

## Exercise 21

For the following exercises, determine the domain and range of the quadratic function.

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

### Solution

Any value of  $x$  can be plugged into a polynomial function, so the domain is

$$\{x \mid -\infty < x < \infty\}.$$

Because the coefficient of the squared term is positive, the parabola opens upward; in other words, the squared term takes on values between 0 to infinity. The smallest value of  $f(x)$  is  $0 + 2 = 2$ , and the highest value of  $f(x)$  is  $\infty + 2 = \infty$ .

$$\{y \mid 2 \leq y < \infty\}$$

