Algebra 1R
Unit 3 Day 2 Notes

Name:_____
Date:_____

Standard Form of Linear Equations

PROBLEM 1 How Much Did We Make?

The Marshall High School Athletic Association sells tickets for the weekly football games. Students pay $5 and adults pay $10 for a ticket.

1. How much money would the athletic association collect:
   a. if 100 students and 50 adults buy tickets to the game?

$\$5(100) + \$10(50)$
$500 + 500$
$\$1000$

   b. if 125 students and 75 adults buy tickets to the game?

$5(125) + 10(75)$
$625 + 750$
$\$1375$

2. What quantities in the situation are independent? What quantities are dependent? Explain your reasoning.

I- # tickets sold (both student and adult)
D- $ collected

3. Write an expression that represents the total amount of money collected for any number of tickets sold. Use **s** to represent the number of student tickets sold, and use **a** to represent the number of adult tickets sold.

$5s + 10a$

4. Write a function that represents the total amount of money collected. Use the function to determine the amount of money collected at each game.

$f(s,a) = 5s + 10a$

a. **Game 1**
85 student tickets
80 adult tickets

$f(85,80) = 5(85) + 10(80)$
$= 425 + 800$
$= \$1225$

b. **Game 2**
94 student tickets
63 adult tickets

$f(94,63) = 5(94) + 10(63)$
$= 470 + 630$
$= \$1100$

Standard Form of Linear Equation

PROBLEM 2.4 How Many Tickets Do We Need to Sell?

The football team is playing in an out-of-town tournament. The athletic association needs to raise $3000 to send the team to this tournament. The money raised from selling tickets to a special event home game will be used toward the tournament cost.

1. Complete the table of values for the given number of tickets sold. In the last row of the table write and expression for the total amount of money collected in terms of the number of tickets sold.

Student Tickets ($5) (Tickets Sold)	Adult Tickets ($10) (Tickets Sold)	Money Collected (Dollars)
0	300	3000
100	250	3000
200	200	3000
300	150	3000
450	75	3000
500	50	3000
600	0	3000
Expression: s	a	5s + 10a

2. What relationship exists between the number of student tickets sold and the number of adult tickets sold in this situation? Explain your reasoning. There is a linear relationship between the # of student tickets sold and the # of adult tickets sold. The # of adult tickets needing to be sold is decreasing at a constant rate of 50 tickets for every 100 tickets of students sold.

3. Write an equation to represent the total number of student and adult tickets that must be sold to collect $3000.

$$5s + 10a = 3000$$

4. This equation represents a linear equation in **Standard Form**. How is this form different from **Slope-Intercept Form** (y=mx + b)?

The variables are on the same side of the equation in standard form. The slope & y-intercept are not seen in the equation.

Determining the x- and y-intercepts to graph a linear function.

To determine the x-intercept: put in a zero for y and solve for x

To determine the y-intercept: put in a zero for x and solve for y

1. Determine the x-intercept and y-intercept of the graphs described by each equation above.

a. Student Tickets

$5S + 10A = 3000$

$-10A \quad -10A$

$\frac{5S}{5} = \frac{-10A}{5} + \frac{3000}{5}$

$S = -2A + 600$

b. Adult Tickets

$5S + 10A = 3000$

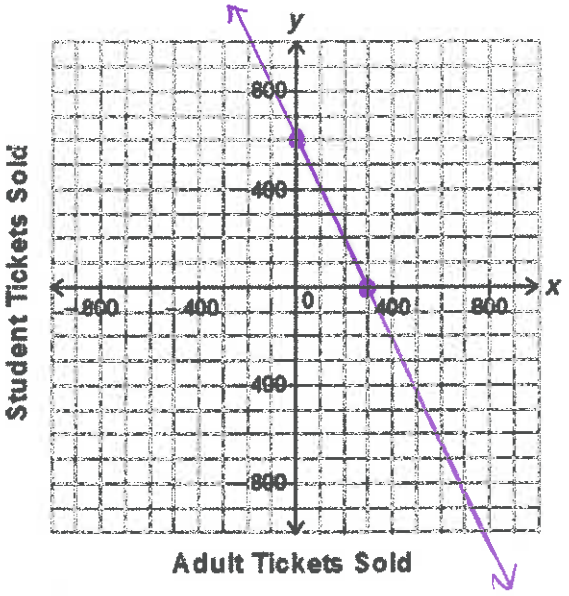
$-5S \quad -5S$

$\frac{10A}{10} = \frac{-5S}{10} + \frac{3000}{10}$

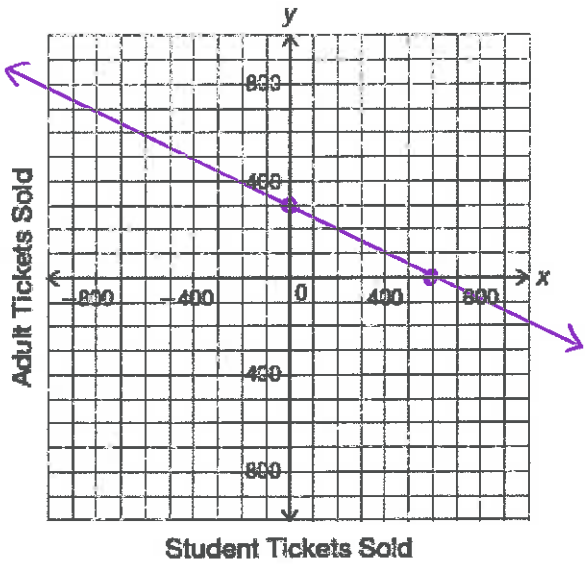
$A = -\frac{1}{2}S + 300$

2. Use the x-intercepts and y-intercepts to graph each equation.

a. Student Tickets Sold



b. Adult Ticket Sold



Check for Understanding

Convert each equation from **standard form** into **slope intercept form**, find the intercepts and graph.

1. $6x + 3y = 900$

$-6x \quad -6x$

$\frac{3y}{3} = \frac{-6x}{3} + \frac{900}{3}$

$y = -2x + 300$

Solve for y to get in slope-intercept form

y int

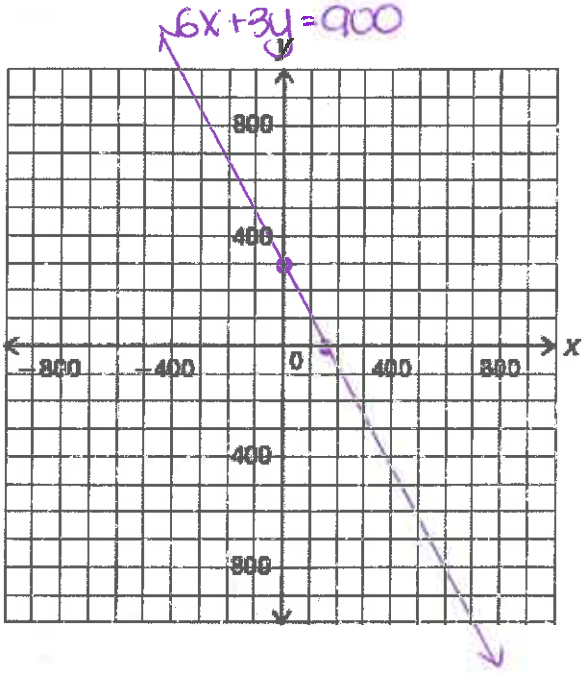
$y = 300$

x int

$6x + 3(0) = 900$

$6x = 900$

$x = 150$



2. $2x - 4y = 1600$

$-2x \quad -2x$

$\frac{-4y}{-4} = \frac{-2x}{-4} + \frac{1600}{-4}$

$y = \frac{1}{2}x - 400$

y int

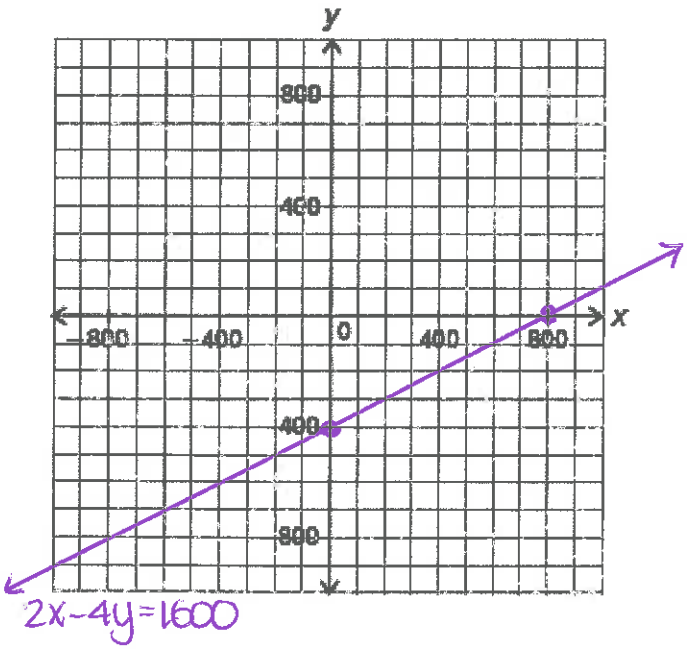
$y = -400$

x int

$2x - 4(0) = 1600$

$2x = 1600$

$x = 800$



Slope-Intercept & Standard Form:

PROBLEM 2 Good Form!

Convert each given equation to the form indicated. Then, identify the *x*-intercept, *y*-intercept, and the slope. Show your work for each.

1. $6x + 5y = 20$

a. slope-intercept form:

$6x + 5y = 20$
$-6x \quad -6x$
$\frac{5y}{5} = \frac{-6x}{5} + \frac{20}{5}$
$y = -\frac{6}{5}x + 4$

b. *x*-intercept:

$6x + 5(0) = 20$
$6x = 20$
$x = \frac{20}{6}$
$\left(\frac{10}{3}, 0\right)$

c. *y*-intercept:

$y = 4$

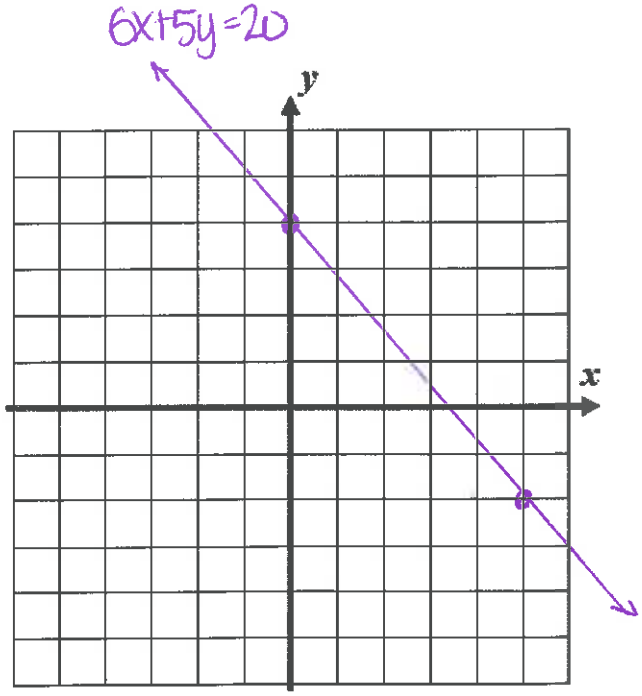
d. slope:

$m = -\frac{6}{5}$

Which form makes it easier to graph?

Ok, now graph it!

slope-intercept form.



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

Get x and y on the same side

a. standard form:

$3(y) = 3(-\frac{2}{3}x) + 3(10)$

$3y = -2x + 30$

$+2x \quad +2x$

$2x + 3y = 30$

b. x-intercept:

$2x + 3(0) = 30$

$2x = 30$

$x = 15$

c. y-intercept:

$2(0) + 3y = 30$

$3y = 30$

$y = 10$

d. slope: $-\frac{2}{3}$

Which form is easier to use to graph?

Standard form

Ok, now graph it!! * watch the scale *

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