

QUADRATIC FUNCTIONS (Extra Practice):

1. Determine the domain and range of the following functions.

a) $f(x) = -3(x - 2)^2 + 5$

b) $f(x) = 2x^2 + 4x - 9$

2. Determine the zeros of the function $f(x) = -3(x + 1)^2 + 12$.

3. Determine the y-intercept of $f(x) = -\frac{1}{2}(x + 4)^2 + 9$.

4. Determine over what interval the function $f(x) = 2x^2 - 5x - 3$ is positive.

5. Determine over what interval the function $f(x) = 3x^2 + 6x - 5$ is increasing.

6. Determine the extrema of the function $f(x) = -2x^2 + 12x - 7$.

7. What is the axis of symmetry of the function $f(x) = -\frac{1}{4}x^2 + 3x + 1$?

8. Determine the values of x for which the function $f(x) = -3(x + 4)^2 + 5$ is equal to -7 .

9. Find the rule of the quadratic function represented by a parabola with a vertex at $V(-1, 5)$ and passing through the point $P(1, 3)$.

10. A stone is thrown upward from the top of a seaside cliff. The function which gives the stone's height h (in m) above sea level as a function of time t (in sec) since it was thrown has the rule:
 $h = -t^2 + 12t + 160$.

Find the interval of time over which the height of the stone is at least 180 m above sea level.

11. The height h , in metres, of a diver relative to the water level is described by the rule

$$h = \frac{1}{2}t^2 - 6t + 10$$
 where t represents the elapsed time, in seconds, since the start of the dive.

How long did the diver remain underwater?

12. A projectile is thrown upward from a height of 12 m. After 10 seconds, it reaches its maximum height and after 24 seconds, it hits the ground. Knowing that its trajectory follows the rule of a quadratic function, find the elapsed time between the moment it reaches a height of 6.5 m, on its descent, and the time when it hits the ground.

