



# Comparing Functions

Let's evaluate and compare functions.

## 23.1 Worked Example: Vertex Form

Write the function  $f(x) = x^2 + 2x - 8$  in vertex form. Then, write the coordinates of the vertex.

Step 1:

$$b = 2, \text{ so } \left(\frac{b}{2}\right)^2 = 1.$$

Step 2:

$$f(x) = x^2 + 2x + 1 - 8 - 1$$

Step 3:

$$f(x) = (x + 1)^2 - 9$$

Step 4:

The vertex is  $(-1, -9)$ .

## 23.2 Finding the Vertex

Write each function in vertex form, then find the coordinates of the vertex.

1.  $y = x^2 - 4x + 7$

2.  $y = (x - 1)(x + 3)$



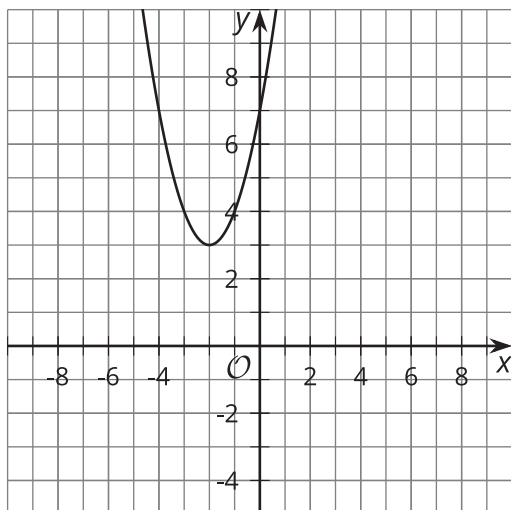
3.  $y = (x - 2)(x + 2)$

4.  $y = x^2 - 2x + 1$

5.  $y = -x^2 - 2x - 6$

6.  $y = 2x^2 - 12x + 22$

7.



## 23.3

## Comparing Functions

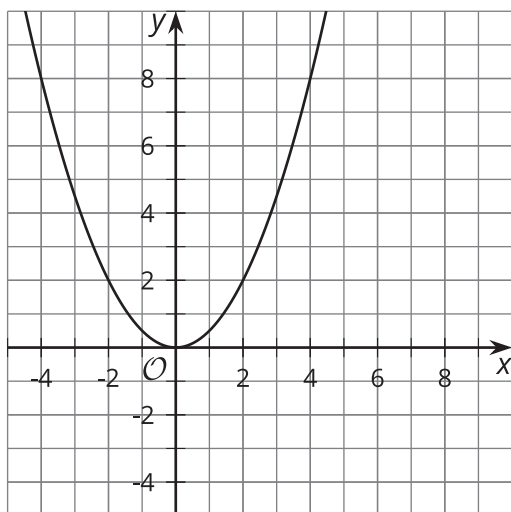
The notation  $f(2)$  means the output of function  $f$  when  $x$  is 2. For each function, decide whether  $f(2) > f(3)$ ,  $f(2) < f(3)$ , or  $f(2) = f(3)$ .

1.  $f(x) = x^2 + 2x + 3$

2.  $f(x) = (x - 2)(x - 3)$

3.  $f(x) = -x^2 + 5$

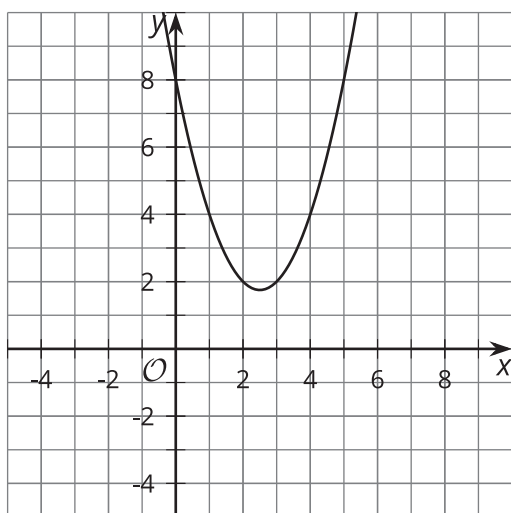
4.



5.

Graph of line on coordinate plane.

6.



7.

