6.2 More Graphing Polynomials

1. \( f(x) = -2x^4 + 4x^3 \)
   a. End Behavior
      \( x \to \infty, f(x) \to -\infty \)
      \( x \to -\infty, f(x) \to -\infty \)
   b. \( x \)-intercepts
      \( -2x^3(x-2) = 0 \)
      \( x = 0 \) \( x = 2 \)
   c. Multiplicity
      \( x = 0 \) \( m = 3 \) passes through, flat
      \( x = 2 \) \( m = 1 \) passes through
   d. \( y \)-intercept
      \( (0, 0) \)

2. \( f(x) = x^3 + x^2 - 5x + 3 \)
   a. End Behavior
      \( x \to \infty, f(x) \to \infty \)
      \( x \to -\infty, f(x) \to -\infty \)
   b. \( x \)-intercepts
      \( x = 1 \) \( x = -3 \)
      \( x = -3 \) \( x^3 + 3 = 0 \)
   c. Multiplicity
      \( x = 1 \) \( m = 2 \) bounces
      \( x = -3 \) \( m = 1 \) passes through
   d. \( y \)-intercept
      \( (0, 3) \)

3. Sketch the graph described and create a polynomial function with these characteristics.
   - The graph passes through the \( x \)-axis at \( x = 0 \).
   - The graph bounces on the \( x \)-axis at \( x = -3 \).
   - As \( x \to \infty, f(x) \to -\infty \) and as \( x \to -\infty, f(x) \to \infty \).

4. Sketch the graph described and create a polynomial function with these characteristics.
   - The graph passes through the \( x \)-axis at \( x = 2 \) and \( x = -4 \).
   - The graph bounces on the \( x \)-axis at \( x = 1 \).
   - As \( x \to \infty, f(x) \to -\infty \) and as \( x \to -\infty, f(x) \to -\infty \).

\[ f(x) = -(x-2)(x+4)(x-1)^2 \]