

Unit 7: Introduction to Quadratic Functions

ADVANCED

Name: _____ Date: _____

Show all work. Give each answer as an exact value (integer, fraction like $\frac{3}{4}$, or coordinate pair like $(3, -4)$).

1. A quadratic function is defined by $f(x) = 3x^2 - 5x + 8$. Compute $f(-4)$.

Answer: _____

3. For the quadratic function $h(x) = 2x^2 - 20x + 11$, find the y-coordinate of the vertex.

Answer: _____

5. The parabola $y = x^2 - 2x - 24$ crosses the x-axis at two points. Find the sum of its two x-intercepts (the x-values where $y = 0$).

Answer: _____

7. For $f(x) = x^2 + 3x - 10$, compute the average rate of change between $x = 2$ and $x = 6$, i.e. $(f(6) - f(2))/(6 - 2)$.

Answer: _____

9. The parabola $y = (x - 7)(x + 1)$ has its vertex at some point (h, k) . Find k , the minimum value of y .

Answer: _____

11. Compare quadratic $q(x) = x^2$ and exponential $e(x) = 2^x$. Find the smallest positive integer x for which $e(x)$ is greater than $q(x)$ for all integers at least that large (i.e. the value of x where 2^x permanently overtakes x^2). Give that x .

Answer: _____

2. For the quadratic function $g(x) = -2x^2 + 12x - 7$, find the x-coordinate of the vertex.

Answer: _____

4. A quadratic function has values $f(0) = 4$, $f(1) = 4$, and $f(2) = 10$. Using second differences to confirm it is quadratic, find $f(3)$.

Answer: _____

6. A quadratic function passes through $(0, 0)$ and is written $f(x) = a \cdot x^2$. If $f(6) = 108$, find the value of a .

Answer: _____

8. A parabola is given in factored form $y = 2(x + 5)(x - 3)$. Find the x-coordinate of its vertex (the axis of symmetry).

Answer: _____

10. A ball's height in feet after t seconds is $H(t) = -16t^2 + 96t + 40$. Find its maximum height in feet.

Answer: _____