

Math 1010 Lesson 1-5
(Textbook 1.9 and Lab 1)
More equations of Lines

“standard form” $Ax + By = C$

$$-2x + y = 2$$

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

$$y = 2$$

What is the y-intercept?
(give an ordered pair) $(0, b)$

$(0, 2)$

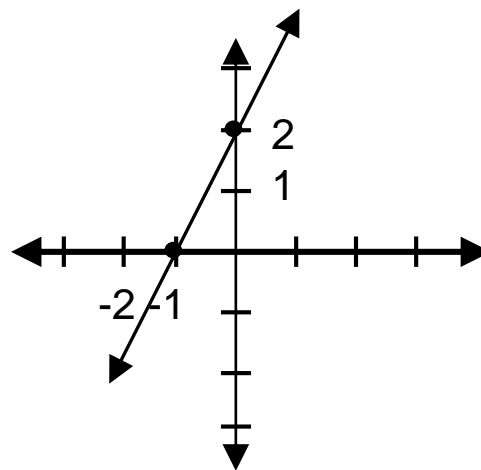
$$-2x + y = 2$$

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

$$x = -1$$

What is the x-intercept?
(give an ordered pair) $(a, 0)$

$(-1, 0)$



“standard form” $Ax + By = C$

$$4x - 3y = -12$$

What is the y-intercept?
(give an ordered pair) $(0, b)$

$$4(0) - 3y = -12$$

$(0, 4)$

$$-3y = -12$$

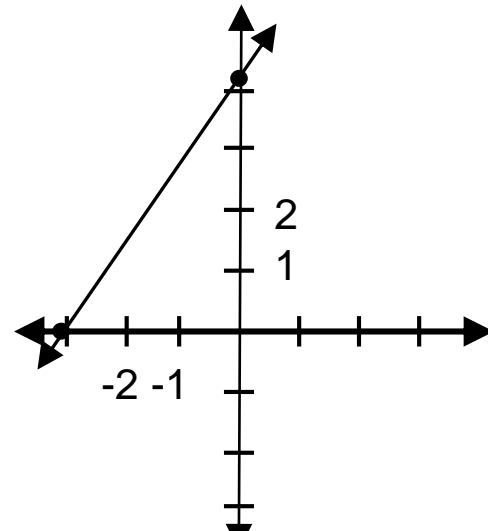
$$4x - 3(0) = -12$$

What is the x-intercept?
(give an ordered pair) $(a, 0)$

$$4x = -12$$

$(-3, 0)$

Graph the line.



“standard form” $Ax + By = C$

$$4x - 3y = -12$$

What “nice” thing did you notice about the coefficients of ‘x’ and ‘y’?

$$-2x + y = 2$$

They both divide the constant evenly.

This makes it extremely easy to find the ‘x’ and ‘y’ intercepts (and then graph).

Which of the following have this “nice” pattern?

What are the intercepts?

$$7x - 3y = 21$$

$(0, -7)$ $(3, 0)$

$$-5x - 2y = 24$$

$(0, -12)$ $(?, 0)$

$$-2x - 9y = 27$$

$(0, -3)$ $(?, 0)$

“standard form” $Ax + By = C$

If the standard form equation does NOT have the nice pattern, you can convert it to slope intercept form.

$$-5x - 2y = 24$$

$$-5x = 2y + 24$$

$$-5x - 24 = 2y$$

$$-\frac{5}{2}x - 12 = y$$

$$y = -\frac{5}{2}x - 12$$

$$-2x + 9y = 27$$

$$9y = 2x + 27$$

$$y = \frac{2}{9}x + 3$$

$$y = \frac{2}{9}x + 3$$

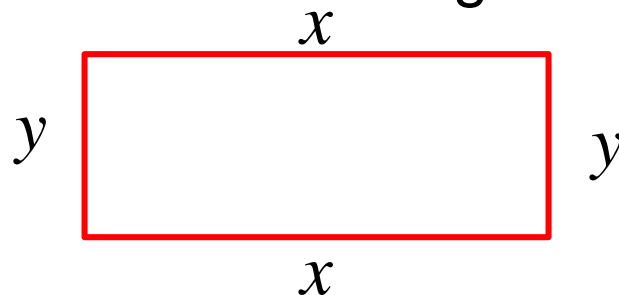
Which you can graph.

Standard form linear equations

Your town has authorized funding to build a new ramp and pathways for skateboarding. The facility needs to have a fence around it. The budget allows for a 350 feet of fencing. The only stipulation is that the width be between 35 and 60 feet in order to enclose the ramp. Find the length and width of the enclosure so that you use all of the fencing.

$$\text{Perimeter} = 2w + 2L$$

$$350 = 2x + 2y$$



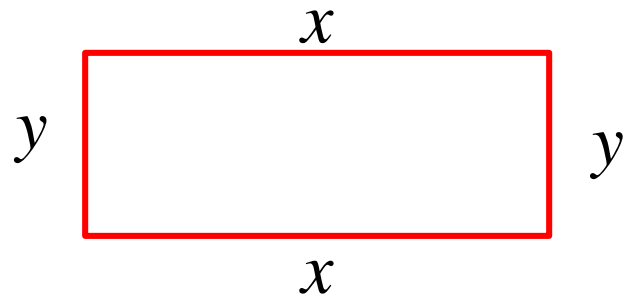
Write the equation in slope-intercept form. (show your work!)

$$y = -x + 175$$

What is the practical domain? $35 \leq x \leq 60$

Standard form linear equations

$$\text{Perimeter} = 2w + 2L$$



$$350 = 2x + 2y$$

$$y = -x + 175$$

$$\text{Domain: } 35 \leq x \leq 60$$

What is the resulting range?

$$115 \leq y \leq 140$$

$$y_{\min} = -60 + 175 \quad y_{\max} = -35 + 175$$

Is it easier to find the range using the standard form equation or the slope intercept from equation? explain

Slope intercept form \rightarrow has already been solved for 'y'

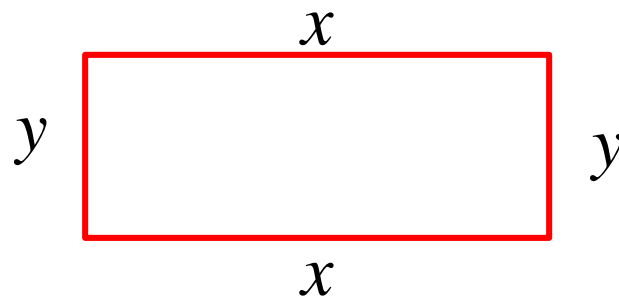
If fence is sold in 1 foot increments, are the domain and range really a continuous set or a discrete set of numbers?

Standard form linear equations

$$\text{Perimeter} = 2w + 2L$$

$$350 = 2x + 2y$$

$$y = -x + 175$$



Domain: $35 \leq x \leq 60$

Range: $115 \leq y \leq 140$

If fence is sold in 1 foot increments, are the domain and range a continuous set or a discrete set of numbers?

Redefine the domain and range so that they are a discrete set of numbers.

$$\text{width} = \{35, 36, 37, 38, \dots, 58, 59, 60\}$$

$$\text{length} = \{115, 116, 117, 118, \dots, 138, 139, 140\}$$

You are working in the purchasing department of an electronics store. Your job this month is to stock up on GPS units and tablet PCs. Your supervisor informs you that you have a budget of \$12,000 for the month. You know the average *wholesale* cost of GPS units are \$125 and the average *wholesale* cost of tablet PCs is \$400.

Write an expression that represents the total amount you can spend on GPS units. $125g$

Write an expression that represents the total amount you can spend on PC tablets. $400t$

Write an equation that relates your total budget to the amount you can spend on GPS units and PC tablets.

$$125g + 400t = 12,000$$

the total cost of all GPS units. $125g$

The total cost of all PC tablets. $400t$

Total cost / budget equation: $125g + 400t = 12,000$

Rewrite the equation in the following form: $g = f(t)$

$$g = \frac{-400t + 12,000}{125} \quad g = -3.2t + 96$$

Rewrite the equation in the following form: $t = f(g)$

$$t = \frac{-125t + 12,000}{400} \quad t = -0.3125g + 30$$

$t = f(g)$ to define the input and output variables.

What is the horizontal intercept? $(g, t) = (96, 0)$

What is the practical meaning of the horizontal intercept?

You can buy a maximum of 96 GPS units if you don't purchase any PC tablets.