Review

Unit 1

Domain

Graphing Parent Functions

Inverses

Unit 2

Degree/End Behavior

Sketching Polynomials

Polynomial Division

Unit 3

Factoring

Finding Zeros

Domain

1. Fractions
2. Square Roots

Find the domain of the following functions.

1. $y = \frac{4}{x+2}$

$\boxed{x \neq -2}$

2. $y = \sqrt{1-2x}$

$1 - 2x \geq 0$

$1 \geq 2x$

$\boxed{\frac{1}{2} \geq x}$

3. $y = x^2 - 5x + 4$

$\boxed{\mathbb{R}}$

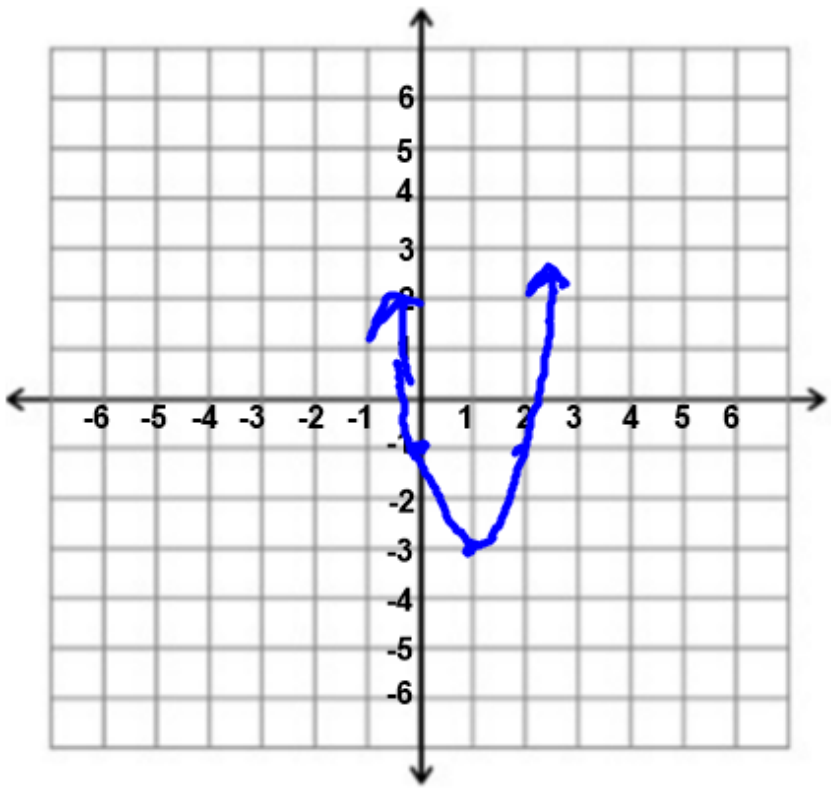
4. $y = \frac{x+5}{\sqrt{3-x}}$

$3 - x > 0$

$\boxed{3 > x}$

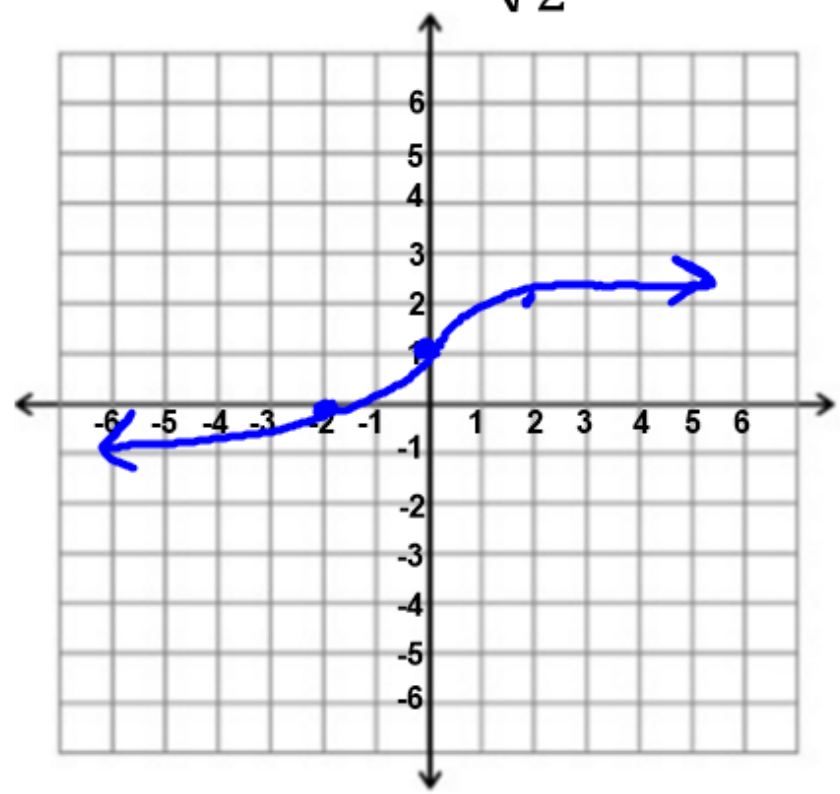
Graphing Parent Functions

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



$(-1,1) \rightarrow (-1,2)$
$(0,0) \rightarrow (0,0)$
$(1,1) \rightarrow (1,2)$

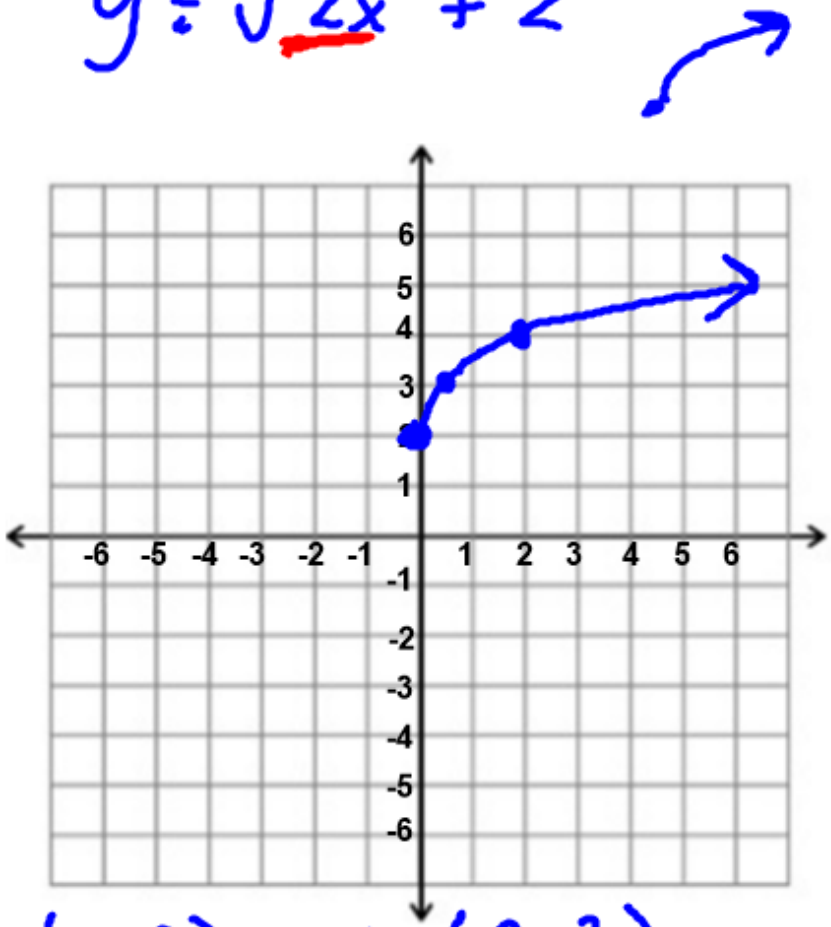
$$g(x) = \sqrt[3]{\frac{x}{2}} + 1$$



$(-1,-1) \rightarrow (-2,-1)$
$(0,0) \rightarrow (0,0)$
$(1,1) \rightarrow (2,1)$

Graphing Parent Functions

$y = \sqrt{2x} + 2$

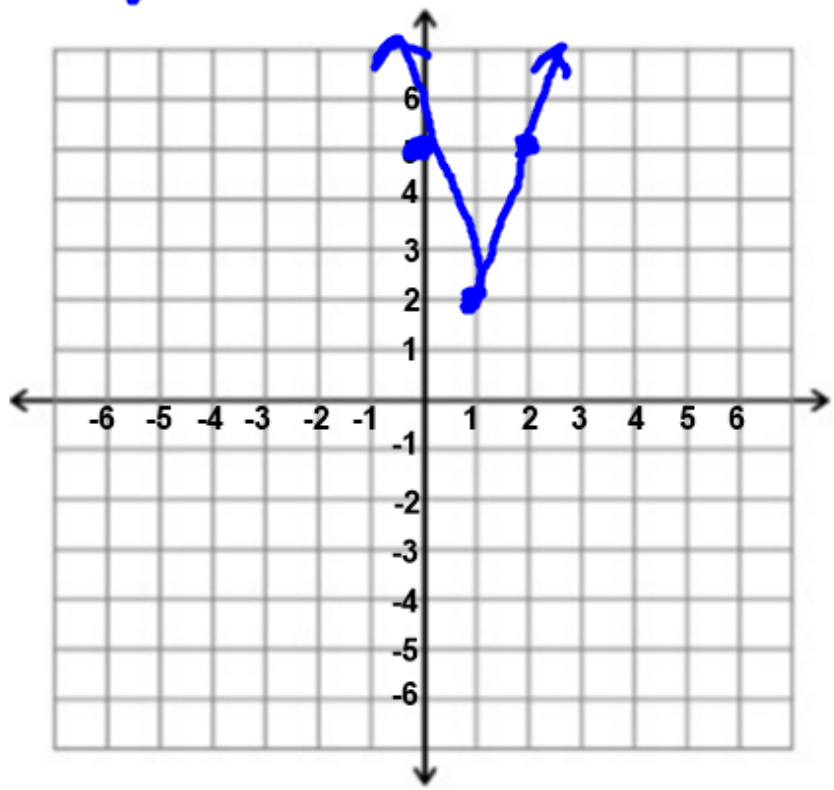


$(4,2) \rightarrow (2,2)$

$(0,0) \rightarrow (0,0)$

$(1,1) \rightarrow (\frac{1}{2},1)$

$y = 3|x-1| + 2$



$(1,1) \rightarrow (1,3)$

$(0,0) \rightarrow (0,0)$

$(-1,1) \rightarrow (-1,3)$

Inverses

Find the inverse.

$f(x) = x^2 - 1, \boxed{x \leq 0}$

$y = x^2 - 1$

$y + 1 = x^2$

$\boxed{-\sqrt{y+1} = x}$

$f^{-1}(y) = -\sqrt{y+1}$

$f(x) = \dfrac{2}{x+3}$

$(x+3)y = \dfrac{2}{x+3} \cdot (x+3)$

$\dfrac{(x+3)\cancel{y}}{\cancel{y}} = \dfrac{2}{y}$

$x + 3 = \dfrac{2}{y}$

$\boxed{x = \dfrac{2}{y} - 3}$

$f^{-1}(y) = \dfrac{2}{y} - 3$

Degree and End Behavior

Find the degree and end behavior.

$y = 3x^2 - 8x^5 + 19$

D: 5 (odd)

EB: ↑ ↓

$y = 4x^7 + x^4 + 12x^{10}$

D: 10

EB: ↑ ↑

Sketching Polynomials (1 of 2)

$$y = 1(2-1x)^{1}(x+4)^{2}(x-3)^{1}$$

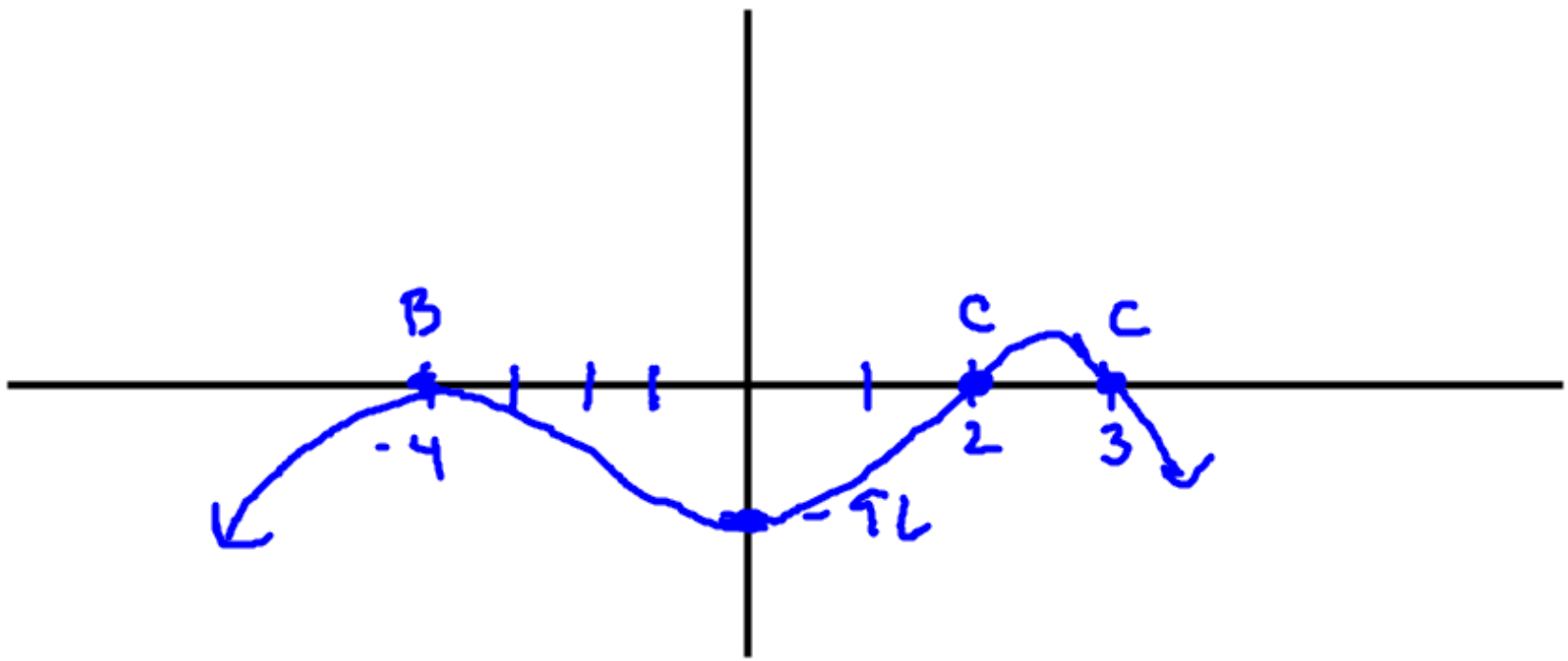
$x=2$ C $\quad$ $x=-4$ B $\quad$ $x=3$ C

E.B. ↓↓

Degree: 4 (even)

L.C: $1(-1)(1)^2(1)$

$\boxed{=-1}$

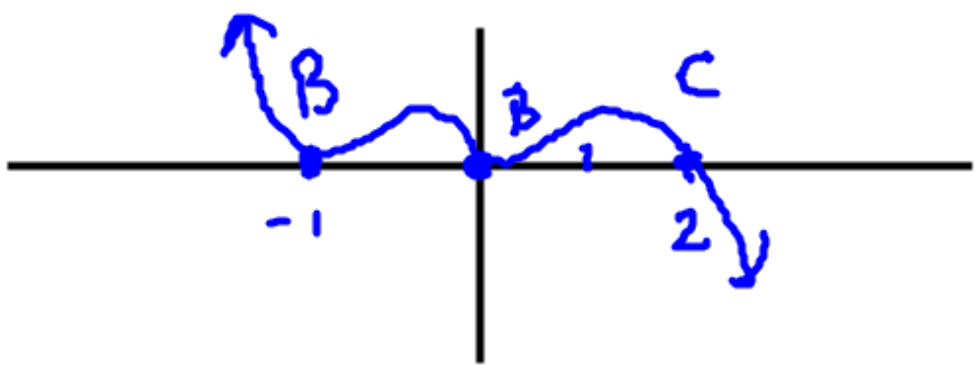


y-int: $y = (2-0)(0+4)^2(0-3)$

$= \boxed{-96}$

Sketching Polynomials (2 of 2)

$$y = -x^2(x+1)^2(x-2)$$



Polynomial Division (1 of 2)

$$(x^3 + 5x^2 - 3x - 1) \div (x^2 - 1)$$

$$\boxed{x + 5 + \frac{-2x + 4}{x^2 - 1}}$$

$$\begin{array}{r|l} x^2 - 1 & \cancel{x^3} + 5x^2 - 3x - 1 \\ & -(\cancel{x^3} \qquad\quad - x) \\ \hline & 5x^2 - 2x - 1 \\ & -(5x^2 \qquad\quad - 5) \\ \hline & -2x + 4 \end{array}$$

Polynomial Division (2 of 2)

$$(6x^3 + 2x^2 - 11x + 12) \div (3x + 4)$$

Factoring (1 of 2)

$$3x^3 + 8x^2 - 12x - 32$$

$$x^2(3x+8) - 4(3x+8)$$

$$(x^2-4)(3x+8)$$

$$\boxed{(x+2)(x-2)(3x+8)}$$

$$4x^4 - 5x^2 - 9$$

$$(4x^2-9)(x^2+1)$$

$$\boxed{(2x-3)(2x+3)(x^2+1)}$$

Factoring (2 of 2)

a^3+b^3

$=(a+b)(a^2-ab+b^2)$

$250x^3+128$

$2(125x^3+64)$

$a=5x \quad b=4$

$\boxed{2(5x+4)(25x^2-20x+16)}$

a^3-b^3

$=(a-b)(a^2+ab+b^2)$

$2x^3+9x^2+13x+6$

-1	2	9	13	6
	↓	-2	-7	-6
	2	7	6	0

$(x+1)(2x^2+7x+6)$

$\boxed{(x+1)(2x+3)(x+2)}$

Finding Zeros (1 of 2)

$$x^4 - 5x^2 = 14$$

$$x^4 - 5x^2 - 14 = 0$$

$$(x^2 - 7)(x^2 + 2) = 0$$

$$x^2 - 7 = 0$$

$$x^2 = 7$$

$$\boxed{x = \pm\sqrt{7}}$$

$$x^2 + 2 = 0$$

$$x^2 = -2$$

$$\boxed{x = \pm i\sqrt{2}}$$

Finding Zeros (2 of 2)

$$x^6 + 8x^3 = 0$$

$$x^3(x^3+8) = 0$$

$$\underbrace{x^3}_{x=0}\underbrace{(x+2)}_{x=-2}\underbrace{(x^2-2x+4)}$$

$$x = \frac{2 \pm \sqrt{(-2)^2 - 4(4)(1)}}{2(1)}$$

$$= \frac{2 \pm \sqrt{-12}}{2} = 1 \pm i\sqrt{3}$$

$$\boxed{x = 0, -2, 1 \pm i\sqrt{3}}$$