# Chapter 9 Section 2

## MA1032 Data, Functions & Graphs

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# Polynomials

- $y = 4x^2 + 2$
- $y = 7t^6 - 8t + 7.2$
- $f(x) = x^4 - 3x^2 - x + 2$
- $y = 4x^4 - x^3 - 2x^2 + x + 3$

## Standard Form

$$f(x) = a_n x^n + a_{n-1} x^{n-1} + a_{n-2} x^{n-2} + \cdots + a_2 x^2 + a_1 x + a_0$$

## Example

- $f(x) = \pi x^3 - \sqrt{2}x + e$
- $g(x) = x^{1.5} + x^2$

# Terminology

$$f(x) = a_n x^n + a_{n-1} x^{n-1} + a_{n-2} x^{n-2} + \cdots + a_2 x^2 + a_1 x + a_0$$

- Degree
- Term
- Coefficient
- Constant term
- Leading term

Example

$p(x) = 3x^4 - x + 2x^5 - x^3 + 100$

# Numerical Observation

$$f(x) = x^4 + 5x^2 + 6x + 20 \text{ and } g(x) = x^4$$

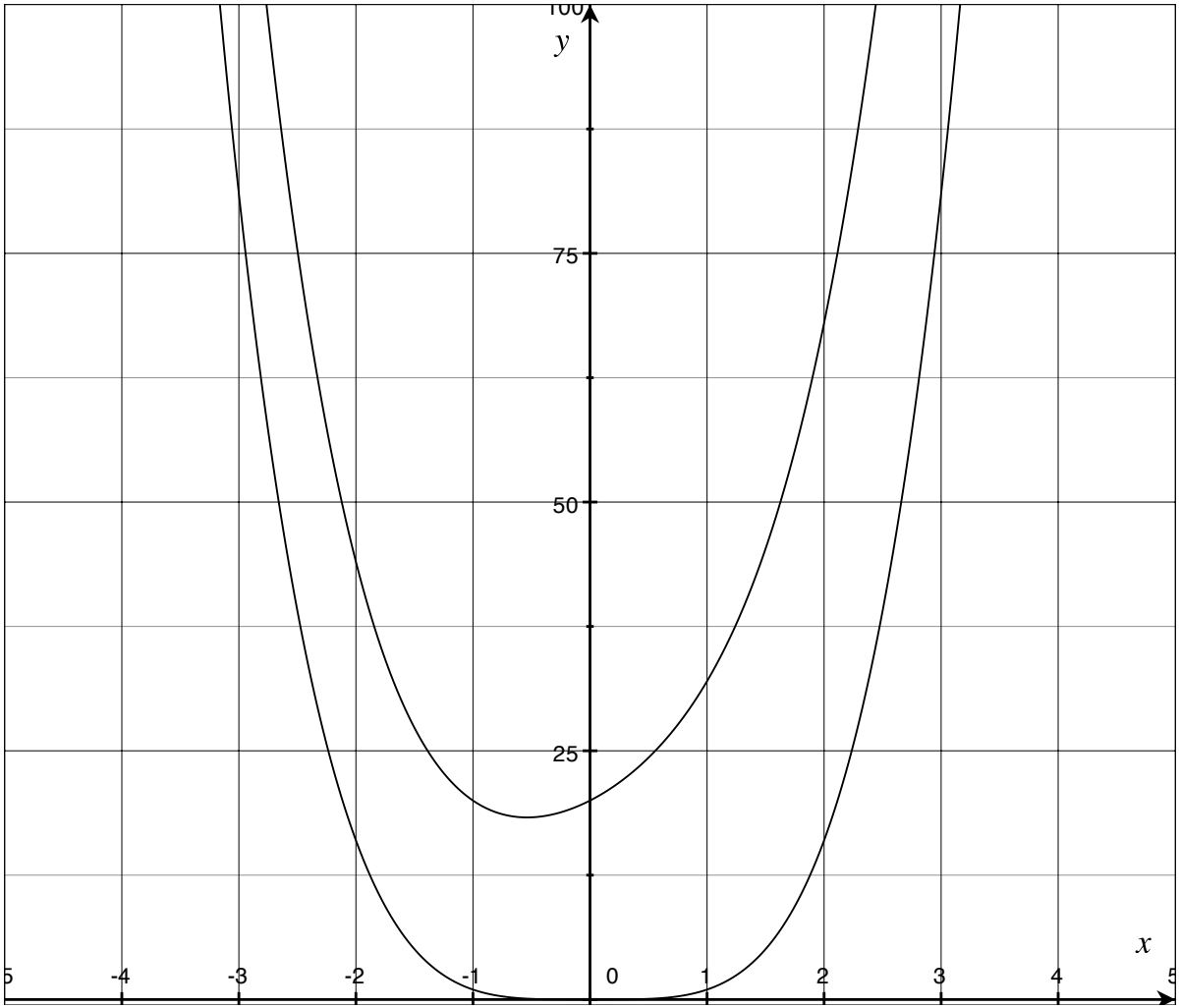
Evaluate:

$f(2)$
$f(10)$

$g(2)$
$g(10)$

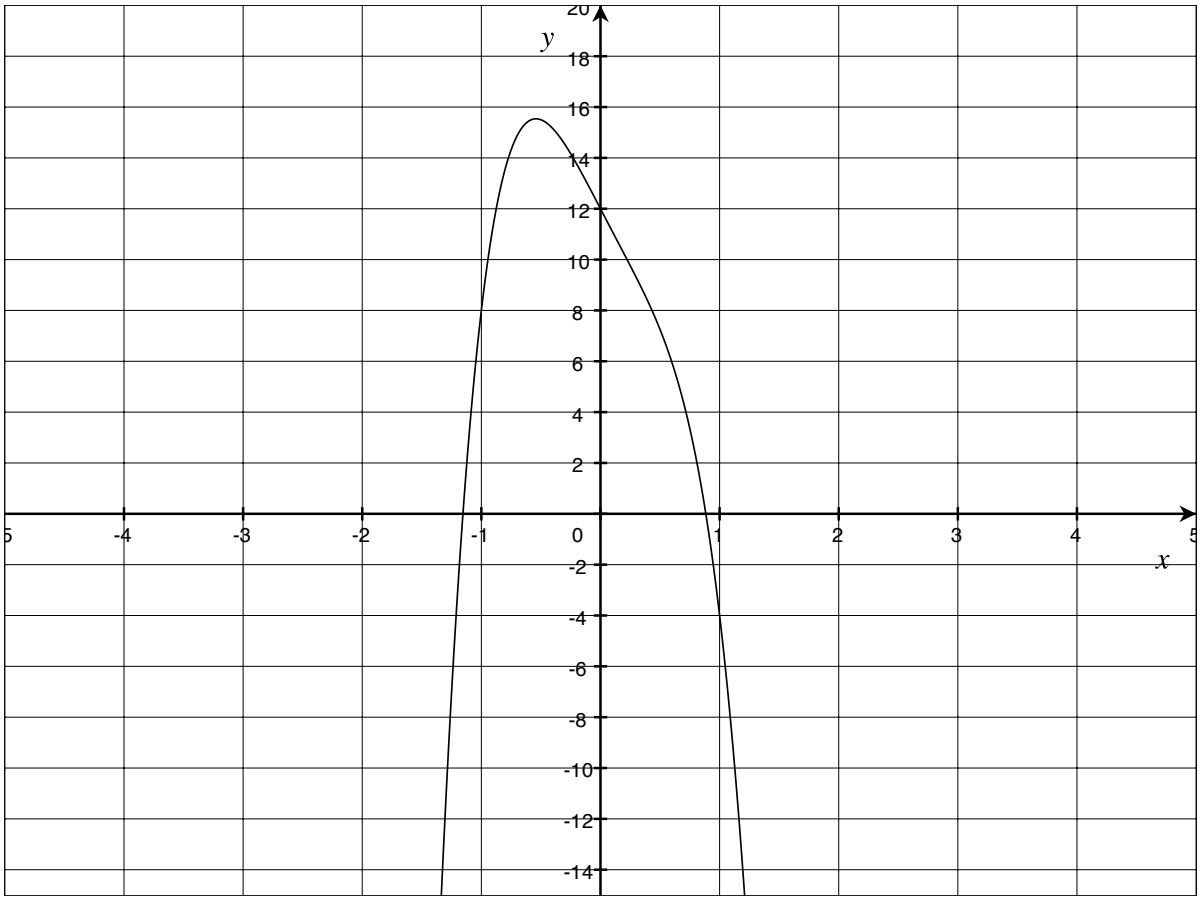
# Graphical Observation

$f(x) = x^4 + 5x^2 + 6x + 20$ and $g(x) = x^4$



# Zeros (or Roots)

$$y = -10x^4 + 3x^3 - 9x + 12$$



# Summary

- Polynomial terminology
- Long-run behavior
- Zeros