Exercise 24

For the following exercises, determine the end behavior of the functions.

$$f(x) = (2 - x)^7$$

Solution

This polynomial is in factored form. The degree is found by counting the number of x's: 7. Multiply the coefficients of the power functions to get the leading coefficient: $(-1)^7 = -1$. Expand it to be sure.

$$f(x) = 128 - 448x + 672x^2 - 560x^3 + 280x^4 - 84x^5 + 14x^6 - x^7$$

The leading term is $-x^7$. x is raised to an odd power and the coefficient is negative, so $f(x) \to \infty$ as $x \to -\infty$ and $f(x) \to -\infty$ as $x \to \infty$.