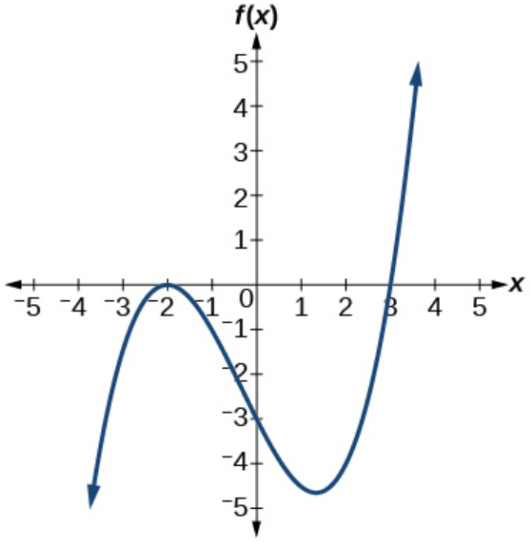
# Exercise 51

For the following exercises, use the graphs to write the formula for a polynomial function of least degree.




---

**Solution**

Notice where the graph crosses the $x$-axis: The zeros are $x = -2$ and $x = 3$. The model equation of the polynomial function is

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

The multiplicity of $x = -2$ is even (2 at least) because the graph bounces back here. To determine $A$, use a known point on the graph, for example, the $y$-intercept $(0, -3)$.

$$-3 = A(0+2)^2(0-3) \quad \rightarrow \quad -3 = A(-12) \quad \rightarrow \quad A = \frac{1}{4}$$

Therefore,

$$f(x) = \frac{1}{4}(x+2)^2(x-3).$$