Exercise 64

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 $x = 2$ and a root of multiplicity 1 at $x = -2$. y-intercept at $(0, 4)$.

Solution

Based on the zeros, the model polynomial function is

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

Use the provided point $(0, 4)$ to determine A.

$$4 = A(0+3)^2(0-2)^2(0+2) \quad \rightarrow \quad 4 = A(72) \quad \rightarrow \quad A = \frac{1}{18}$$

Therefore,

$$f(x) = \frac{1}{18}(x+3)^2(x-2)^2(x+2).$$