Name KEY Date

3.2 Practice

Properties of Quadratic Functions in Standard Form

Identify the axis of symmetry and vertex for the graph of each function.

1. $g(x) = x^2 - 4x + 2$

AOS: $x = \frac{-(-4)}{2(1)} = \frac{4}{2} = 2$

V(2 , −2)

2. $h(x) = -8x^2 + 12x - 11$

AOS: $x = \frac{-(12)}{2(-8)} = \frac{-12}{-16} = \frac{3}{4}$

V(3/4 , −6.5)

3. $k(x) = -4(x + 3)^2 + 9$ (h, k)

V(−3, 9)

AOS: x = −3

For each function, (a) determine whether the graph opens upward or downward, (b) find the axis of symmetry, (c) find the vertex, (d) find the *y*-intercept, (e) identify the domain and range, and (f) max or min. Then graph the function. *(use two colors, one for each graph)*

4. $f(x) = -x^2 + 3x + 1$

$x = \frac{-b}{2a} = \frac{-(3)}{2(-1)}$

a. Upward or downward — down

b. Axis of symmetry — x = 1.5

c. Vertex — (1.5, 3.25)

d. *y*-intercept — (0, 1)

e. Domain/Range — D: ℝ, (−∞, ∞)

R: $y \le 3.25$, (−∞, 3.25]

f. Max or Min — max

5. $g(x) = 2x^2 + 4x - 2$

$x = \frac{-b}{2a} = \frac{-(4)}{2(2)}$

a. Upward or downward — up

b. Axis of symmetry — x = −1

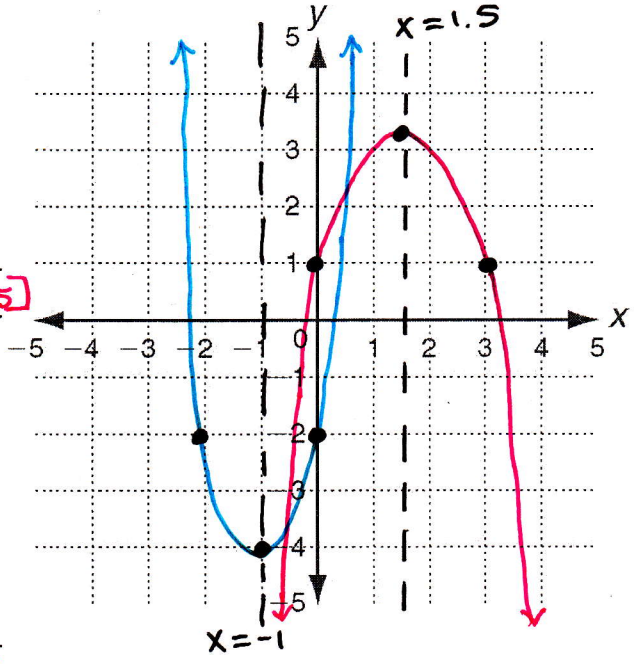
c. Vertex — (−1, −4)

d. *y*-intercept — (0, −2)

e. Domain/Range — D: ℝ, (−∞, ∞)

R: $y \ge -4$, [−4, ∞)

f. Max or Min — min



Find the minimum or maximum value of each function. Then state the domain and range of the function.

6. $g(x) = x^2 - 2x + 1$

Minimum

$x = \frac{-(-2)}{2(1)} = \frac{2}{2} = 1 \rightarrow (1, 0)$ Min

D: ℝ, (−∞, ∞)

R: $y \ge 0$, [0, ∞)

7. $h(x) = -5x^2 + 15x - 3$

Maximum

$x = \frac{-(15)}{2(-5)} = \frac{-15}{-10} = \frac{3}{2} \rightarrow (3/2, \frac{33}{4})$ max

D: ℝ, (−∞, ∞)

R: $y \le 33/4$, (−∞, 33/4]

Solve.

8. A record label uses the following function to model the sales of a new release.

$$a(t) = -90t^2 + 8100t$$

The number of albums sold is a function of time, *t*, in days. On which day were the most albums sold? What is the maximum number of albums sold on that day? maximum

$x = \frac{-8100}{2(-90)} = 45$

(45, 182250) max

Day 45 → 182,250 albums sold.