Exercise 64

The y-intercept is $(0, 1)$. The x-intercept is $(1, 0)$. Degree is 3. End behavior: as $x \to -\infty$, $f(x) \to \infty$, as $x \to \infty$, $f(x) \to -\infty$.

Solution

The x-intercepts reveal the structure of the function. Cube the term to make the degree 3, and place a minus sign in front to create the specified end behavior.

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

The function is graphed below, and the intercepts are labelled.