

Graphing Polynomial Functions



Preliminaries and Objectives

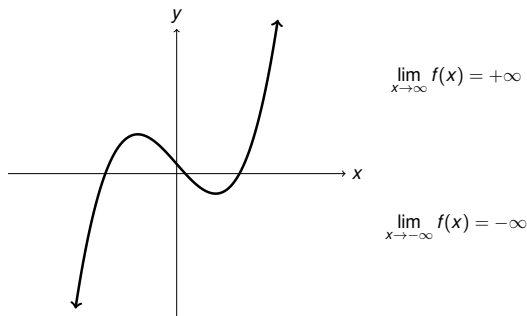
- Preliminaries
- Intercepts
 - Factoring Polynomials

- Objectives
- Graph Polynomial Functions

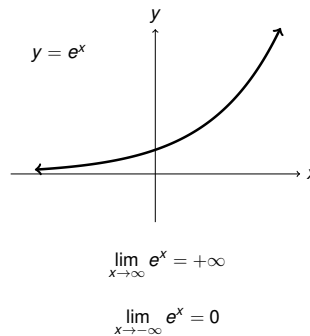
Keys to Graphing

- y-intercept
- x-intercept
- end behavior

End Behavior



End Behavior



End Behavior

$$f(x) = x^3 + x^2 - 14x - 24$$

$$= (x - 4)(x + 3)(x + 2)$$

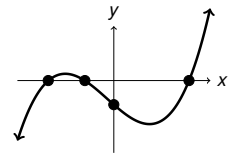
y-intercept : (0, -24)

x-intercepts : (4, 0), (-3, 0), (-2, 0)

end behavior :

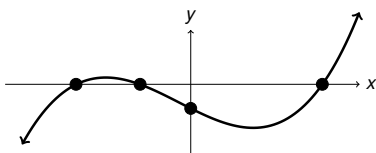
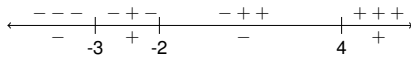
$$\lim_{x \rightarrow -\infty} f(x) = +\infty$$

$$\lim_{x \rightarrow \infty} f(x) = -\infty$$



Analyzing Factors

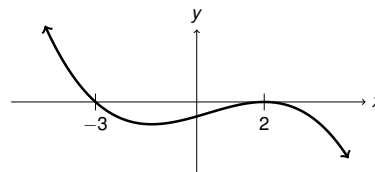
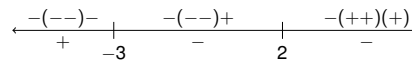
$$f(x) = (x - 4)(x + 3)(x + 2)$$



Example 2

$$f(x) = -(x - 2)^2(x + 3)$$

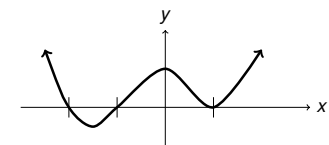
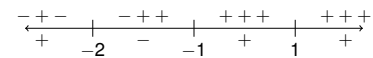
$$= -x^3 + x^2 + 8x - 12$$



Example 3

$$f(x) = (x + 1)^3(x - 1)^4(x + 2)$$

$$= x^8 + x^7 - 5x^6 - 3x^5 + 9x^4 + 3x^3 - 7x^2 - x + 2$$



Recap

To graph a polynomial

- Factor the polynomial to find the x -intercepts
- Plug in $x = 0$ to find the y -intercept
- Analyze the end behavior and intervals where the function is positive and where it is negative