Graphs

2.2 Graphing Equations

September 7, 2010

The **graph of an equation** in two variables, x and y, consists of all the points in the xy-plane whose coordinates (x, y) satisfy the equation.

Procedure for plotting the graphs of equations.

- **Step 1:** In a table, list several pairs of coordinates that make the equations true.
- **Step 2:** Plot these points on a graph and connect the points with a smooth curve. Use arrows to indicate that the graph continues.

Example 1

Graph the equation $y = 2x - 1$.

$\mathbf{x}$	$\mathbf{y = 2x - 1}$	$(\mathbf{x}, \mathbf{y})$
-2		
-1		
0		
1		
2		

Example 2

Graph the equation $y = x^2 - 5$.

$\mathbf{x}$	$\mathbf{y = x^2 - 5}$	$(\mathbf{x}, \mathbf{y})$
-3		
-2		
-1		
0		
1		
2		
3		

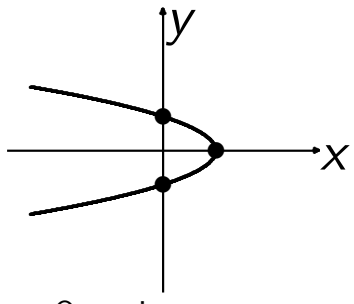
Example 3

Graph the equation $y = x^3$.

$\mathbf{x}$	$\mathbf{y = x^3}$	$(\mathbf{x}, \mathbf{y})$
-2		
-1		
0		
1		
2		

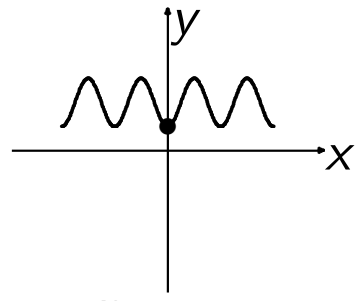
An **x-intercept** of a graph is a point where the graph intersects the x-axis.

An **y-intercept** of a graph is a point where the graph intersects the y-axis.



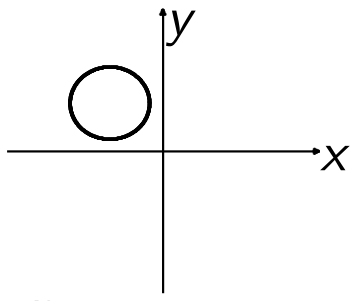
One x-intercept

Two y-intercepts



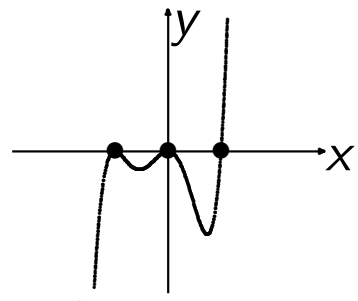
No x-intercept

One y-intercept



No x-intercepts

No y-intercepts



Three x-intercepts

One y-intercept

Example 4

Given the equation $y = x^2 + 4$, find the indicated intercepts of its graph, if any.

- x-intercept(s)
- y-intercepts(s)

Example

Find the x-intercept(s) and y-intercept(s) (if any) of the graphs of the equations

- $y = 4x^2 - 1$
- $y = \sqrt{x - 4}$
- $y = \dfrac{1}{x^2 + 4}$