**Algebra 2**

Semester 1 Review

Name:

Period:

Parent Functions

☺ Definition of a function

☺ Graph parent functions (linear, quadratic, absolutely value) with transformations (reflections, vertical dilations, translations – up/down/left/right).

☺ Describe the transformations (in words) from a graph or equation.

☺ Write an equation from a description and/or a graph.

☺ QUADRATIC FUNCTIONS: Convert from standard to vertex form by completing the square.

☺ LINEAR FUNCTIONS: Write the equation from a point & slope, from two points, vertical/horizontal lines through a point.

Graph.

$y = -2(x+3)^2 + 4$	$y = \frac{1}{4}(x-2)^2 - 5$	$y = x^2 + 2x + 3$	$y = x^2 + 8x + 20$
$y = -\frac{2}{3}|x-4| + 2$	$y = 4|x| - 7$	$4x + 3y = 9$	$x - 2y = 12$

Identify the parent function, describe the transformations represented by the graph, and write the equation.
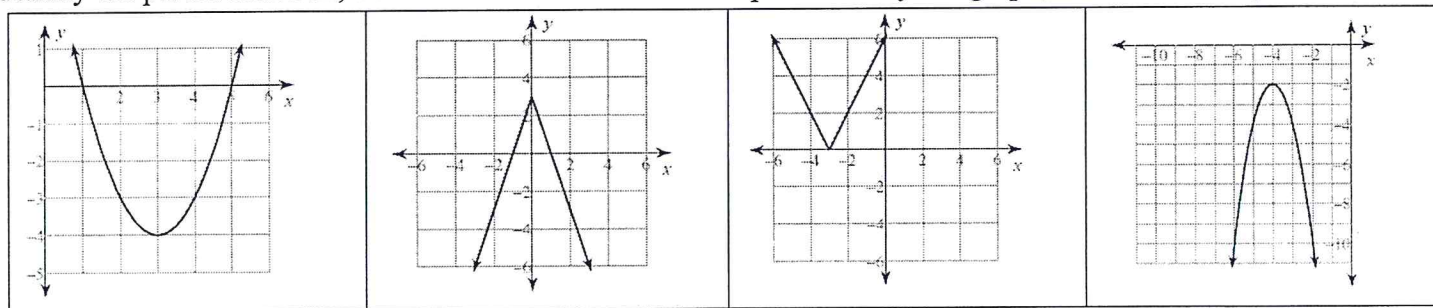
Write the equation of the line described.

through the points (-5, -3) and (1, -1)	through the point (2, 5) perpendicular to $y = 3x + 4$
horizontal line through (7, 2)	through the point (-3, 7) parallel to $y = \frac{4}{5}x - 11$

Quadratic Equations & Complex Numbers

☺ Solve by factoring (and Zero Product Property), finding square roots, graphing, and Quadratic Formula.

☺ Solve word problems (using calculator).

☺ Solve equations requiring complex solutions.

☺ Add/Subtract/Multiply complex numbers

Solve.

$7x^2 + 30x = 25$	$3x^2 = 24 - x$	$10x^2 - 3 = -159$	$7x^2 - 7 = 532$
$5x^2 - 4 = -14$	$-8x^2 = 8x - 10$	$11x^2 = -8x + 24$	$4x^2 = 24 + 29x$

Simplify.

$(7-12i)-(4+8i)$	$(-8i)(-6-2i)$	$(-2i)+(-6-12i)-11$	$(-11-6i)(2-2i)$

Polynomials
☺ Find Degree & Leading Coefficient from standard form and factored form.
☺ Find roots and graph.
☺ Write equation from a description (degree and roots) and/or a graph.
☺ Polynomial division

Absolute Value Equations & Inequalities
☺ Solve absolute value equations which often require inequalities and checking for extraneous solutions
☺ Solve inequalities.
☺ Graphing solutions on a number line.
☺ Open/Closed intervals.

Solve and graph.

$5+\lvert-4k\rvert\le13$	$\lvert-10x\rvert-9=21$	$\lvert3x-9\rvert-9\le27$	$4\lvert7x-2\rvert+5=13$
$-5-8n<-13$ *and* $-3-10n>-23$		$-6(8x-5)\le-126$	

Systems of Equations & Matrices
☺ Solve systems of two equations (2 unknowns) using substitution, elimination, and graphing.
☺ Solve systems of three equations (3 unknowns) using matrices.
☺ Use matrices to find equation of a parabola passing through three points.

Solve each system.

$\begin{cases}6x-10y=-14\\x+20y=-24\end{cases}$	$\begin{cases}8x-8y=8\\-5x-2y=16\end{cases}$	$\begin{cases}y=-\dfrac{1}{2}x+1\\x+2y=3\end{cases}$	$\begin{cases}4x+y=7\\-6x+8y=-20\end{cases}$
$\begin{cases}-4x-4z=12\\5x-2y+5z=-21\\5x+3y-z=12\end{cases}$	$\begin{cases}-5y+z=9\\2x-4y-6z=-24\\-4x+6y-6z=-22\end{cases}$	$\begin{cases}6x-3y+z=10\\-26x-4y+z=14\\-x-3y-z=24\end{cases}$	$\begin{cases}4x-2y-3z=23\\2x+y+z=7\\-x-2y-3z=-2\end{cases}$

Find the equation of the parabola passing through the given points.

(1, 2), (2, -1), (5, 2)	(3,1), (2,3), (0,-5)	(-2,7), (4,10), (1,4)

Misc Topics
☺ Direct and Inverse Variation (including word problems)
☺ Simplifying fractions
☺ Simple Logic