

# Graph of Equations

## (1) Lines

◦ Standard Form

x	y
6	0
0	

e.g.  $2x + 3y = 12$

this is a slanted line.

- Every slanted line will eventually intersect the x- and y-axis.

- a line can be defined by 2 points, for example, an x-intercept and y-intercept.

- to find X-INTERCEPT, let  $y=0$  and solve equation for x.

e.g.  $2x + 3(0) = 12 \Rightarrow x = 6$

- to find Y-INTERCEPT, let  $x=0$ , and solve equation for y.

e.g.  $2(0) + 3y = 12 \Rightarrow y = 4$

- To find if a point is on the graph or not, check if it satisfies the equation of the graph.

e.g.  $(2, 3)$  is NOT on the line because  $(2)(2) + (3)(3) = 13 \neq 12$

$$2x + 3y = 12$$

e.g. Is  $(3, 2)$  on the line of  $2x + 3y = 12$ ? Verify that  $2 \cdot 3 + 3 \cdot 2 = 6 + 6 = 12$  YES.

## (2) Circles

☆ An equation depending only on x represents a vertical line  
 ... .. y represents a horizontal line

## WEBASSIGN

2. Determine if  $(2,0)$  and  $(-2,-12)$  are on the graph of the equation  $y = x^2 - 3x + 2$ .

$$(1). y = x^2 - 3x + 2 = 2^2 - 3(2) + 2 = 4 - 6 + 2 = 0$$

so the point  $(2,0)$  is on the graph.

$$(2) y = x^2 - 3x + 2 = (-2)^2 - 3(-2) + 2 = 4 + 6 + 2 = 12 \neq -12$$

so the point  $(-2, -12)$  is NOT on the graph.

3. Determine if  $(1,3)$  and  $(2,0)$  lie on the graph of the equation  $y = 1 - |x-3|$ .

$$(1). 3 \stackrel{?}{=} 1 - |1-3|$$

$$3 \stackrel{?}{=} 1 - |-2|$$

$$3 \stackrel{?}{=} 1 - 2$$

$3 = -1$  is a false statement, so  $(1,3)$  is not on  $y = 1 - |x-3|$

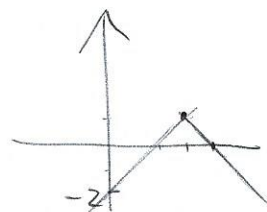
$$(2) 0 \stackrel{?}{=} 1 - |2-3|$$

$$0 \stackrel{?}{=} 1 - |-1|$$

$$0 \stackrel{?}{=} 1 - 1$$

$0 = 0$  is a true statement, so  $(2,0)$  is on  $y = 1 - |x-3|$

→ substitute the  $x$  and  $y$  coordinates of the point into the equation, and see if it is a true statement.





4. Determine if the point  $(2, -\frac{28}{3})$  is on the graph of the equation  $y = \frac{1}{3}x^3 - 3x^2$ .

$$-\frac{28}{3} \stackrel{?}{=} \frac{1}{3} \cdot (2)^3 - 3 \cdot (2)^2$$

$$-\frac{28}{3} \stackrel{?}{=} \frac{1}{3} \cdot (8) - 3 \cdot (4)$$

$$-\frac{28}{3} \stackrel{?}{=} \frac{8}{3} - 12$$

$$-\frac{28}{3} \stackrel{?}{=} \frac{8}{3} - \frac{12}{1}$$

$$-\frac{28}{3} \stackrel{?}{=} \frac{8 \cdot 1 - 3 \cdot 12}{3 \cdot 1}$$

$$-\frac{28}{3} \stackrel{?}{=} \frac{-28}{3}$$

YES, TRUE STATEMENT. So the point is on the graph of  $y = \frac{1}{3}x^3 - 3x^2$ .