

Unit 7: Introduction to Quadratic Functions

ADVANCED · SET 2

Name: _____

Date: _____

Show your work and give each answer as an exact value; use plain-text notation (2^3 , $\sqrt{16}$), fractions like $\frac{3}{4}$, coordinate pairs like $(3, -4)$.

1. The quadratic function $f(x) = 2x^2 - 12x + 23$ is written in standard form. Find the coordinates of its vertex, written as an ordered pair (x, y) .

Answer: _____

3. Consider the quadratic $f(x) = x^2$ and the exponential $g(x) = 2^x$. For positive integers x , find the GREATEST integer value of x for which x^2 is greater than or equal to 2^x .

Answer: _____

5. A parabola is given in factored form as $f(x) = (2x - 3)(x + 5)$. Find the SUM of its two x -intercepts (its zeros), as an exact value.

Answer: _____

7. A ball's height in feet after t seconds is $h(t) = -16t^2 + 64t + 80$. Find the maximum height, in feet, that the ball reaches.

Answer: _____

9. A quadratic function $f(x) = ax^2 + bx + c$ produces the values $f(1) = 6$, $f(2) = 17$, $f(3) = 34$, $f(4) = 57$. Using second differences, find the leading coefficient a .

Answer: _____

2. A quadratic number pattern (one whose second differences are constant) begins 3, 10, 21, 36, 55, ... Find the next term.

Answer: _____

4. For the quadratic function $f(x) = -3x^2 + 5x - 7$, evaluate $f(-2)$.

Answer: _____

6. For the quadratic function $f(x) = x^2$, find the average rate of change over the interval from $x = 2$ to $x = 7$.

Answer: _____

8. A ball's height in feet after t seconds is $h(t) = -16t^2 + 64t + 80$. Find the time t , in seconds, when the ball hits the ground ($h = 0$).

Answer: _____

10. Find the minimum value of the quadratic function $f(x) = 4x^2 + 20x + 9$.

Answer: _____

11. In a growing pattern of tiles, figure number n uses $n^2 + n$ tiles. How many tiles are in figure 9?

Answer: _____

12. A quadratic and a linear function intersect where $x^2 = 6x - 8$. Find the SUM of the two x -values where they meet.

Answer: _____