

### CW & HW 3.3.14: Standard Form

Name \_\_\_\_\_

Situation: At the concession stand, you can buy a piece of pizza for \$2 or a bag of popcorn for \$1. You and your friends spend a total of \$10.

Define the variables: Let  $x$  = # of pieces of pizza you buy  
 $y$  = # of bags of popcorn you buy

Equation in standard form:  **$2x + 1y = 10$**

1. a) If you buy 0 pieces of pizza, how many bags of popcorn do you buy?

$$x=0 \quad 2(0) + 1y = 10$$

$y = 10$  bags of popcorn

b) Write your answer as an ordered pair  $(x, y)$  and plot it below.  $(0, 10)$

c) Where is this point located? on the y-axis

2. a) If you buy 0 bags of popcorn, how many pieces of pizza do you buy?

$$y=0 \quad 2x + 1(0) = 10$$

$$2x = 10$$

$x = 5$  pieces of pizza

b) Write your answer as an ordered pair  $(x, y)$  and plot it below.  $(5, 0)$

c) Where is this point located? on the x-axis

3. Draw a line connecting the x and y-intercepts.

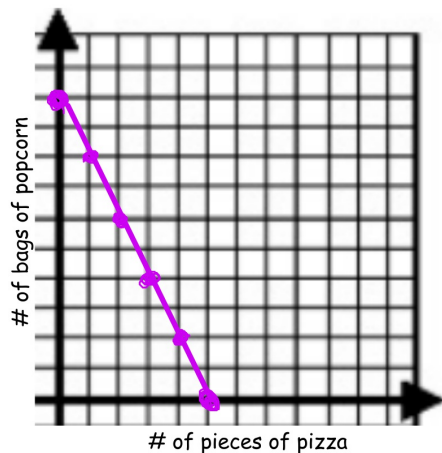
4. a) What other combinations of pieces of pizza and bags of popcorn could you buy for \$10? List the combinations as ordered pairs  $(x, y)$ . For example you could buy 1 piece of pizza and 8 bags of popcorn  $(1, 8)$ .

$(3, 4)$   
 $\$6 \ \$4 \rightarrow \$10$   
 $(2, 6)$   
 $(4, 2)$

b) Plot the ordered pairs.

c) What do you notice about the ordered pairs?

They are on the line



### 3.3.14: Standard Form and Finding x- and y-intercepts

Standard Form:  $Ax + By = C$

where  $A$ ,  $B$  and  $C$  are real numbers.

Every point  $(x, y)$  on the line is a solution to the equation.

y-intercept: where the graph crosses the y-axis  $(0, y)$

x-intercept: where the graph crosses the x-axis  $(x, 0)$

Situation: Each time you bike  $(x)$  at the YMCA, you bike 3 miles. Each time you run  $(y)$  at the YMCA, you run 2 miles. Your total for one week of biking and running is 18 miles.

5. Define the variables. Let  $x$  = # of times you bike  
 $y$  = # of times you run

6. Write an equation in standard form.  $3x + 2y = 18$

7. If you bike 0 times, how many times do you run? Write your answer as an ordered pair  $(x, y)$ . What significant feature of the graph is this?

$x=0$   
 $2y = 18$   
 $y = 9$   $(0, 9)$  y-intercept

8. If you run 0 times, how many times do you bike? Write your answer as an ordered pair  $(x, y)$ . What significant feature of the graph is this?

$y=0$   
 $3x + 2y = 18$   
 $3x = 18$   
 $x = 6$   $(6, 0)$  x-intercept

9. Draw a line connecting the x and y-intercepts.

10. If you bike 4 times, how many times do you run? Then write this solution as an ordered pair and plot it.  $(4, 3)$

$$3x + 2y = 18$$

$$3(4) + 2y = 18$$

$$12 + 2y = 18$$

$$-12 \quad -12$$

$$2y = 6$$

$$\frac{2y}{2} = \frac{6}{2}$$

$$y = 3$$

11. If you run 6 times, how many times do you bike? Then write this solution as an ordered pair and plot it.  $(2, 6)$

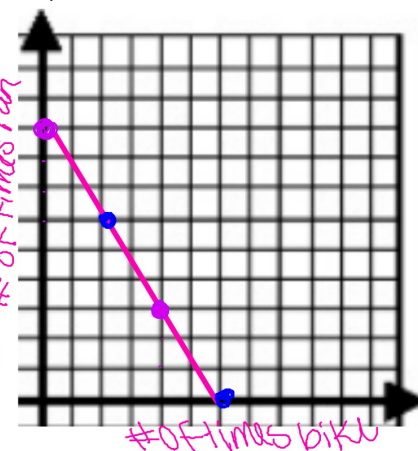
$$3x + 2(6) = 18$$

$$3x + 12 = 18$$

$$-12 \quad -12$$

$$3x = 6$$

$$\rightarrow x = 2$$



Situation: The Vikings won a football game by scoring touchdowns (x) worth 6 points each and field goals (y) worth 3 points each. The Vikings scored a total of 48 points in the game.

12. Define the variables. Let  $x$  = # of touchdowns

$y$  = # of field goals

13. Write an equation in standard form.  $6x + 3y = 48$

14. What is the y-intercept? Plot it.  $(0, \#) \rightarrow (0, y)$   
 $(0, 16)$   $6(0) + 3y = 48$   
 $3y = 48$   
 $y = 16$

15. Explain the meaning of the y-intercept in context of the problem.

0 touchdowns and 16 field goals equals 48 points

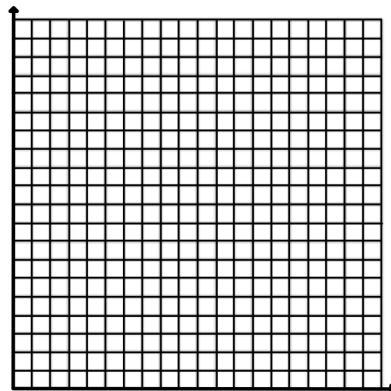
16. What is the x-intercept? Plot it.  $(\#, 0) \rightarrow (x, 0)$   
 $(8, 0)$   $6x + 3(0) = 48$   
 $6x = 48$   
 $x = 8$

17. Explain the meaning of the x-intercept in context of the problem.

18. Draw a line connecting the x and y-intercepts.

19. Use the graph to name one point on the line (other than the x or y-intercept) that is a solution to the problem.

20. Explain what the point in #19 means in context of the problem and why it's a solution to the situation/equation.



21. If the Vikings make 7 field goals, how many touchdowns do they make? Does this solution make sense in context of the problem?

Situation: The Dodgeball Tournament collected 480 canned goods for Viktor's Pantry. Each team that participated brought in 20 items and each individual that participated brought in 8 items.

22. Define the variables. Let  $x$  =

$y$  =

23. Write an equation in standard form.

24. What is the y-intercept?

25. Explain the meaning of the y-intercept in context of the problem.

26. What is the x-intercept?

27. Explain the meaning of the x-intercept in context of the problem.

28. If 16 teams participated, how many individuals participated?

Situation: To go open skating, the cost is \$3 for each student (x) and \$5 for each adult (y). The total money earned at open skating was \$60.

29. Write an equation in standard form.

30. What is the y-intercept? Plot it.

31. What is the x-intercept? Plot it.

32. Draw a line connecting the x and y-intercepts.

33. Use the graph to name a point on the line (other than the x or y-intercept) that is a solution to the problem.

34. Explain what the point in #33 means in context of the problem and why it's a solution to the situation/equation.

