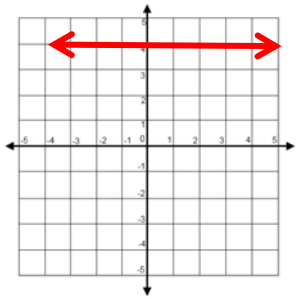
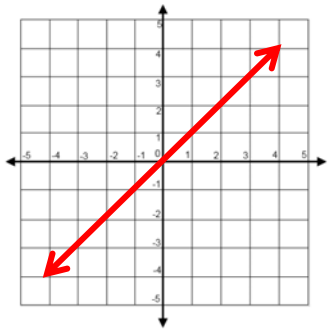
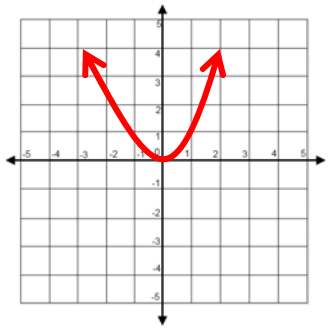
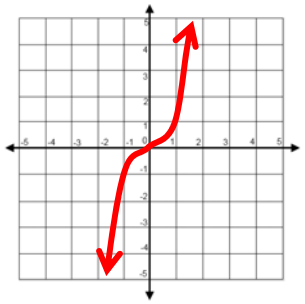
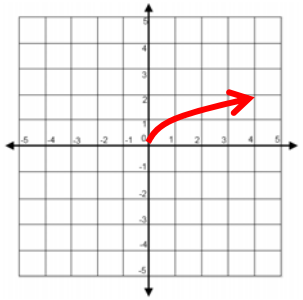
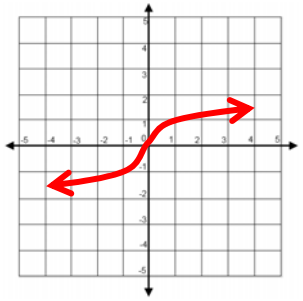
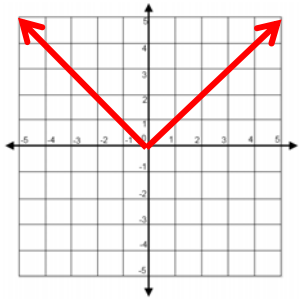
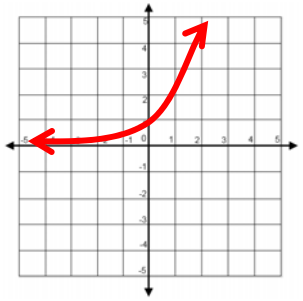
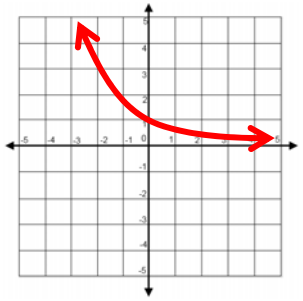
Parent Function Graphic Organizer

What is a parent function?

Name	Parent Function Equation	Graph	Domain & Range	Key Characteristics*	Table of Values
Constant	$f(x) = b$		Domain: $(-\infty, +\infty)$ Range: (b)	Constant: $(-\infty, +\infty)$ Even End Behavior: as x → -∞, f(x) → b; as x → +∞, f(x) → b Intercept: (0, b) **Even**	x | $f(x)$ -2 | b -1 | b 0 | b 1 | b 2 | b
Linear (stop at 1:55)	$f(x) = x$ $f(x) = mx + b$ m = slope b = intercept		Domain: **$(-\infty, +\infty)$** Range: **$(-\infty, +\infty)$**	Increasing: **$(-\infty, +\infty)$** Positive: **$(0, \infty)$** Negative: **$(-\infty, 0)$** **Odd** End Behavior: **as x → -∞, f(x) → -∞;** **as x → +∞, f(x) → +∞** Intercept: **(0, b)**	x | $f(x)$ -2 | -2 -1 | -1 0 | 0 1 | 1 2 | 2
Quadratic	$f(x) = x^2$ $f(x) = ax^2 + bx + c;$ $a \neq 0$		Domain: **$(-\infty, +\infty)$** Range: **$[0, +\infty)$**	Increasing: **$(0, +\infty)$** Decreasing: **$(-\infty, 0)$** Positive: **$(-\infty, +\infty)$** Min: **(0, 0) *vertex** Inflection: **(0, 0)** Symmetry: $\frac{-b}{2a}$ **Even** End Behavior: **as x → -∞, f(x) → +∞;** **as x → +∞, f(x) → +∞**	x | $f(x)$ -2 | 4 -1 | 1 0 | 0 1 | 1 2 | 4

Name	Parent Function Equation	Graph	Domain & Range	Key Characteristics*	Table of Values
Cubic	$f(x) = x^3$ $f(x) = ax^3 + bx^2 + cx + d$		Domain: **(-∞, +∞)** Range: (-∞, +∞)	Increasing: **(-∞, +∞)** Positive: **(0, +∞)** Negative: **(-∞, 0)** Inflection: **(0, 0)** **Odd** End Behavior: **as x → -∞, f(x) → -∞;** **as x → +∞, f(x) → +∞**	*x* | *f(x)* -2 | -8 -1 | -1 0 | 0 1 | 1 2 | 8
Square Root	$f(x) = \sqrt{x}$		Domain: **[0, +∞)** Range: **[0, +∞)**	Increasing: **(0, +∞)** Positive: **(0, +∞)** Min: **(0, 0) *vertex** End Behavior: **as x → 0 (from the right), f(x) → 0;** **as x → +∞, f(x) → +∞**	*x* | *f(x)* 0 | 0 1 | 1 2 | $\sqrt{2}$ 3 | $\sqrt{3}$ 4 | 2
Cube Root	$f(x) = \sqrt[3]{x}$		Domain: **(-∞, +∞)** Range: **(-∞, +∞)**	Increasing: **(-∞, +∞)** Positive: **(0, +∞)** Negative: **(-∞, 0)** Inflection: **(0, 0)** **Odd** End Behavior: **as x → -∞, f(x) → -∞;** **as x → +∞, f(x) → +∞**	*x* | *f(x)* 0 | 0 1 | 1 2 | $\sqrt[3]{2}$ 3 | $\sqrt[3]{3}$ 4 | $\sqrt[3]{4}$
Absolute Value (stop at 1:45)	$f(x) = \lvert x \rvert$ $f(x) = a \lvert x - h \rvert + k$		Domain: **(-∞, +∞)** Range: **[0, +∞)**	Increasing: **(0, +∞)** Decreasing: **(-∞, 0)** Positive: **(-∞, +∞)** Min: **(0, 0) *vertex** Vertex: **(0, 0); (h, k)** Symmetry: **x = 0 (x = h)** **Even** End Behavior: **as x → -∞, f(x) → +∞;**	*x* | *f(x)* -2 | 2 -1 | 1 0 | 0 1 | 1 2 | 2

				as x → +∞, f(x) → +∞	
Exponential	$f(x) = 2^x$		Domain: **(-∞, +∞)** Range: **(0, +∞)**	Increasing: **(-∞, +∞)** Positive: **(-∞, +∞)** End Behavior: **as x → -∞, f(x) → 0;** **as x → +∞, f(x) → +∞** Asymptote: **y=0**	*x* | *f(x)* -2 | $\frac{1}{4}$ -1 | $\frac{1}{2}$ 0 | 1 1 | 2 2 | 4
Exponential	$f(x) = \frac{1}{2}^x$		Domain: **(-∞, +∞)** Range: **(0, +∞)**	Decreasing: **(-∞, +∞)** Positive: **(-∞, +∞)** End Behavior: **as x → -∞, f(x) → +∞;** **as x → +∞, f(x) → 0** Asymptote: **y=0**	*x* | *f(x)* -2 | 4 -1 | 2 0 | 1 1 | $\frac{1}{2}$ 2 | $\frac{1}{4}$

*Key characteristics refers to intervals where the function is increasing or decreasing, constant, positive, or negative. It also refers to relative maximums and minimums, symmetries, inflection points, asymptotes, end behavior, and even/odd.