

Exercise 59

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

Degree 5. Roots of multiplicity 2 at $x = 3$ and $x = 1$, and a root of multiplicity 1 at $x = -3$.
 y -intercept at $(0, 9)$

[Add a period at the end to be consistent.]

Solution

Based on the zeros and multiplicities, the model polynomial function is

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

Use the provided point, the y -intercept, to determine A .

$$9 = A(0 + 3)(0 - 1)^2(0 - 3)^2 \rightarrow 9 = A(27) \rightarrow A = \frac{1}{3}$$

Therefore,

$$f(x) = \frac{1}{3}(x + 3)(x - 1)^2(x - 3)^2.$$

