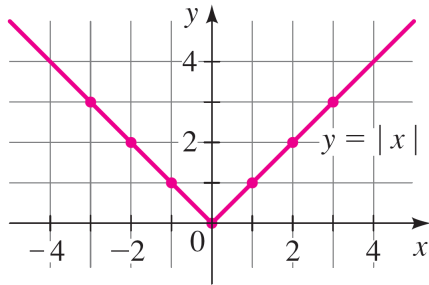


The Graph of an Equation

The **graph** of an equation in x and y is the set of all points (x, y) in the coordinate plane that satisfy the equation.

EXAMPLE: Sketch the graph of the equation $y = |x|$.

Solution: We make a table of values that helps us to sketch the graph of the equation.



x	$y = x $	(x, y)
-3	3	$(-3, 3)$
-2	2	$(-2, 2)$
-1	1	$(-1, 1)$
0	0	$(0, 0)$
1	1	$(1, 1)$
2	2	$(2, 2)$
3	3	$(3, 3)$

EXAMPLE:

Sketch the graphs of the following functions.

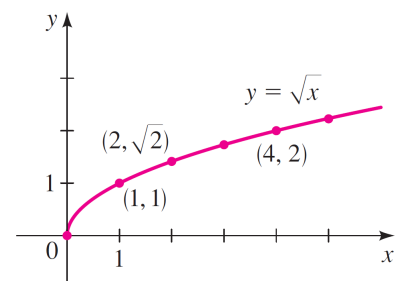
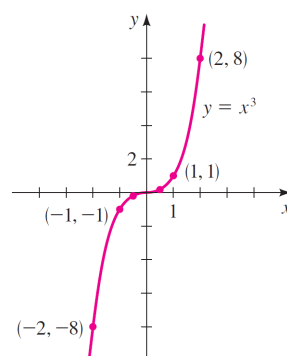
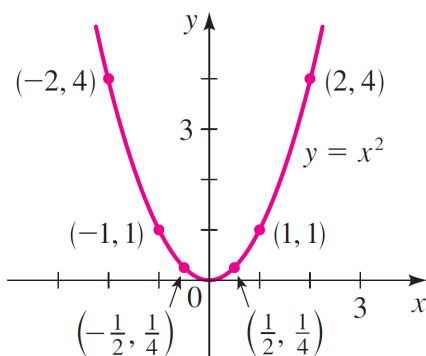
(a) $f(x) = x^2$ (b) $g(x) = x^3$ (c) $h(x) = \sqrt{x}$

Solution: We first make a table of values. Then we plot the points given by the table and join them by a smooth curve to obtain the graph. The graphs are sketched in the Figures below.

x	$f(x) = x^2$
0	0
$\pm \frac{1}{2}$	$\frac{1}{4}$
± 1	1
± 2	4
± 3	9

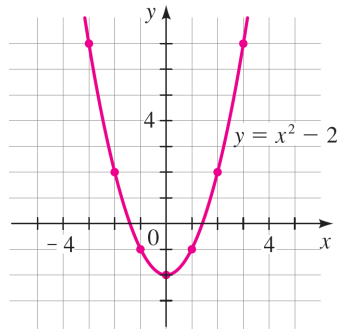
x	$g(x) = x^3$
0	0
$\frac{1}{2}$	$\frac{1}{8}$
1	1
2	8
$-\frac{1}{2}$	$-\frac{1}{8}$
-1	-1
-2	-8

x	$h(x) = \sqrt{x}$
0	0
1	1
2	$\sqrt{2}$
3	$\sqrt{3}$
4	2
5	$\sqrt{5}$



EXAMPLE: Sketch the graph of the equation $y = x^2 - 2$.

Solution: Plugging the numbers $0, \pm 1, \pm 2, \pm 3$ in for x , we find some of the points that satisfy the equation in the following table. In the Figure below we plot these points and then connect them by a smooth curve. A curve with this shape is called a *parabola*.



x	$y = x^2 - 2$	(x, y)
-3	7	$(-3, 7)$
-2	2	$(-2, 2)$
-1	-1	$(-1, -1)$
0	-2	$(0, -2)$
1	-1	$(1, -1)$
2	2	$(2, 2)$
3	7	$(3, 7)$

EXAMPLE: Sketch the graph of the equation $x = y^2 - 2$.

Solution: Plugging the numbers $0, \pm 1, \pm 2, \pm 3$ in for y , we find some of the points that satisfy the equation in the following table. In the Figure below we plot these points and then connect them by a smooth curve.

y	$x = y^2 - 2$	(x, y)
0	-2	$(-2, 0)$
1	-1	$(-1, 1)$
-1	-1	$(-1, -1)$
2	2	$(2, 2)$
-2	2	$(2, -2)$
3	7	$(7, 3)$
-3	7	$(7, -3)$

