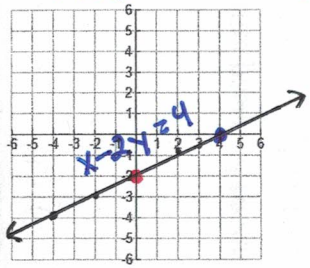
$y=-30$ (0,-30)

Example 2: Graph each linear equation using x- and y-intercepts.

a.) $x-2y=4$

x-int: $x-2(0)=4$, $x=4$, (4,0)

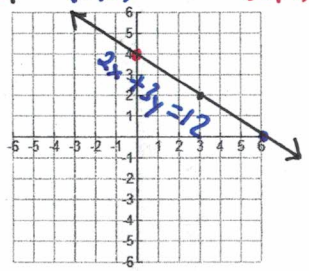
y-int: $(0)-2y=4$, $-2y=4$, $y=-2$, (0,-2)



b.) $2x+3y=12$

x-int: $2x+3(0)=12$, $2x=12$, $x=6$, (6,0)

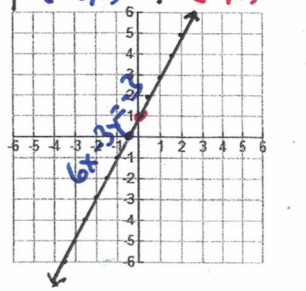
y-int: $2(0)+3y=12$, $3y=12$, $y=4$, (0,4)



c.) $6x-3y=-3$

x-int: $6x-3(0)=-3$, $6x=-3$, $x=-\frac{3}{6}$ or $-\frac{1}{2}$, $(-\frac{1}{2},0)$

y-int: $6(0)-3y=-3$, $-3y=-3$, $y=1$, (0,1)



Example 3: Change each linear equation that's in slope-intercept form into standard form.

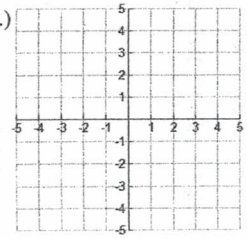
a.) $y=-3x+\frac{1}{4}$ b.) $y=\frac{1}{2}x-4$ c.) $y=\frac{3}{4}x+2$ d.) $y=-\frac{2}{3}x-5$

- **horizontal line** → has the form _____ and only crosses the _____

- **vertical line** → has the form _____ and only crosses the _____

Example 4: Graph each set of equations and shade in the figure that is created.

a.)



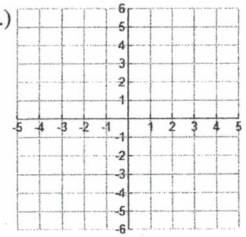
$x-2y=-2$

$x-2y=6$

$x+4=0$

$2x=6$

b.)



$y=2x+4$ $y=2$

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

$2x-y=4$

$y=-2x-4$