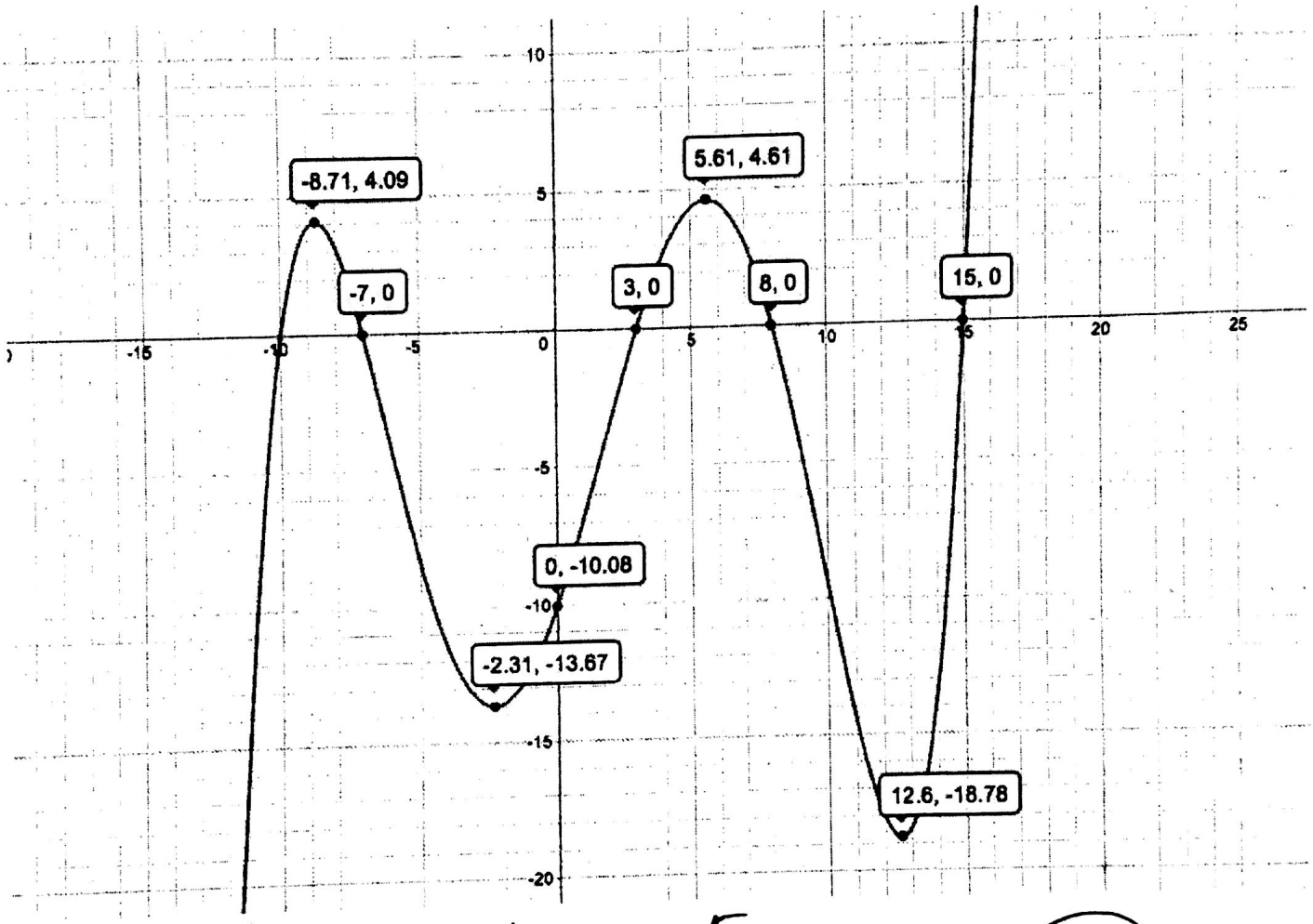
CC Algebra 2 Name _____ Date _____ Pd ___

Unit 4A—Polynomial Functions Test Review

For the following graph, describe the key features listed below. Please use proper notation! ☺



Domain $(-\infty, \infty)$ Range $(-\infty, \infty)$ Degree 5 Leading Coefficient: positive or negative

Y-Intercept $(0, -10.08)$ X-Intercept(s) $(-10,0)$ $(-7,0)$ $(3,0)$ $(8,0)$ $(15,0)$

Increasing Interval(s) $(-\infty, -8.71) \cup [-2.31, 5.61] \cup [12.6, \infty)$

Decreasing Interval(s) $[-8.71, -2.31] \cup [5.61, 12.6]$

End Behavior As $x \to -\infty$, $f(x) \to -\infty$ and As $x \to \infty$, $f(x) \to \infty$

Maximums and Minimums of the graph (please list as Absolute or Local):

No Abs. max / min!

$(-8.71, 4.06)$ local max

$(5.61, 4.61)$ local max

$(-2.31, -13.67)$ local min

$(12.6, -18.78)$ local min

Write a polynomial expression that fits the following description. *Ans will vary

A. Cubic Trinomial with a positive leading coefficient $x^3 + 4x - 6$

B. Quintic binomial with a negative leading coefficient $-x^5 + 7x^3$

C. Quartic polynomial with a negative leading coefficient $-x^4 + 6x^3 + 5x^2 - 10$

For the following polynomials, identify the following key features. Then sketch its graph. Please make sure to label the x-axis of your graphs.

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

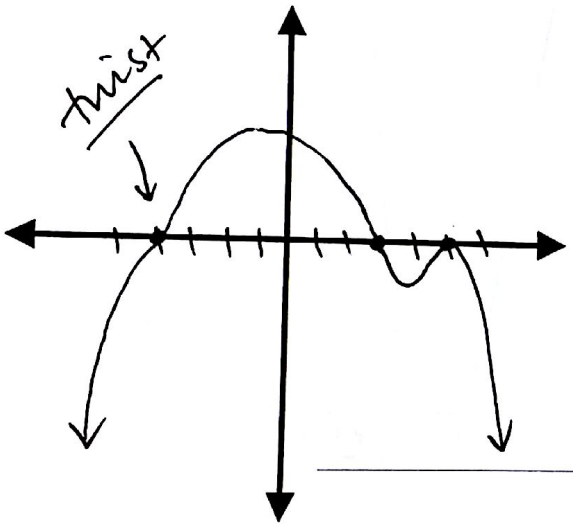
Degree 6

LC(+/-) −

End Behavior

As $x \to -\infty$, $f(x) \to -\infty$

As $x \to \infty$, $f(x) \to -\infty$



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

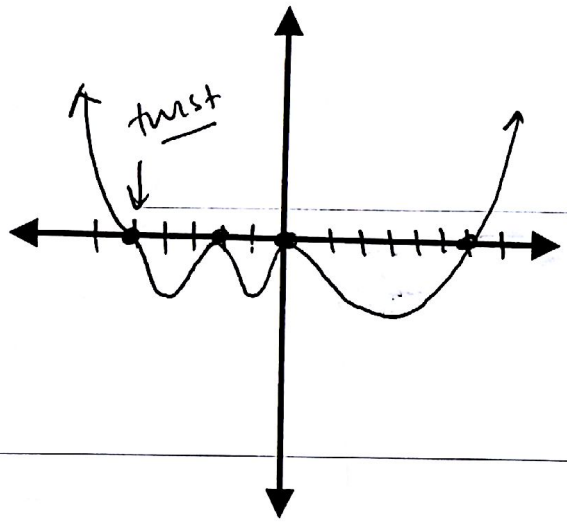
Degree 8

LC(+/-) +

End Behavior

As $x \to -\infty$ $f(x) \to \infty$

As $x \to \infty$ $f(x) \to \infty$



Use the following functions to complete the operations below.

$f(x) = x^2 + 2x - 4$ $\quad$ $g(x) = x^3 - 4x$ $\quad$ $h(x) = -x^2 + 6$

a. $f(x) + h(x)$

$x^2 + 2x - 4 + (-x^2 + 6)$

$x^2 + 2x - 4 - x^2 + 6$

$\boxed{2x + 2}$

b. $g(x) - h(x)$

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

$x^3 - 4x + x^2 - 6$

$\boxed{x^3 + x^2 - 4x - 6}$

c. $g(x) + h(x) - f(x)$

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

$x^3 - 4x - x^2 + 6 - x^2 - 2x + 4$

$\boxed{x^3 - 2x^2 - 6x + 10}$

d. $f(x) \cdot h(x)$

$(x^2 + 2x - 4)(-x^2 + 6)$

$-x^4 + 6x^2 - 2x^3 + 12x + 4x^2 - 24$

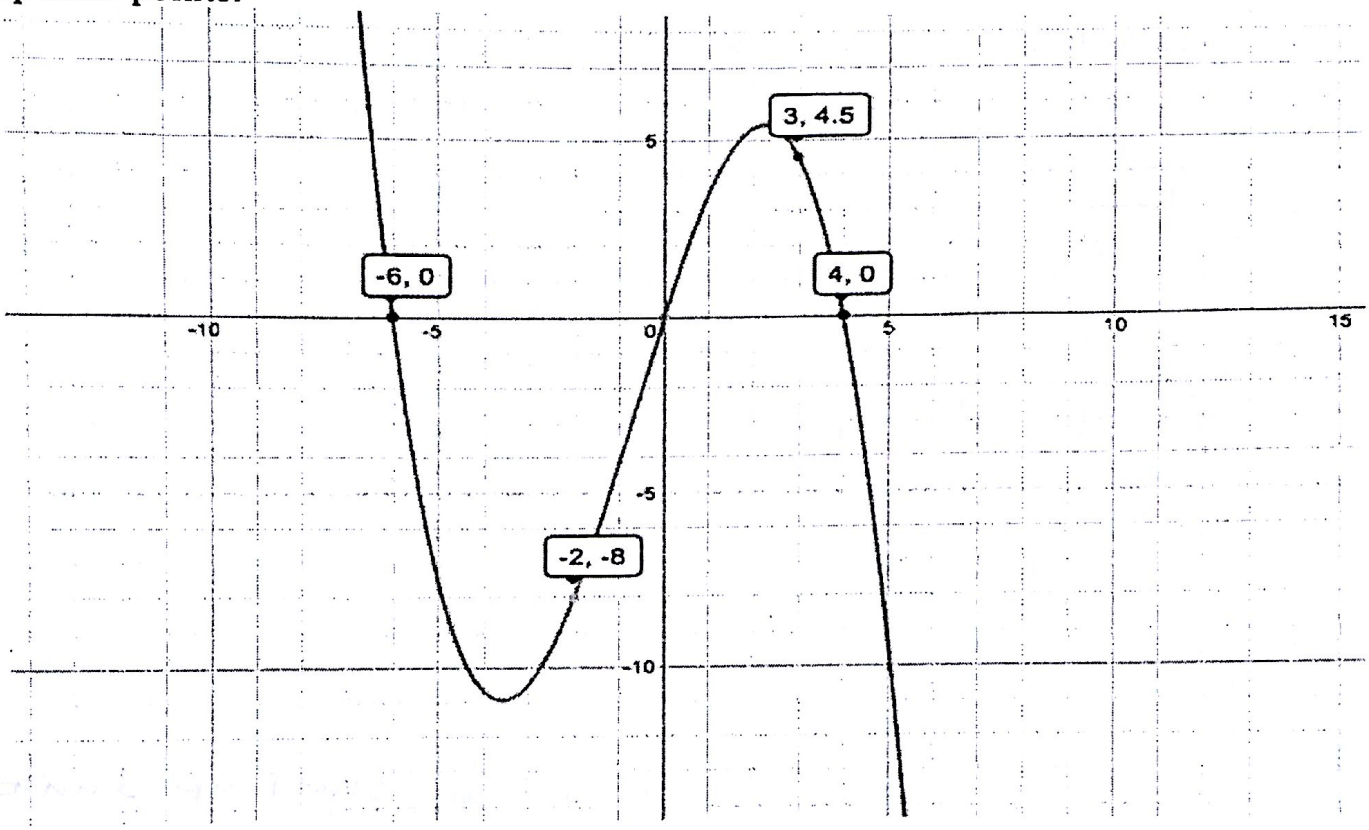
$\boxed{-x^4 - 2x^3 + 10x^2 + 12x - 24}$

e. $g(x) \cdot h(x)$

$\hookrightarrow (x^3 - 4x)(-x^2 + 6)$

$-x^5 + 6x^3 + 4x^3 - 24x = \boxed{-x^5 + 10x^3 - 24x}$

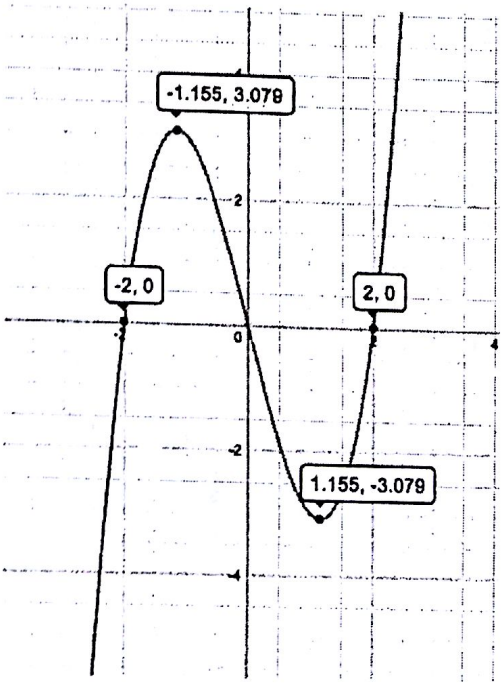
The graph of the parent function $f(x) = -\frac{1}{6}x(x-4)(x+6)$ is shown. Complete the table below to describe the effects of the given transformation to the entire function and to specific points.



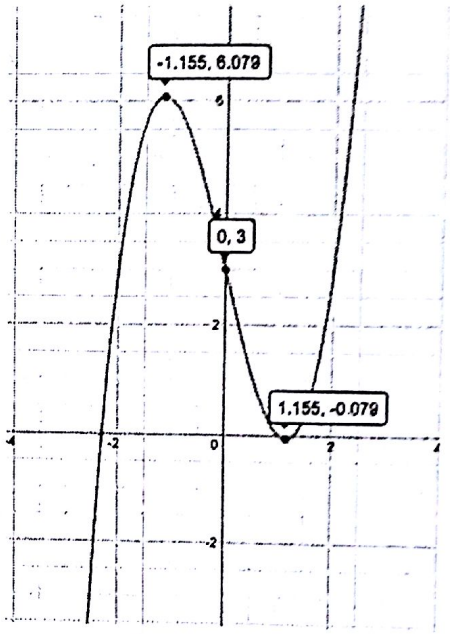
Transformation Equation	Written Description of Change	Change to x-coordinate	Change to y-coordinate	New coordinates for the point (-2, -8)	New coordinates for the point (4,0)
1. $y = f(x) + 6$	shift up 6 units	none	add 6	(-2, -2)	(4, 6)
2. $y = f(x-2)$	shift right 2 units	add 2	none	(0, -8)	(6, 0)
3. $y = -f(x)$	reflect over x-axis	none	change sign	(-2, 8)	(4, 0)
4. $y = f(-x)$	reflect over y-axis	change sign	none	(2, -8)	(-4, 0)
5. $y = 3f(x)$	vertical stretch by factor of 3	none	multiply by 3	(-2, -24)	(4, 0)
6. $y = f(\frac{1}{4}x)$	horizontal stretch by factor of 1/4	divide by 1/4	none	(-8, -8)	(16, 0)

The graph of the parent function, f(x), is shown below. For the following graphs, please describe the transformation of the parent function in words and in notation form.

Graph of f(x)



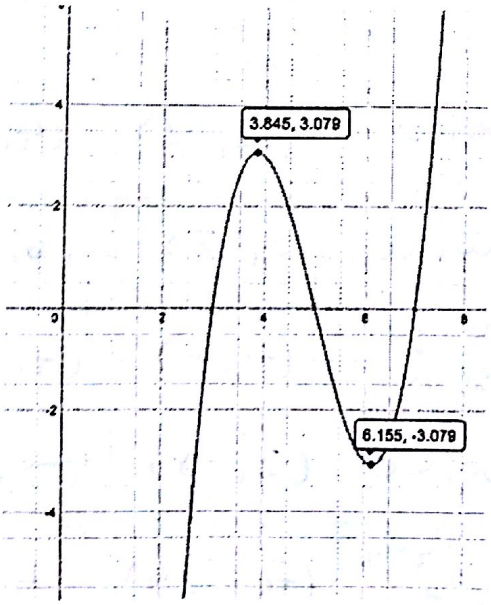
a.



Transformation: shift up 3 units

Notation form: f(x) +3

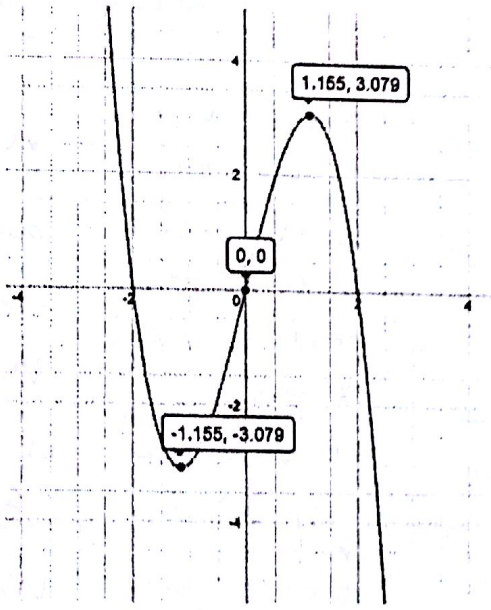
b.



Transformation: shift right 5 units

Notation form: f(x-5)

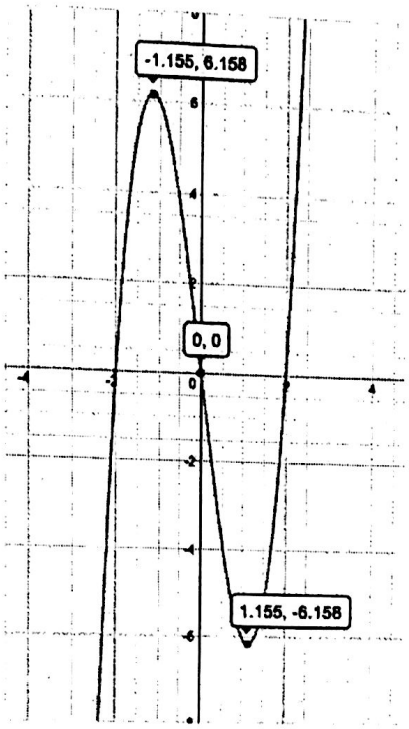
c.



Transformation: reflection over x-axis or y-axis

Notation form: -f(x) or f(-x)

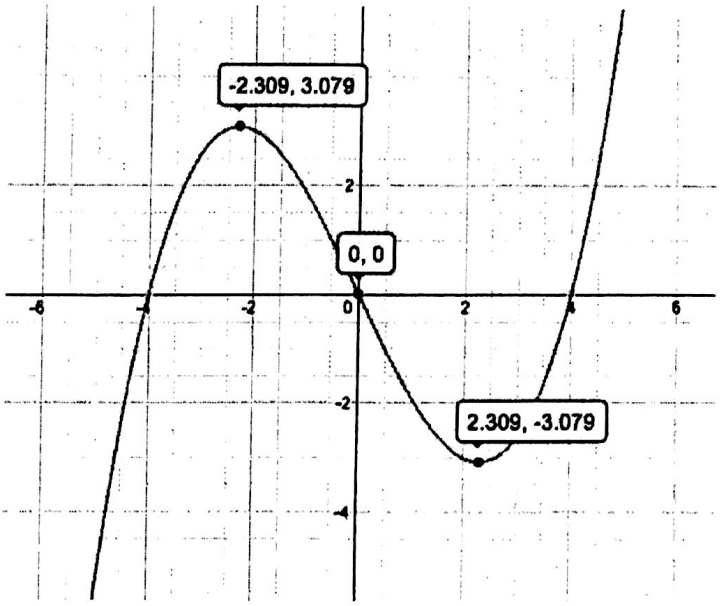
d.



Transformation: vertical stretch

Notation form: $2f(x)$

e.



Transformation: horizontal stretch

Notation form: $f(\frac{1}{2}x)$