College Algebra Name: Key

Chapter 2A Review Date: _____ Period: _____

Identify the vertex, axis of symmetry, then rewrite the function in vertex form.

1.) $f(x) = 2x^2 - 12x + 19$

$\frac{12}{2(2)} = 3$ $2(3)^2 - 12(3) + 19$

1

Vertex: $(3, 1)$

Axis of symmetry: $x = 3$

Vertex form: $f(x) = 2(x-3)^2 + 1$

2.) $f(x) = -2x^2 - 16x - 34$

$\frac{16}{2(-2)} = \frac{16}{-4} = -4$

$-2(-4)^2 - 16(-4) - 34$

-2

Vertex: $(-4, -2)$

Axis of symmetry: $x = -4$

Vertex form: $f(x) = -2(x+4)^2 - 2$

Write an equation for a linear function given the following information.

3.) $f(5) = 1$ and $f(-5) = 3$

$(5, 1)$ $(-5, 3)$ $\frac{3-1}{-5-5}$ $\frac{2}{-10} = \frac{-1}{5}$

$y - 1 = \frac{-1}{5}(x - 5)$

$y - 1 = -\frac{1}{5}x + 1$

$y = -\frac{1}{5}x + 2$

$f(x) = \frac{-1}{5}x + 2$

4.) $f(2) = 5$ and $f(0) = -4$

$(2, 5)$ $(0, -4)$ $\frac{-4-5}{0-2} = \frac{-9}{-2} = \frac{9}{2}$

$f(x) = 9/2x - 4$

Write an equation in vertex form for the quadratic function given the vertex and a point on the graph.

5.) vertex: $(h, k) = (-3, 4)$ point: $(x, y) = (3, 0)$

$0 = A(3+3)^2 + 4$

$0 = 36A + 4$

$-4 = 36A$

$-\frac{1}{9} = A$

$f(x) = -\frac{1}{9}(x+3)^2 + 4$

6.) vertex: $(h, k) = (2, 5)$ point: $(x, y) = (3, 7)$

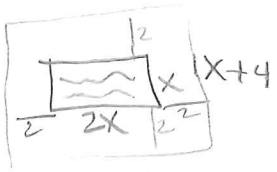
$7 = A(3-2)^2 + 5$

$7 = 1A + 5$

$2 = A$

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

7.) A rectangular swimming pool is twice as long as it is wide. A small concrete walkway surrounds the pool. The walkway is a constant 2 feet wide. If the total area enclosed by the pool and walkway is 646 square feet, find the dimensions of the pool.



$(2x+4)(x+4) = 646$

$2x^2 + 8x + 4x + 16 = 646$

$2x^2 + 12x - 630 = 0$

$2(x^2 + 6x - 315)$

-315: -15, 21; $-15 + 21 = 6$

$2(x-15)(x+21)$

$x = 15$

30 feet by 15 feet

8.) The volume of a box is 96 cubic inches. The length is 8 inches more than the height. The width is 2 inches less than the height. Find the dimensions of the box.

$L = x+8$

$w = x-2$

$h = x$

$x(x+8)(x-2) = 96$

$x(x^2 + 6x - 16) = 96$

$x^3 + 6x^2 - 16x - 96 = 0$

$x^2(x+6) - 16(x+6) = 0$

$(x^2 - 16)(x+6)$

$x^2 = 16$ $\quad x = -6$

$x = \pm 4$

$+4, -4$

12in by 2in by 4in

$12 \times 2 \times 4$ in

Write a function in standard form of minimum degree with given zeros and multiplicities.

9.) -2 (multiplicity of 2) and 7 (multiplicity of 1)

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

$(x^2 + 4x + 4)(x-7)$

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

$-7x^2 - 28x - 28$

$f(x) = x^3 - 3x^2 - 24x - 28$

10.) 1 (multiplicity of 2) and -1 (multiplicity of 2)

$(x-1)(x-1)(x+1)(x+1)$

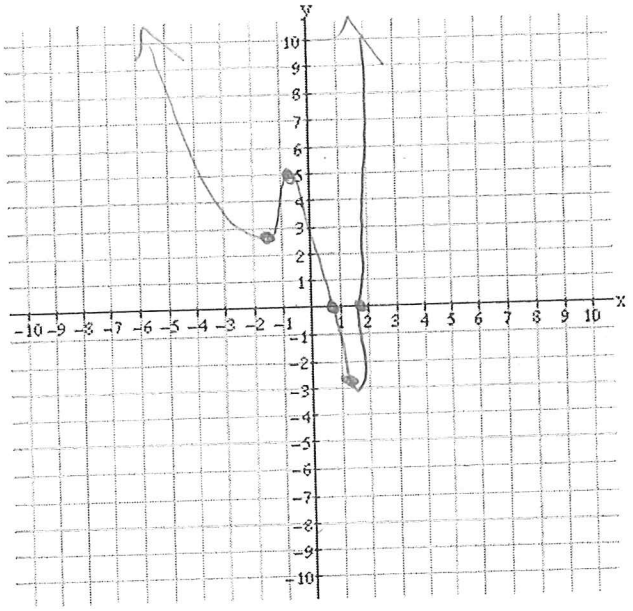
$(x-1)(x+1)$ $\quad (x-1)(x+1)$

$(x^2 - 1)(x^2 - 1)$

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

Find the following information for each function, then graph. If necessary, round all answers to the nearest tenths place.

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



Degree: 4

Leading coefficient: 1

Real Zero(s): X = .67 1.8

Relative Max: (-.5, 5)

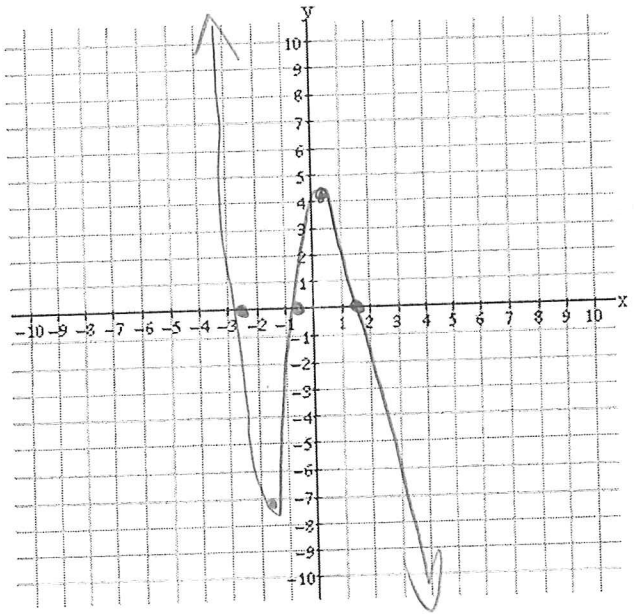
Relative Min: (-1.6, 2.6) (1.3, -2.9)

End Behavior: $x \to \infty$ $f(x) \to \infty$
$x \to -\infty$ $f(x) \to \infty$

Domain: $(-\infty, \infty)$

Range: $[-2.9, \infty)$

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



Degree: 3

Leading coefficient: -2

Real Zero(s): -2.7 -.5 1.2

Relative Max: (.5, 4.3)

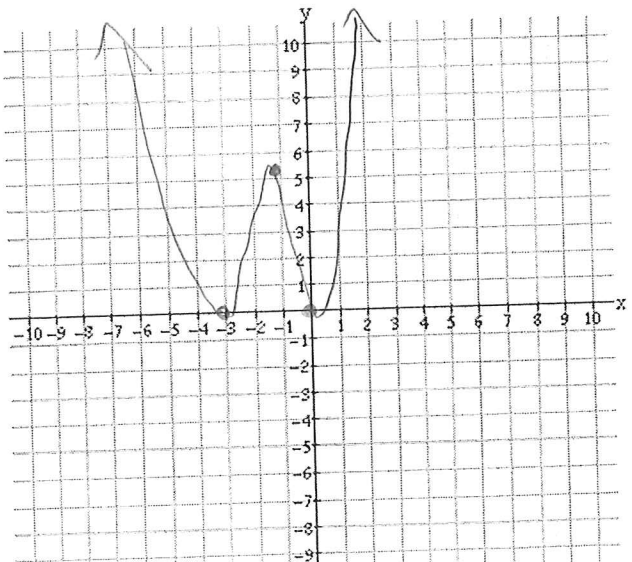
Relative Min: (-1.8, -7.3)

End Behavior: $x \to \infty$ $f(x) \to -\infty$
$x \to -\infty$ $f(x) \to \infty$

Domain: $(-\infty, \infty)$

Range: $(-\infty, \infty)$

13.) $f(x) = x^4 + 6x^3 + 9x^2$



Degree: 4

Leading coefficient: 1

Real Zero(s): 0, 0, -3, -3

Relative Max: (-1.5, 5.1)

Relative Min: (0, 0) (-3, 0)

End Behavior: $x \to \infty$ $f(x) \to \infty$
$x \to -\infty$ $f(x) \to \infty$

Domain: $(-\infty, \infty)$

Range: $[0, \infty)$

Write the following in factored form then list all the zeros.

14.) $f(x) = x^5 - 5x^4 + 8x^3 - 40x^2 - 9x + 45$

	1	-5	8	-40	-9	45
1		1	-4	4	-36	-45
	1	-4	4	-36	-45	0

	1	-4	4	-36	-45
-1		-1	5	-9	45
	1	-5	9	-45	0

$x^3 - 5x^2 + 9x - 45$

$x^2(x-5) \quad 9(x-5)$

$(x^2+9)(x-5)$

$x^2 = -9 \quad x = 5$

$x = \pm 3i$

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

	1	-1	1	-3	-6
-1		-1	2	-3	6
	1	-2	3	-6	0

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

$x^2(x-2) \quad 3(x-2)$

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

$x = 2 \quad x^2 = -3$

$x = \pm i\sqrt{3}$

Factored Form: $(x-1)(x+1)(x-5)(x^2+9)$

Zero(s): $1, -1, 5, \pm 3i$

Factored Form: $(x+1)(x-2)(x^2+3)$

Zero(s): $-1, 2, \pm i\sqrt{3}$