Name: _____ Date: _____

Polynomials Class: **Algebra**

Topic: Graphing Polynomials

Notes

Polynomial: _____

Linear Function: _____

Parent Function: _____

# of Roots: _____

Sketch:

Quadratic Function: _____

Parent Function: _____

# of Roots: _____

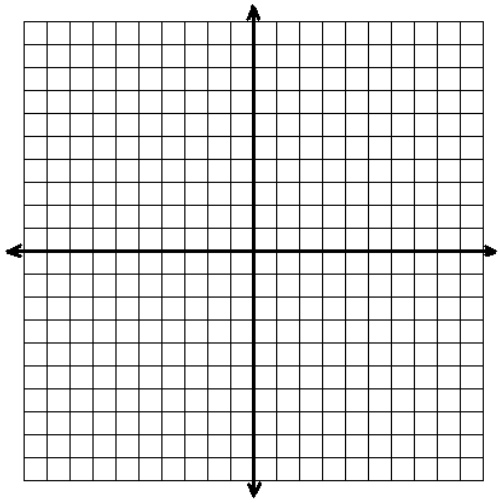
Sketch:

Cubic Function: _____

Parent Function: _____

# of Roots: _____

Graph $g(x)=x^3$ and state the roots.



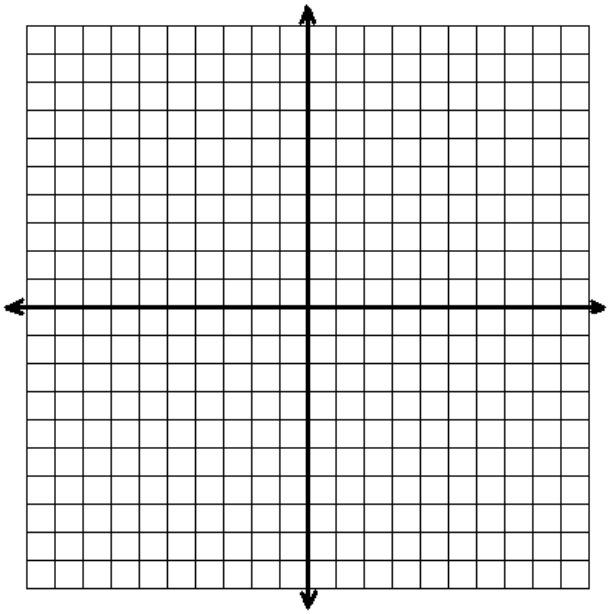
The coefficient of the leading term is **Positive/Negative**?

The exponent of the leading term is **even/odd**?

The end behavior is down/up and down/up?

Model #2

Graph $f(x)=x^3 + x$ and state the roots.



Roots:_____

The coefficient of the leading term is **Positive/Negative**?

The exponent of the leading term is **even/odd**?

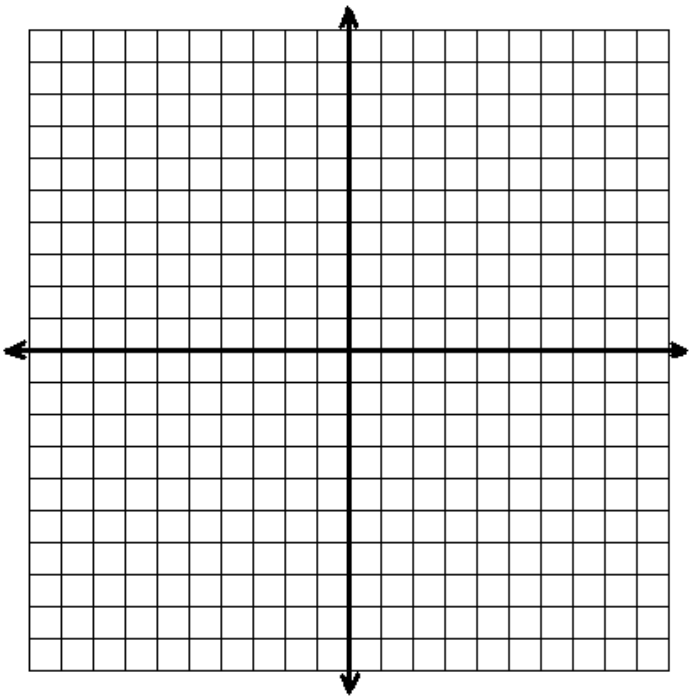
The end behavior is down/up and down/up?

CFU_Think-Pair-Share

State the similarities and differences among the graphs $g(x) = x^3$ and $f(x) = x^3 + x$

Model #3

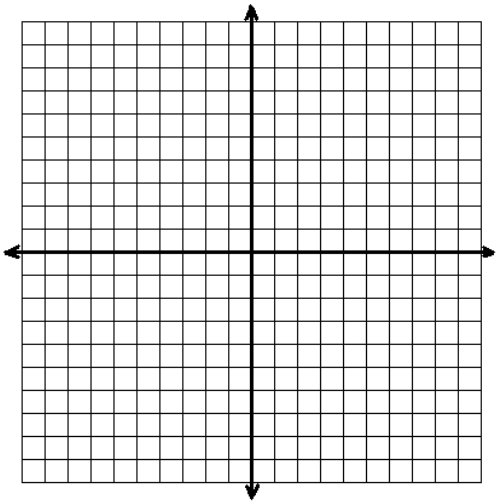
Graph $g(x)=x^3 - x$ and
$f(x) = x^3 - 4x$



Part B_ Describe the shift that occurred.

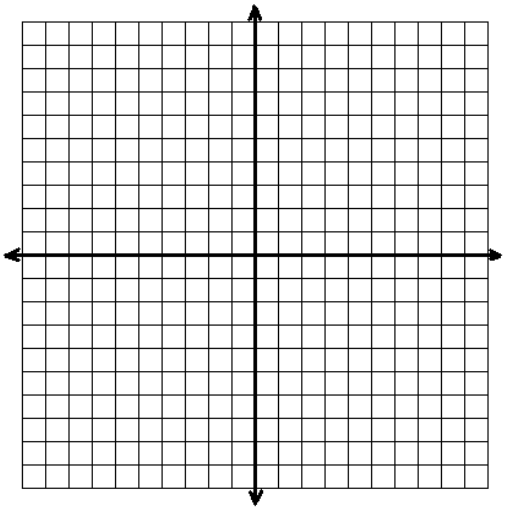
CFU_Think-Pair-Share

1) **Graph $g(x)=x^3$ and $f(x) = 2x^3 - 8x$**



Part B_ Describe the shift that occurred.

2) For the graph $f(x) = 2x^3 - 8x$ answer the following questions.
   a) The coefficient of the leading term is **Positive/Negative**?
   b) The exponent of the leading term is **even/odd**?
   c) The end behavior is down/up and down/up?
   d) Graph the following polynomial.



3) **Got It?** What is the graph of $y = -x^3 + 2x^2 - x - 2$? Describe the graph.

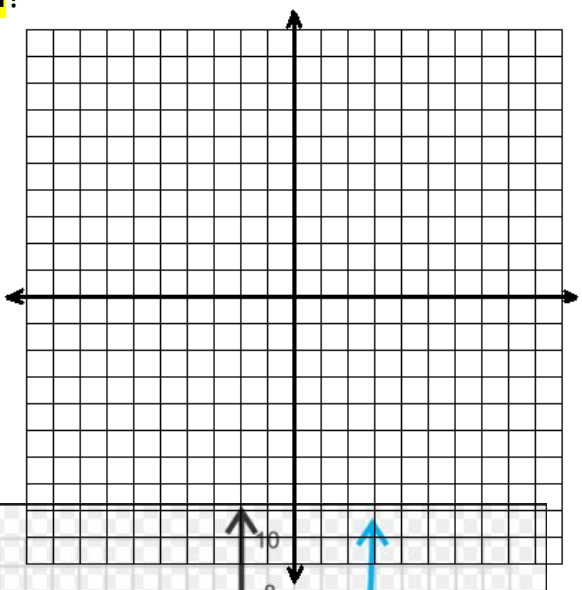
a) The coefficient of the leading term is **Positive/Negative**?

b) The exponent of the leading term is **even/odd**?

c) The end behavior is down/up and down/up?

d) Graph the following graph

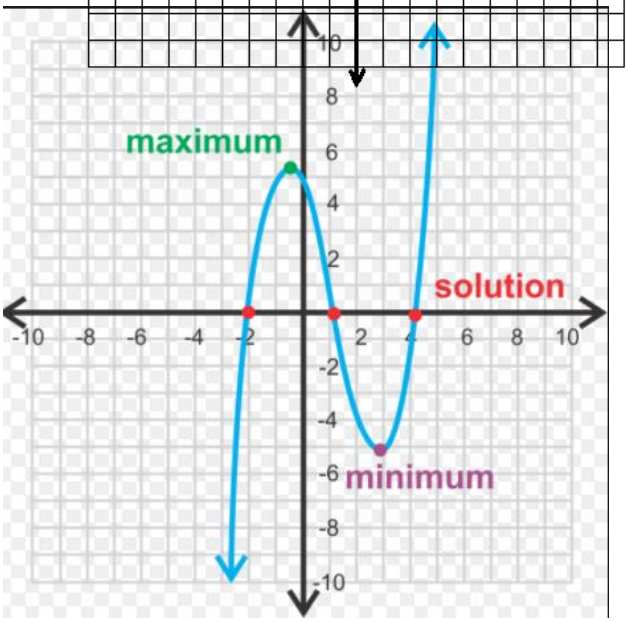
$y = -x^3 + 2x^2 - x - 2$



Guided Practice

1) Based on the graph below, write an expression that is a possible factorization of p(x)?

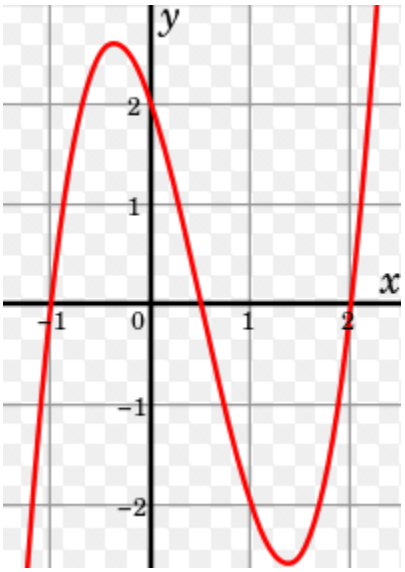
Answer: _____



2) Based on the graph below, write an expression that is a possible factorization of p(x)?

Answer: _____

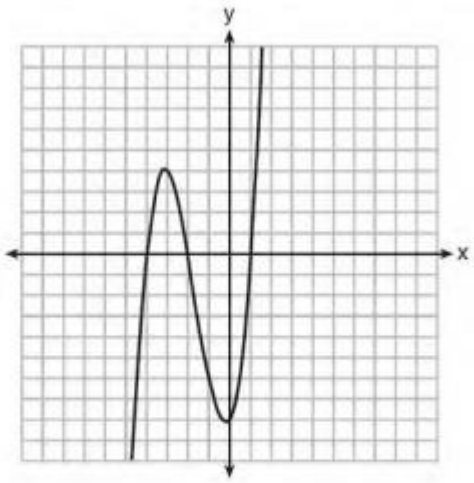
3) Based on the graph below, write an expression that is a possible factorization of p(x)?



Answer: _____

CFU_Think-Pair-Share

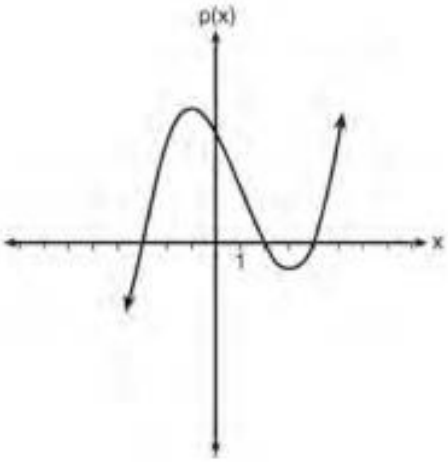
The graph of $f(x)$ is shown below.



Which function could represent the graph of $f(x)$?

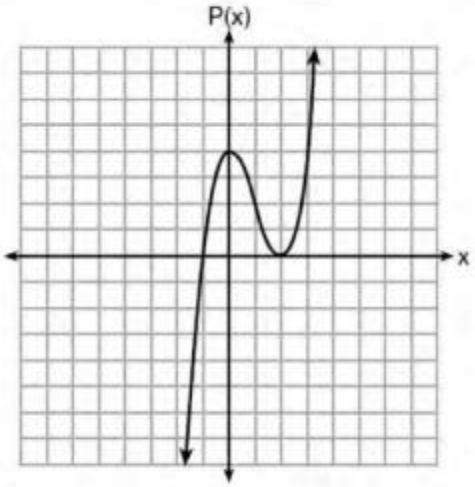
1) $f(x) = (x+2)(x^2+3x-4)$
2) $f(x) = (x-2)(x^2+3x-4)$
3) $f(x) = (x+2)(x^2+3x+4)$
4) $f(x) = (x-2)(x^2+3x+4)$

Based on the graph below, which expression is a possible factorization of $p(x)$?



1) $(x+3)(x-2)(x-4)$
2) $(x-3)(x+2)(x+4)$
3) $(x+3)(x-5)(x-2)(x-4)$
4) $(x-3)(x+5)(x+2)(x+4)$

Wenona sketched the polynomial $P(x)$ as shown on the axes below.

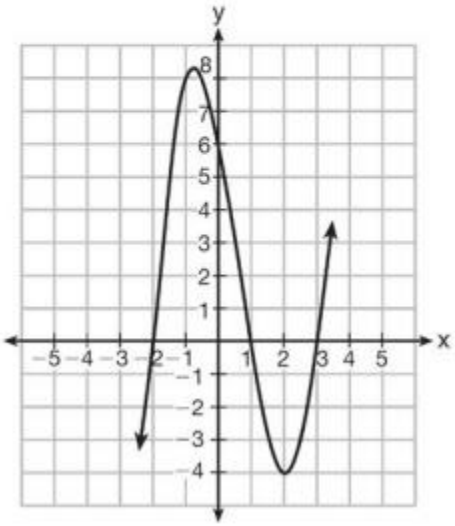


Which equation could represent $P(x)$?

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

Which equation(s) represent the graph below?

I $y = (x+2)(x^2-4x-12)$
II $y = (x-3)(x^2+x-2)$
III $y = (x-1)(x^2-5x-6)$



The zeros of the function $f(x) = 2x^3 + 12x - 10x^2$ are

1) $\{2,3\}$
2) $\{-1,6\}$
3) $\{0,2,3\}$
4) $\{0,-1,6\}$

Independent Practice: _Use your graphing calculator to answer the following questions.

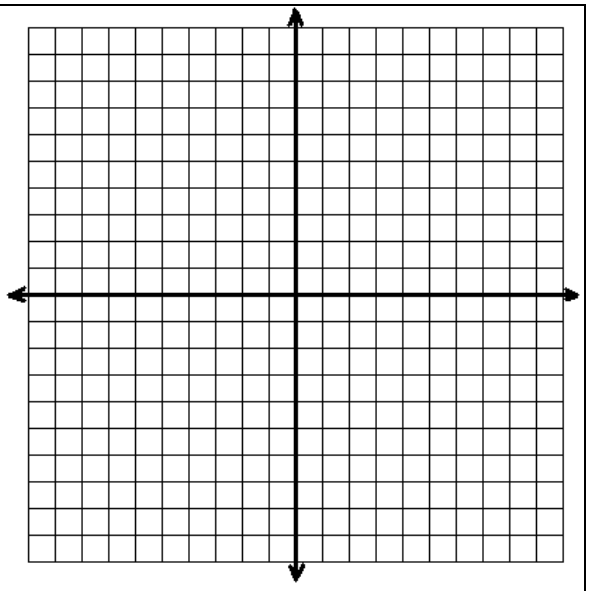
In the functions $f(x) = kx^2$ and $g(x) = |kx|$, k is a positive integer. If k is replaced by $\frac{1}{2}$, which statement about these new functions is true?

1) The graphs of both $f(x)$ and $g(x)$ become wider.
2) The graph of $f(x)$ becomes narrower and the graph of $g(x)$ shifts left.
3) The graphs of both $f(x)$ and $g(x)$ shift vertically.
4) The graph of $f(x)$ shifts left and the graph of $g(x)$ becomes wider.

Given the graph of the line represented by the equation $f(x) = -2x + b$, if b is increased by 4 units, the graph of the new line would be shifted 4 units

1) right
2) up
3) left
4) down

The vertex of the parabola represented by $f(x) = x^2 - 4x + 3$ has coordinates $(2, -1)$. Find the coordinates of the vertex of the parabola defined by $g(x) = f(x - 2)$. Explain how you arrived at your answer. [The use of the set of axes below is optional.]



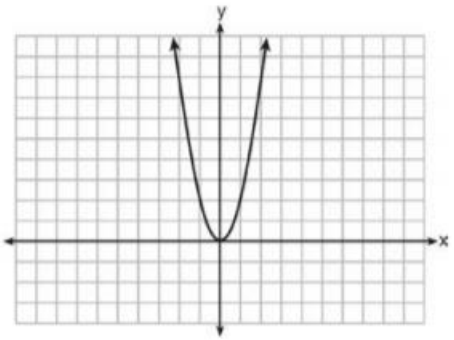
When the function $f(x) = x^2$ is multiplied by the value a, where $a > 1$, the graph of the new function, $g(x) = ax^2$

1) opens upward and is wider
2) opens upward and is narrower
3) opens downward and is wider
4) opens downward and is narrower

How does the graph of $f(x) = 3(x - 2)^2 + 1$ compare to the graph of $g(x) = x^2$?

1) The graph of $f(x)$ is wider than the graph of $g(x)$, and its vertex is moved to the left 2 units and up 1 unit.
2) The graph of $f(x)$ is narrower than the graph of $g(x)$, and its vertex is moved to the right 2 units and up 1 unit.
3) The graph of $f(x)$ is narrower than the graph of $g(x)$, and its vertex is moved to the left 2 units and up 1 unit.
4) The graph of $f(x)$ is wider than the graph of $g(x)$, and its vertex is moved to the right 2 units and up 1 unit.

The graph of the equation $y = ax^2$ is shown below.



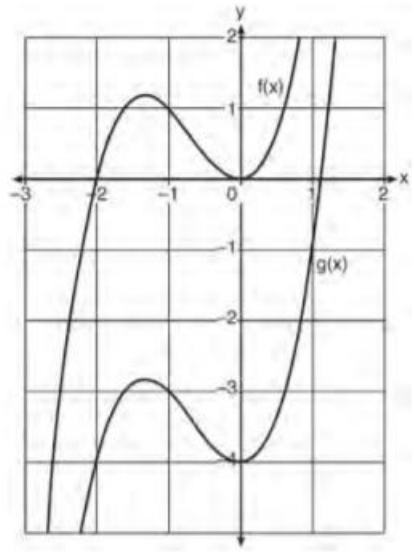
If a is multiplied by $-\frac{1}{2}$, the graph of the new equation is

1) wider and opens downward
2) wider and opens upward
3) narrower and opens downward
4) narrower and opens upward

If the original function $f(x) = 2x^2 - 1$ is shifted to the left 3 units to make the function $g(x)$, which expression would represent $g(x)$?

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

In the diagram below, $f(x) = x^3 + 2x^2$ is graphed. Also graphed is $g(x)$, the result of a translation of $f(x)$.



Determine an equation of $g(x)$. Explain your reasoning.