Algebra II Name _____

Quadratics Review

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Problems 1 – 3, 6, 7, 9 are no calculator. Be able to do these without using a graphing calculator.

1. For each of the following find the vertex, axis of symmetry, min or max value, domain and range. Sketch showing 3 points.

a. $f(x) = \frac{1}{2}(x+5)^2 + 1$ b. $y = x^2 + 6x - 2$ c. $f(x) = -2x^2 - 3x + 4$

2. Convert the following to vertex form.

a. $y = -2x^2 - 3x + 4$. b. $f(x) = 3x^2 - 6x - 8$

3. Convert to standard form.

a. $y = -2(x - 3)^2 + 11$ b. $f(x) = \frac{2}{3}(x+6)^2 - 1$

4. A ball is dropped from the top of a building. The distance in meters above the ground *y* of the ball after *t* seconds can be modeled by the equation $y = -9.8t^2 + 100$.

a. What is the y-intercept of the equation?

b. Describe the meaning of the y-intercept, in context to the problem.

5. Marnie throws a softball straight up into the air. The ball leaves her hand when it is exactly 5 ft. from the ground. The height, *h* of the ball, in feet, can be written as a function of time, *t*, in seconds, as $h = -16t^2 + 40t + 5$.

a. What is the maximum height the ball reaches?

b. At what time does the ball reach its maximum height?

6. Find the equation of the quadratic function that contains (0,3) (1,2) and (2,3).

7. Write a rule for g described by the transformations of graph f. Use either form of the quadratic.

a. $f(x) = (x - 3)^2 + 5$; make wider, translate up 3 units and to the left 5 units.

b. $f(x) = x^2 - 9$; reflect over the x-axis, make narrower, translate 4 units up and to the right 7 units.

8. Find the equation of the parabola given the following

a. vertex (-1, 3) and focus (-1, -1)

b. vertex (3, 0) and directrix y = -2

c. focus (5, -7) and directrix y = -4

9. Identify the vertex, focus, directrix and axis of symmetry. Sketch the parabola

a. $f(x) = \frac{1}{16}x^2$

b. $(y+1) = -\frac{1}{8}(x-3)^2$

c. $2x^2 + 8y = 0$

10. The table shows the heights y of a dropped object after x seconds. Verify that the data show a quadratic relationship. Write a function that models the data. What is the height of the object after 2.75 seconds?

Time, x	0	0.5	1	1.5	2	2.5
Height, y	150	146	134	114	86	50

11. Compare the average rates of change from the point (-4, 6) to the vertex (-2, 4) and from the vertex to the point (-1, 7) on the graph of a parabola.