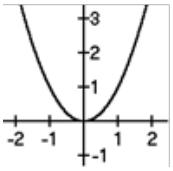
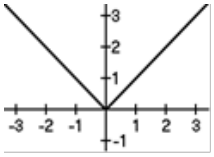
Write the parent function:



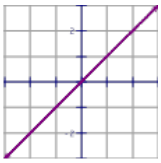
x^2

Write the parent function:



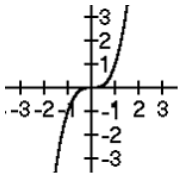
$|x|$

Write the parent function:



x

Write the parent function:



x^3

List the transformations:

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

Shift Right 3

Shift Down 4

List the transformations:

$$f(x) = -|x+3|$$

V. Flip or Reflection across x-axis

Shift Left 3

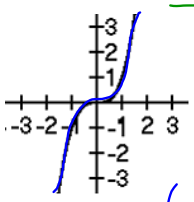
List the transformations:

$$f(x) = 4\sqrt[3]{x} + 2$$

V. Stretch by 4

Shift Up 2

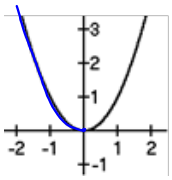
State where the function is **increasing**



Going up

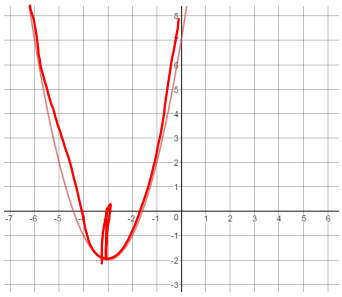
$(-\infty, \infty)$

State where the function is **decreasing**



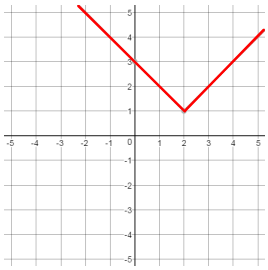
$(-\infty, 0)$

State where the function is **increasing**



$(-3, \infty)$

State where the function is **decreasing**



$(-\infty, 2)$

x-values!

State the **x-intercept**

$$g(x) = \sqrt{x+1} - 2$$

$0 = \sqrt{x+1} - 2$

$+2 \qquad +2$

$2^2 = \sqrt{x+1}^{\,2}$

$4 = x+1$

$x = 3$

$\boxed{(3, 0)}$

State the **y-intercept**

$h(x) = 2(x-3)^2 + 1$

0

$2(0-3)^2+1$

$2(9)+1$

$18+1$

19

$(0,19)$

Perform the operation and write in standard form

$(82x^8 + 21x^2 - 6) + (18x + 7x^8 - 42x^2 + 3)$

$89x^8 - 21x^2 + 18x - 3$

Perform the operation and write in standard form

$(-2x + 23x^5 + 11) - (5 + 9x^3 - x)$

$23x^5 + 9x^3 - 3x + 6$

Perform the operation and write in standard form

$(10x^2 - x + 4) - (5x - 7) + (6x - 11)$

$10x^2 - 14$

Perform the operation and write in standard form

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

$x^3 - 3x^2 + 4x$

$\quad -2x^2 + 6x - 8$

$x^3 - 5x^2 + 10x - 8$

Perform the operation and write in standard form

$$(x^4+3x^3-7x+5)\div(x^2-2)$$

Perform the operation and write in standard form

$$(x^4-7x^2+3x-10)\div(x-3)$$

Factor

$$x^2+\overset{-}{5}x-\overset{\times}{14}$$

$(x+7)(x-2)$

Factor

$$3x^2 - 10x - 8$$

$-12 \cdot 2 = -24$

$3x^2 - 12x + 2x - 8$ $\quad -12 + 2 = -10$

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

Factor

$$2x^2 + x - 6$$

Factor

$$2x^2 - 18$$

Factor

$$2x^3 - 6x^2 - 8x + 24$$

Factor

$$8x^3 - 125$$

$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$

$a = 2x$

$b = 5$

$(2x-5)(4x^2 + 10x + 25)$

Factor

$$x^3 + 64$$

Find the zeros and the multiplicities:

$$f(x) = (x-5)^2(x+3)^5(x+7)$$

Find the zeros and the multiplicities:

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

Determine the End Behavior

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

Determine the End Behavior

$$f(x) = x^3 + 2x^2 - 7x - 13$$

Determine the End Behavior

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

Determine the End Behavior

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

Determine the End Behavior

$$f(x) = -x(x+2)^2(x-5)^2(x-7)$$

Determine the **zeros** and **type of intersection** for each zero.

$$f(x) = -x(x+2)^2(x-5)^2(x-7)$$

Determine the **zeros** and **type of intersection** for each zero.

$$f(x) = (x-5)^2(x+3)^5(x+7)$$

Determine the **zeros** and **type of intersection** for each zero.

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

Determine the **zeros** and **type of intersection** for each zero.

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

Solve the inequality:

$$-(x+1)(x-3)^2 \geq 0$$

Solve the inequality:

$$(x-2)(x-5)^3(x+3) < 0$$