

Pre-Calculus 30
Characteristics of Polynomial Functions

Degree 0: Constant Function

$f(x) = 3$

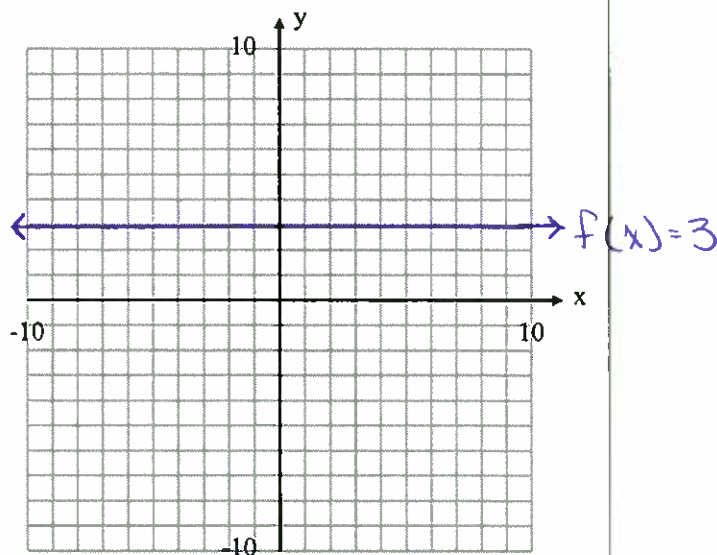
End Behavior: II to I

Domain: $x \in \mathbb{R}$
 $(-\infty, \infty)$

Range: $y = 3$

Number of x-intercepts: none

Constant: 3



Degree 1: Linear Function

$f(x) = 2x + 1$

End Behavior: III to I

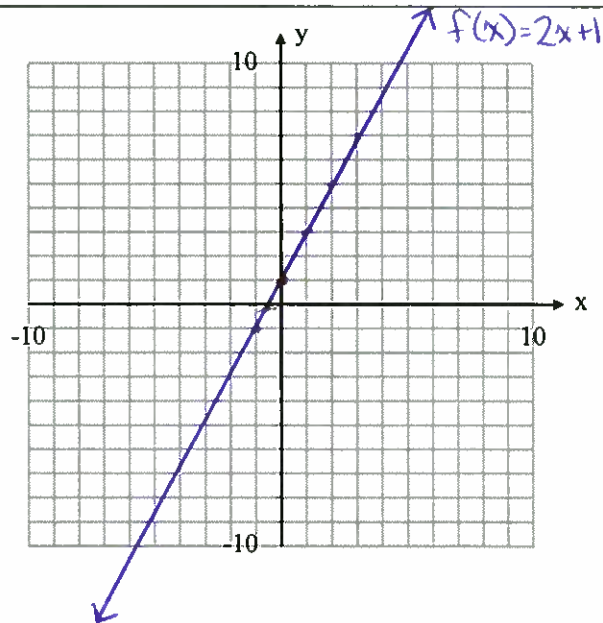
Domain: $x \in \mathbb{R}$
 $(-\infty, \infty)$

Range: $y \in \mathbb{R}$
 $(-\infty, \infty)$

Number of x-intercepts: 1

Intercepts: $y = 2x + 1$
 $0 = 2x + 1$
 $-1 = 2x$
 $(-1/2, 0) (0, 1)$

Constant: 1



Degree 2: Quadratic Function

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

End Behavior: II to I

Domain: $x \in \mathbb{R}$
 $(-\infty, \infty)$

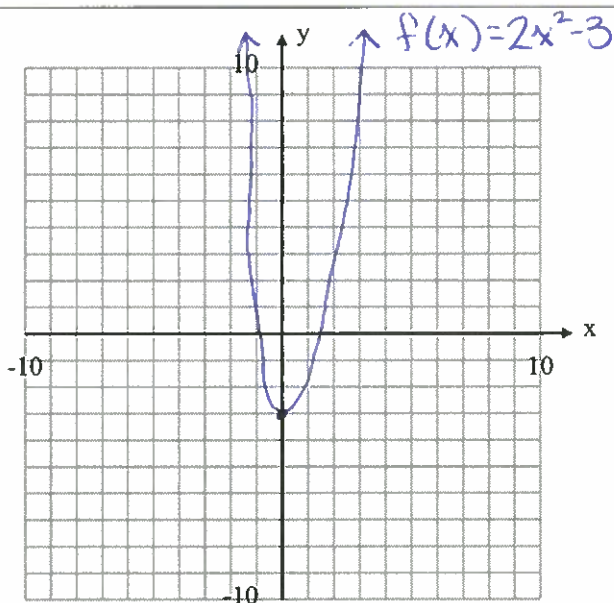
Range: $y \geq -3$
 $[-3, \infty)$

Number of x-intercepts: 2

Intercepts: $(0, -3)$
 $(-\sqrt{3/2}, 0)$ $(\sqrt{3/2}, 0)$

Vertex/Max or Min:
Min: $(0, -3)$

Constant:
-3



Degree 3: Cubic Function

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

End Behavior: III to I

Domain: $x \in \mathbb{R}$
 $(-\infty, \infty)$

Range: $y \in \mathbb{R}$
 $(-\infty, \infty)$

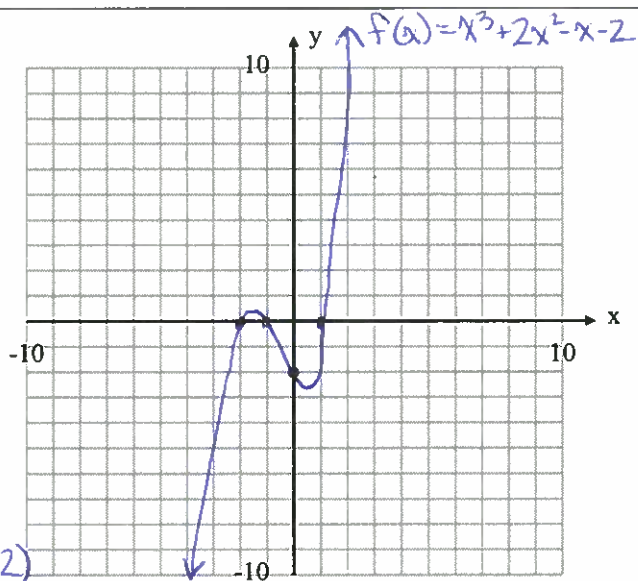
Number of x-intercepts: 3

Intercepts: $(-2, 0), (-1, 0), (1, 0), (0, -2)$

Relative Max: $(-1.5, 0.6)$

Relative Min: $(0.2, -2.1)$

Constant:
-2



Degree 4: Quartic Function

$$f(x) = x^4 + 5x^3 + 5x^2 - 5x - 6$$

End Behavior: II to I

Domain: $x \in \mathbb{R}$
 $(-\infty, \infty)$

Range: $y \geq -6.9$ $[-6.9, \infty)$

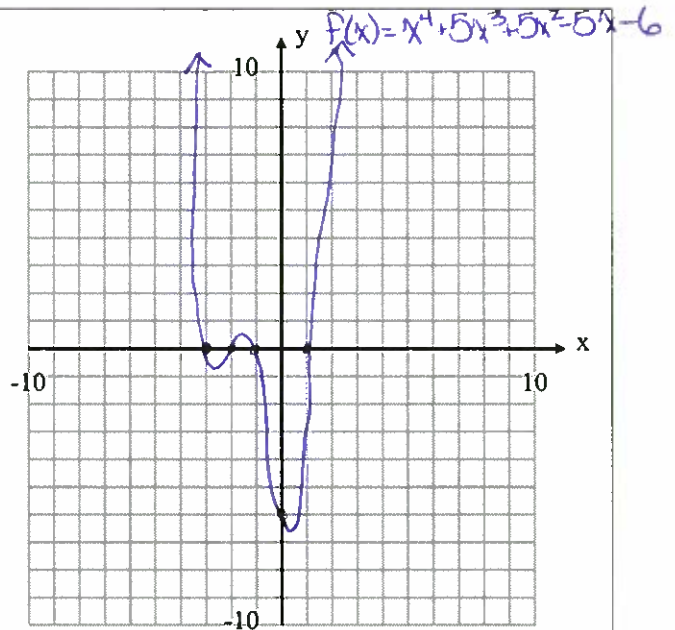
Number of x-intercepts: 4

Intercepts: $(-3, 0), (-2, 0), (-1, 0), (1, 0)$
 $(0, -6)$

Relative Max: $(-1.5, 0.9)$

Relative Minimums: $(0.3, -6.9), (-2.6, -1.4)$

Constant: -6



Degree 5: Quintic Function

$$f(x) = x^5 + 3x^4 - 5x^3 - 15x^2 + 4x + 12$$

End Behavior: III to I

Domain: $x \in \mathbb{R}$

Range: $y \in \mathbb{R}$

Number of x-intercepts: 5

Intercepts: $(0, 12), (-3, 0), (-2, 0), (-1, 0),$
 $(1, 0), (2, 0)$

Relative Maximums: $(-2.6, 6.4), (0.1, 12.3)$

Relative Minimums: $(-1.5, -3.3), (1.6, -10.3)$

Constant: 12

