

## Exercise 65

For the following exercises, use the given information about the polynomial graph to write the equation.

Degree 4. Roots of multiplicity 2 at  $x = \frac{1}{2}$  and roots of multiplicity 1 at  $x = 6$  and  $x = -2$ .  
 $y$ -intercept at  $(0, 18)$ .

### Solution

Based on the zeros, the model polynomial function is

$$f(x) = A \left(x - \frac{1}{2}\right)^2 (x - 6)(x + 2).$$

Use the provided point  $(0, 18)$  to determine  $A$ .

$$18 = A \left(0 - \frac{1}{2}\right)^2 (0 - 6)(0 + 2) \rightarrow 18 = A(-3) \rightarrow A = -6$$

Therefore,

$$f(x) = -6 \left(x - \frac{1}{2}\right)^2 (x - 6)(x + 2).$$

