4.2 Polynomial Functions & Models

Graphs of Polynomials

Degree, *x*-intercepts, and turning points

The graph of a polynomial function of degree $n \geq 1$ has at most n x-intercepts and at most $n - 1$ turning points.

From *Precalculus with Modeling and Visualization* 3rd ed. by Rockswold, 2006, p.262

End Behavior

- A polynomial of odd degree with a positive leading coefficient has negative y-values for large negative x-values, and positive y-values for large positive x-values.
- A polynomial of even degree with a positive leading coefficient has positive y-values for both large positive and large negative x-values.

Example

Graph $f(x) = \begin{cases} x-2, & x < 0 \\ 5, & x \geq 0 \end{cases}$

This is an example of a piecewise defined function. These functions are defined by different rules on different parts of their domain.

Example

Graph $f(x) = \begin{cases} x^2, & -2 \leq x < 0 \\ x+1, & 0 \leq x \leq 2 \end{cases}$

Is this function continuous on its domain?

Solve $f(x) = 0$.