

## 4.2 Polynomial Functions & Models

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# Graphs of Polynomials

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## **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* 3<sup>rd</sup> ed. by Rockswold, 2006, p.262

## End Behavior

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- 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.

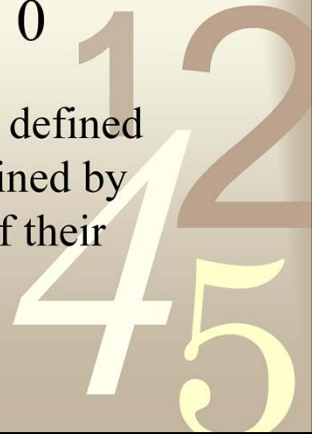
## Example

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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

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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  $f(x) = 0$ .

