

# 1. Graphs of Basic Functions

There are six basic functions that we are going to explore in this section. We will graph the function and state the domain and range of each function. The six basic functions are the following:

1.  $f(x) = x$

2.  $f(x) = x^2$

3.  $f(x) = x^3$

4.  $f(x) = \sqrt{x}$

5.  $f(x) = |x|$

6.  $f(x) = \frac{1}{x}$

## 1. $f(x) = x$

Make a table of ordered pairs that satisfy  $f(x) = x$

Remember  $y = f(x) = x$

$f(-2) = -2$

$f(-1) = -1$

$f(0) = 0$

$f(1) = 1$

$f(2) = 2$

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

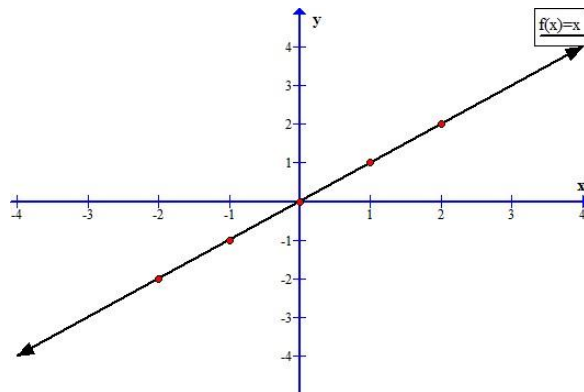


Figure 1.1

These ordered pairs indicate a graph in the shape shown in Figure 1.1. The domain is  $(-\infty, \infty)$  and the range is  $(-\infty, \infty)$ .

## 2. $f(x) = x^2$

Make a table of ordered pairs that satisfy  $f(x) = x^2$

Remember  $y = f(x) = x^2$

$$f(-2) = (-2)^2 = 4$$

$$f(-1) = (-1)^2 = 1$$

$$f(0) = (0)^2 = 0$$

$$f(1) = (1)^2 = 1$$

$$f(2) = (2)^2 = 4$$

x	-2	-1	0	1	2
y	4	1	0	1	4

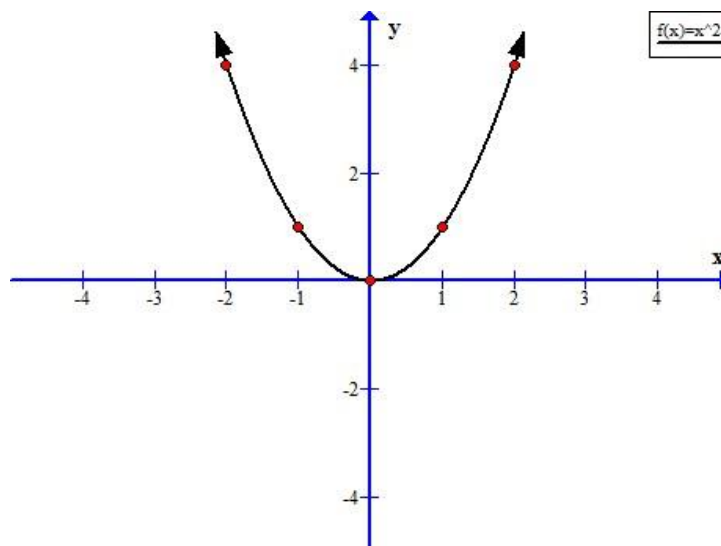


Figure 1.2

These ordered pairs indicate a graph in the shape shown in Figure 1.2. The domain is  $(-\infty, \infty)$  and the range is  $[0, \infty)$ .

### 3. $f(x) = x^3$

Make a table of ordered pairs that satisfy  $f(x) = x^3$

Remember  $y = f(x) = x^3$

$$f(-2) = (-2)^3 = -8$$

$$f(-1) = (-1)^3 = -1$$

$$f(0) = (0)^3 = 0$$

$$f(1) = (1)^3 = 1$$

$$f(2) = (2)^3 = 8$$

x	-2	-1	0	1	2
y	-8	-1	0	1	8

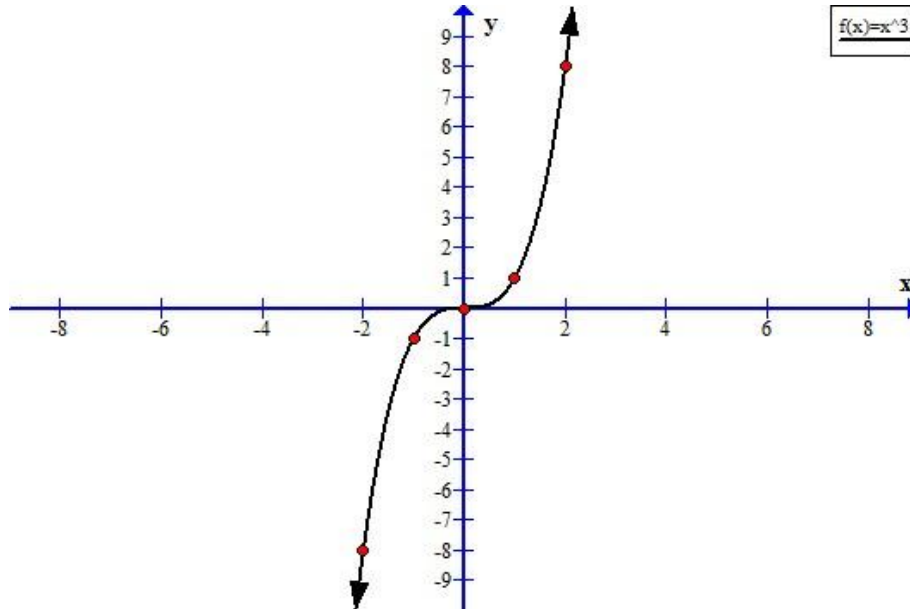


Figure 1.3

These ordered pairs indicate a graph in the shape shown in Figure 1.3. The domain is  $(-\infty, \infty)$  and the range is  $(-\infty, \infty)$ .

4.  $f(x) = \sqrt{x}$

Make a table of ordered pairs that satisfy  $f(x) = \sqrt{x}$

Remember  $y = f(x) = \sqrt{x}$

$f(-2) = \sqrt{-2} = \text{undefined (in the set of real numbers)}$

$f(-1) = \sqrt{-1} = \text{undefined (in the set of real numbers)}$

$f(0) = \sqrt{0} = 0$

$f(1) = \sqrt{1} = 1$

$f(4) = \sqrt{4} = 2$

x	-2	-1	0	1	4
y	und.	und.	0	1	2

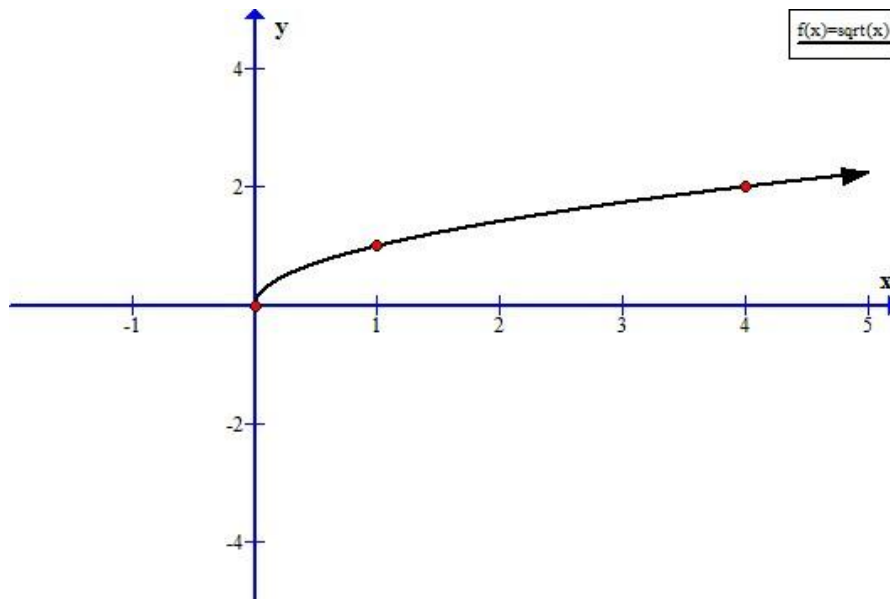


Figure 1.4

These ordered pairs indicate a graph in the shape shown in Figure 1.4. The domain is  $[0, \infty)$  and the range is  $[0, \infty)$ .

## 5. $f(x) = |x|$

Make a table of ordered pairs that satisfy  $f(x) = |x|$

Remember  $y = f(x) = |x|$

$$f(-2) = |-2| = 2$$

$$f(-1) = |-1| = 1$$

$$f(0) = |0| = 0$$

$$f(1) = |1| = 1$$

$$f(2) = |2| = 2$$

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

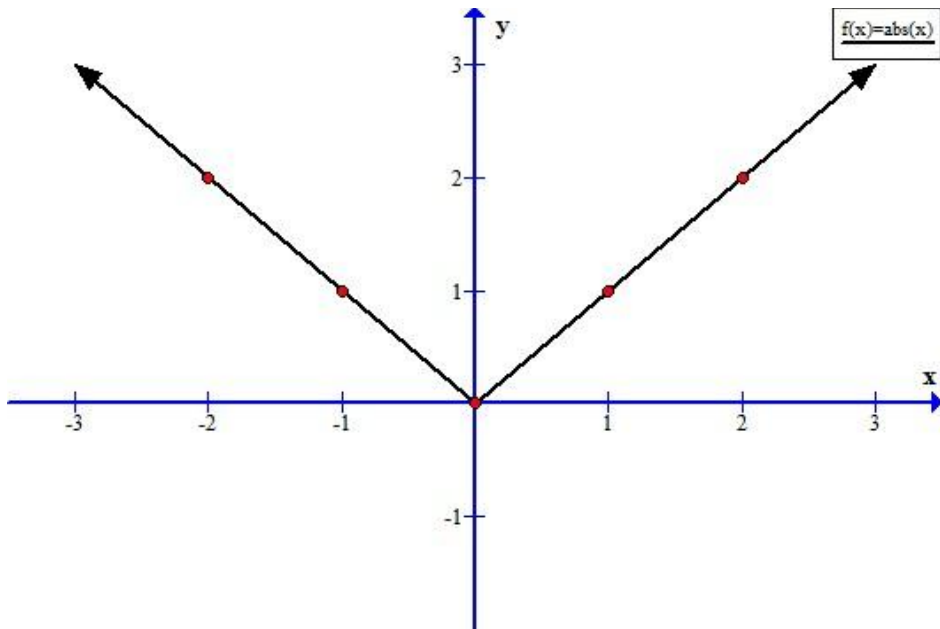


Figure 1.5

These ordered pairs indicate a graph in the shape shown in Figure 1.5. The domain is  $(-\infty, \infty)$  and the range is  $[0, \infty)$ .

6.  $f(x) = \frac{1}{x}$

Make a table of ordered pairs that satisfy  $f(x) = \frac{1}{x}$

Remember  $y = f(x) = \frac{1}{x}$

$$f(-2) = \frac{1}{-2} = -\frac{1}{2}$$

$$f(-1) = \frac{1}{-1} = -1$$

$f(0) = \text{undefined}$

$$f(1) = \frac{1}{1} = 1$$

$$f(2) = \frac{1}{2} = \frac{1}{2}$$

x	-2	-1	0	1	2
y	$-1/2$	-1	und.	1	$1/2$

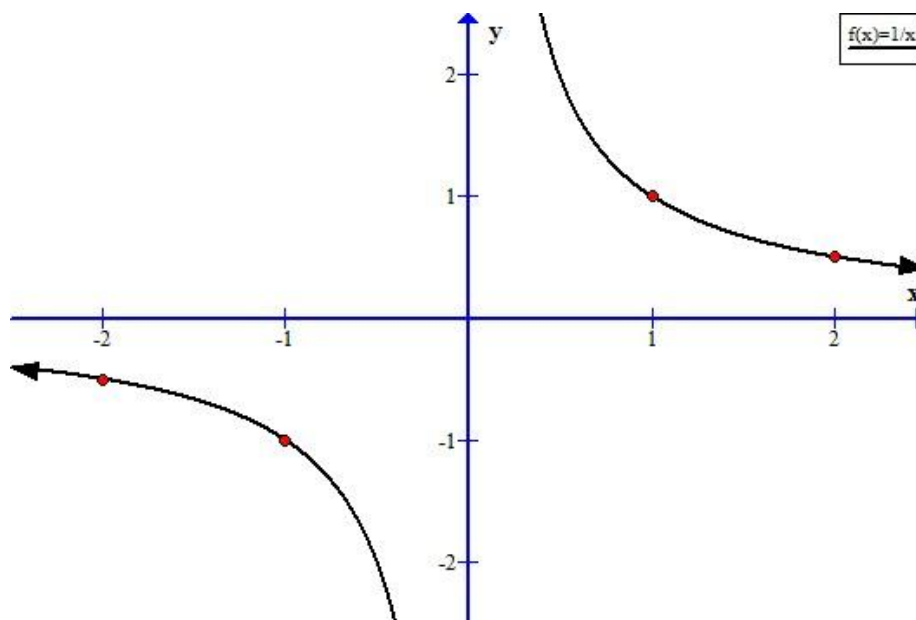


Figure 1.6

These ordered pairs indicate a graph in the shape shown in Figure 1.6. The domain is  $(-\infty, 0) \cup (0, \infty)$  and the range is  $(-\infty, 0) \cup (0, \infty)$ .