

8.2 Linear Equations *in* two variables

Students will be able to find solutions of equations in two variables

An example of an equation in two variables is

$$2x - y = 5$$

A **solution** of an equation in x and y is an ordered pair (x, y) that produces a true statement when the values of x and y are substituted into the equation.

Handwritten work showing the substitution of the ordered pair $(0, -5)$ into the equation $2x - y = 5$:

$$\begin{aligned} 2(0) - (-5) & \stackrel{?}{=} 5 \\ 0 + 5 & = 5 \\ 5 & = 5 \end{aligned}$$

Tell whether the ordered pair is a solution of $2x - y = 5$

Handwritten work for checking solutions:

$(1, -3)$ Yes	$(4, 7)$ No
$2(1) - (-3) \stackrel{?}{=} 5$	$2(4) - 7 =$
$2 + 3$	$8 - 7 \neq 5$

Tell whether the ordered pair is a solution of $3x + 2y = -8$

Handwritten work for checking solutions:

$(0, 4)$	$(-2, -1)$	$(4, -12)$	$(10, -19)$
$3(0) + 2(4)$	$3(-2) + 2(-1)$	$3(4) + 2(-12)$	$3(10) + 2(-19)$
$8 \neq -8$	$-8 = -8$	$-12 \neq -8$	$30 + (-38)$
No	Yes	No	$-8 = -8$
			Yes

The Hawaiian volcano Mauna Loa has erupted many times. In 1859, lava from the volcano traveled 32 miles to the Pacific Ocean at an average speed of 4 miles per hour. The Lava's distance d (in miles) from the ocean t hours after it left the volcano can be approximated by the equation:

$$d = 32 - 4t$$

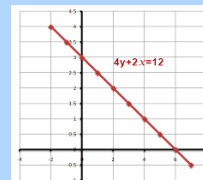
Make a table of solutions for the equation

Time (hours)	0	1	2	3
Distance (miles)	32	28	24	20

How long did it take the lava to reach the ocean?

The **graph** of an equation in two variables is the set of points in a coordinate plane that represent all the solutions of the equation.

An equation whose graph is a line is called a **linear equation**.

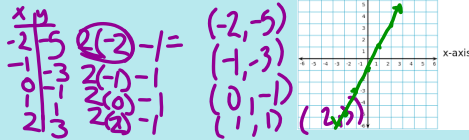


Graphing a Linear Equation

$y = 2x - 1$

x	-2	-1	0	1	2
y					

- 1). Make a table of solutions
- 2). List the solutions as ordered pairs
- 3). Graph the ordered pairs, and note that the points lie on a line. Draw the line, which is the graph of $y = 2x - 1$

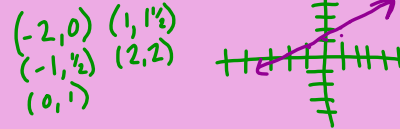


Graphing a Linear Equation

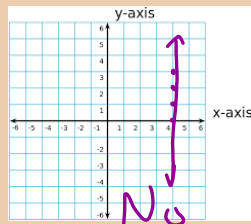
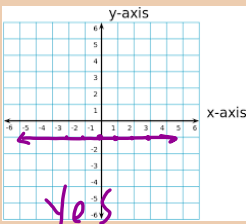
$y = 1/2x + 1$

x	-2	-1	0	1	2
y	0	1/2	1	1 1/2	2

- 1). Make a table of solutions
- 2). List the solutions as ordered pairs
- 3). Graph the ordered pairs, and note that the points lie on a line. Draw the line, which is the graph of $y = 1/2x + 1$



Graph $y = -1$ and $x = 4$. Tell whether each equation is a function.



Using the vertical line test, decide whether each graph is a function.

A function whose graph is a non-vertical line is called a linear function.

When the equation of a linear function is solved for y, the equation is in function form.

Not function form:

$3x + y = 7$

Function form:

$y = -3x + 7$

It is helpful to write an equation in function form before graphing it.

Solve for y

To write an equation in function form, solve for y.

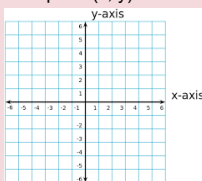
$x + 2y = 6$

$\frac{2y}{2} = \frac{-x+6}{2}$

To graph the equation, use its function form to make a table of solutions. Graph the ordered pairs (x, y) from the table, and draw a line through the points.

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

x	0	1	2
y	3	2 1/2	2



Write $2x - 3y = 3$ in function form. Then graph the equation.

Solve for y

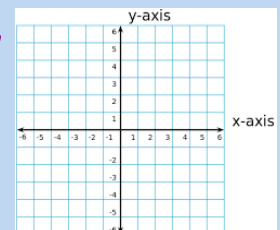
$2x - 3y = 3$

$-2x$

$-3y = -2x + 3$

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

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



The equation $f = 0.944t - 5.74$ gives the fork length f as a function of the total length t for the white shark in cm.

- a). If a white shark has a total length of 250 cm, what would be its fork length? $f = .944(250) - 5.74$
- b). If a white shark has a fork length of 640 cm, what is its total length? $640 = .944t - 5.74$
- c). What percent of the total length is the fork length?

8.2 Homework

Pg. 410-412

#2, 6, 12 - 40 even, 41

42, 50, 54, 55