Test Review

Graphing Quadratics Review Worksheet

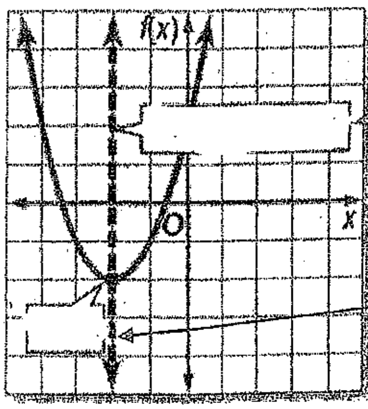
Name ______________

Fill in each blank using the word bank.

vertex	minimum	axis of symmetry	x-intercepts
parabola	maximum	zeros/roots	$ax^2 + bx + c$

1. Standard form of a quadratic function is y = $ax^2 + bx + c$.

2. The shape of a quadratic equation is called a parabola



3. axis of sym.

4. vertex

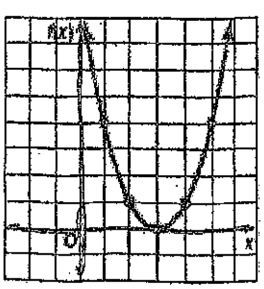
5. When the vertex is the highest point on the graph, we call that a max.

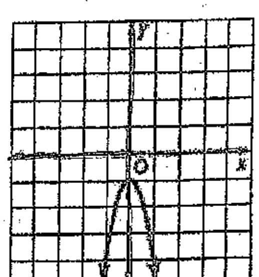
6. When the vertex is the lowest point on the graph, we call that a min.

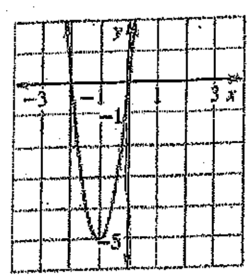
7. Our solutions are the x-intercepts.

8. Solutions to quadratic equations are called zeros/roots.

Determine whether the quadratic functions have two real roots, one real root, or no real roots. If possible, list the zeros of the function.







9. Number of roots: 1

Zero(s): (3,0)

10. Number of roots: 0

Zero(s): none

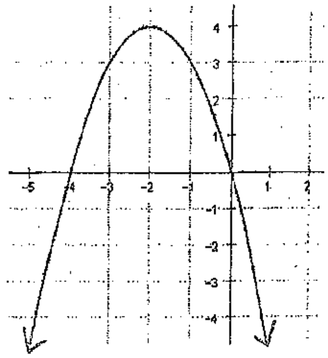
11. Number of roots: 2

Zero(s): (-2,0) + (0,0)

Algebra

Name: ____________

Characteristics of Quadratic Functions



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

Range: $(-\infty, 4]$

Vertex: $(-2, 4)$

Axis of Symmetry: $x = -2$

y-intercept: $(0, 0)$

Interval of Increasing: $(-\infty, -2]$

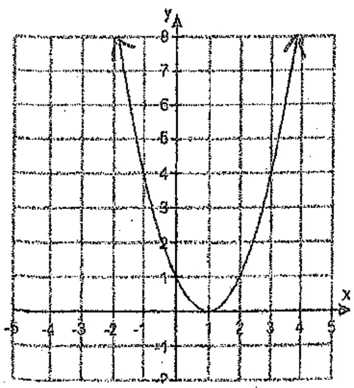
Interval of Decreasing: $[-2, \infty)$

Extreme Value: 4

zero(s): $(-4, 0)$ and $(0, 0)$

as $x \to -\infty$, $y \to -\infty$

as $x \to \infty$, $y \to -\infty$



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

Range: $[0, \infty)$

Vertex: $(1, 0)$

Axis of Symmetry: $x = 1$

y-intercept: $(0, 1)$

Interval of Increasing: $[1, \infty)$

Interval of Decreasing: $(-\infty, 1]$

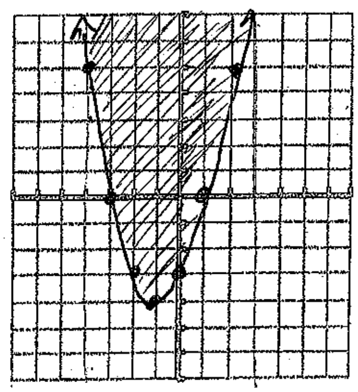
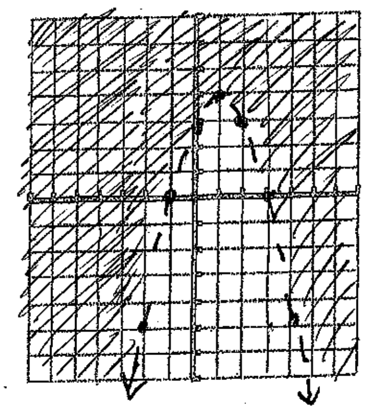
Extreme Value: 0

zero(s): $(1, 0)$

as $x \to -\infty$, $y \to \infty$

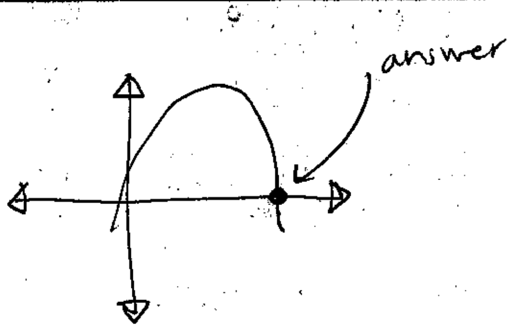
as $x \to \infty$, $y \to \infty$

Quadratic Inequalities

Graphing **Steps:** **1.Graph the Quadratic** **2. Solid or Dotted** $\ge$ or $\le$ Then the parabola is a SOLID curve $<$ or $>$ Then the parabola is a DASHED curve **3. Shade** If you have a $>$ or $\ge$ symbol, shade where y is getting larger If you have a $<$ or $\le$ symbol, shade where y is getting smaller	**1.** $y \ge x^2 + 2x - 3$ 	**2.** $y > -x^2 + 2x + 3$ 
Solving Algebraically **Steps:** **1. Equation** change to an equation **2. Set equation = 0** **3. Solve by factoring** **4. Graph solutions on a number line** **5. Test 3 numbers to determine which interval(s) are solution(s)** **6. Write answer in interval notation.**	**1.** $x^2 + 2x \le 3$ $x^2 + 2x = \cancel{0}\ 3$ $x^2 + 2x - 3 = 0$ $(x+3)(x-1) = 0$ $x = -3, 1$ $-3 \quad 1$ interval: $[-3, 1]$ inequality: $-3 \le x \le 1$	**2.** $2x^2 + 3x > 5$ $2x^2 + 3x = 5$ $2x^2 + 3x - 5 = 0$ $(2x+5)(x-1) = 0$ $x = -5/2, 1$ $-3 \quad -2 \quad -1 \quad 0 \quad 1$ interval: $(-\infty, -\frac{5}{2}) \cup (1, \infty)$ inequality: $x < -\frac{5}{2} \cup x > 1$

Modeling with Quadratics

Evaluating a Function **Hint**: Evaluate the function by finding $h(1)$.	A ball is hit into the air from a height of 4 feet. The function $g(t) = -16t^2 + 120t + 4$ can be used to model the height of the ball where t is the time in seconds after the ball is hit. Find the height of the ball after 1 second. $g(1) = 108$ ft
Analyzing the Vertex **Hint**: 1. Find the axis of symmetry. (This is the time at which the ball reaches maximum height.) 2. Find the vertex by evaluating the function. The second coordinate in the vertex represents the maximum height.	A ball is hit into the air from a height of 4 feet. The function $g(t) = -16t^2 + 120t + 4$ can be used to model the height of the ball where t is the time in seconds after the ball is hit. What is the maximum height the ball reaches? $x = \frac{-120}{2(-16)} = 3.75$ $y = 229$ ft
Analyzing the Zeros **Hint**: 1. Set the quadratic equal to zero and solve. 2. Disregard solutions that are negative (since time does not go backwards!) 3. The remaining zero indicates the time at which the ball hits the ground.	A ball is hit into the air from a height of 4 feet. The function $g(t) = -16t^2 + 120t + 4$ can be used to model the height of the ball where t is the time in seconds after the ball is hit. How long is the ball in the air? $-16t^2 + 12t + 4 = 0$ $\cancel{-4(4t^2 - 3t - 1) = 0}$ $\cancel{t = \frac{+3 \pm \sqrt{3^2 - 4(4)(-1)}}{2(4)}}$ solve by factoring: $(16t+4)(-t+1) = 0$, $t = -1/4$ and 1 $\boxed{OR}$ solve by quad. formula: $t = \frac{-12 \pm \sqrt{(12)^2 - 4(-16)(4)}}{2(-16)}$ $t = -\frac{1}{4}$ and 1



$(+16t + 4)(-t + 1)$