Name:_____   Date:_____

Notes
Algebra Section 5.4
Pages 311-316

Goal: "You will write equations in standard form"

<div align="center">

STANDARD FORM!

$$Ax + By = C$$

</div>

A is always the <u>coefficient</u> of <u>x.</u>   B is always the <u>coefficient</u> of <u>y.</u>

C is always the <u>constant.</u>

You always want A to be <u>positive</u> and not a <u>fraction</u> or <u>decimal.</u>

1. Write equivalent equations in standard form:

Example: $2x - 6y = 4$

You can divide both sides by the same common factor.   divide by 2 $x - 3y = 2$

You can multiply both sides by the same number.   multiply by 2 $2x - 6y = 4$

All three of these equations are in <u>standard</u> <u>form</u> and all of them are <u>equivalent.</u>

Try These:

              1) $x - y = 3$ **2)** $x + 4y = 3$

Many answers are acceptable
Possible answer: $2x - 2y = 6$ Possible answer: $2x + 8y = 6$

You may need to multiply or divide both sides so that A is not negative.
Example:

$$-2x + 3y = 8$$

A (the coefficient of x is a negative) $2x - 3y = -8$
Multiply both sides of the equation by -1

Try These:
$-3x + 2y = -4$ $-x - 4y = 2$ $-2x - 3y = -5$

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

You may need to multiply or divide both sides so that A is not a fraction.

Example:
$$\frac{1}{3}x + 2y = 1$$

A (the coefficient of x is a fraction)
Multiply both sides of the equation by 3
(the denominator of A)

$x + 6y = 3$

Try These:

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

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

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

$x + 4y = -8$

$2x - 15y = 15$

$2x - 15y = -3$

You may need to multiply or divide both sides so that A is not a decimal.

Example:
$$0.6x + 3y = 4$$

A (the coefficient of x is a decimal)
Multiply both sides of the equation by 10
(to clear the decimal)

$6x + 30y = 40$

Try These:

$0.4x + y = -2$

$1.3x - 2y = 1$

$0.55x - 2y = -3$

$4x + 10y = -20$

$13x - 20y = 10$

$55x - 200y = -300$

You may need to multiply or divide both sides so that A is not a negative and a fraction/decimal.

Example:
$$-\frac{1}{3}x + 3y = -1$$

A (the coefficient of x is a fraction and negative)
Multiply both sides of the equation by -3
(to get rid of the fraction and negative)

$x - 9y = 3$

Try These:

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

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

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

$3x + 8y = 12$

$x + 5y = -25$

$2x + 6y = 6$

$-0.3x + 2y = -4$

$-2.4x - y = 3$

$-0.22x + 5y = 1$

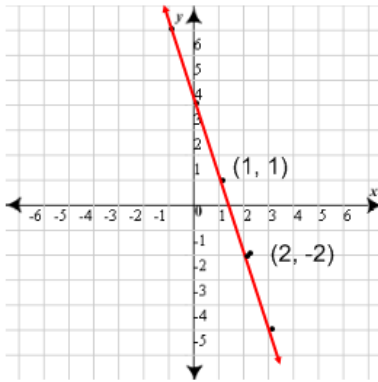$3x - 20y = 40$

$24x + 10y = -30$

$22x - 500y = -100$

Write equations in standard form with given information.

Ex:

Find the slope

Find the y-intercept

Write the equation using m and b

Rewrite the equation in standard form.

$m = -3 \qquad b = 4$

$y = -3x + 4$

$\mathbf{3x + y = 4}$

Try These: (Make sure A is a positive whole number)

1) Passes through (3, –1) (2, –3)

$m = 2 \; b = -7$

$y = 2x - 7$

$-2x + y = -7$ A cannot be negative so multiply

both sides by -1.

$\mathbf{2x - y = 7}$

2) Passes through (2, 2) (4, –2)

$m = -2 \qquad\qquad b = 6$

$y = -2x + 6$

$2x + y = 6$

Complete an equation in standard form
For each equation use the information to find the missing coefficient. Then write the equation in standard form.
Ex: $Ax + 3y = 2$, passes through the point (–1, 0)

$x=\underline{\;\;-1\;\;\;\;\;}$ $\qquad\qquad$ $y=\underline{\;\;0\;\;\;\;\;\;}$

Plug them in and solve for A. $\qquad\qquad$ $A(-1) + 3(0) = 2$

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ $-A = 2$

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ $A = -2$

Write the equation in standard form. $\qquad$ $2x - 3y = -2$

Try These:

1) $-4x + By = 7$, passes through the point $(-1, 1)$
$-4(-1) + B(1) = 7$
$4 + B = 7$
$B = 3$
$-4x + 3y = 7$ $\mathbf{4x - 3y = -7}$

2) $Ax + 4y = 6$, passes through the point $(2, 0)$
$A(2) + 4(0) = 6$
$2A = 6$
$A = 3$
$3x + 4y = 6$

3) $Ax + y = -3$, passes through the point $(2, 11)$
$A(2) + 11 = -3$
$2A = -14$
$A = -7$
$-7x + y = -3$ $\mathbf{7x - y = 3}$

Ex: Your class is taking a trip to the public library. You can travel in small and large vans. A small van holds 8 people and a large van holds 12 people. One possible way your class could get there is to fill 15 small vans and 2 large vans.

 a. Write an equation to model all of the possible combinations of small and large vans your class could take. If one possibility is 15 small vans and 2 large vans then multiply 15 and 8 and 12 and 2 to find the total number of people that need to go.
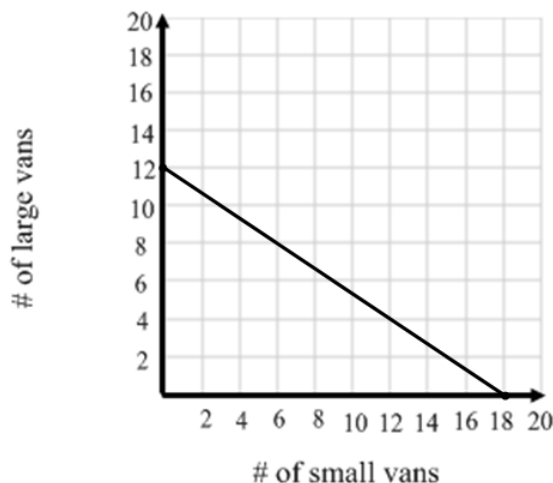
   $8x + 12y = 144$

 b. Graph the equation.

 c. Use your graph to find more possible combinations of vans.

12 small vans, 4 large vans
0 small vans, 12 large vans
18 small vans, 0 large vans
6 small vans, 8 large vans

Ex: At a flea-market t-shirts cost $4.50 and shorts cost $6. You have enough money that if you wanted to you could buy exactly 12 t-shirts and 9 pairs of shorts.

 a. Write an equation to model all of the possible combinations of t-shirts and shorts that you can buy.
   $4.5x + 6y = 108$

 b. Graph the equation.

 c. List the possible combinations of t-shirts and shorts you can buy.

0 T-Shirts, 18 shorts
24 T-shirts, 0 shorts
16 T-shirts, 6 shorts
8 T-shirts, 12 shorts