

3.1 - Quadratic Functions

Review problems

- Transformations of functions.** Use transformations of function $f(x) = x^2$ to sketch the graph of:
(a) $g(x) = -x^2$ (b) $g(x) = (x - 3)^2$ (c) $g(x) = x^2 + 3$
- Finding intercepts.** Find x-intercept(s) and y-intercept(s) of $x^2 - y = 20$
- Solving quadratic equations.** Solve the following quadratic equation: $x(x - 3) = 3x(x + 2)$

Basic knowledge

- Sketch the graph of each quadratic function. Label the vertex, x-intercept(s), y-intercept, and the axis of symmetry:
(a) $y = -2(x + 3)^2 + 50$ (b) $y = (x + 5)^2 + 1$
- Find the equation of a quadratic function with vertex $(2, 3)$ passing through point $(3, 0)$

Intermediate

- Sketch the graph of each quadratic function. Label the vertex, x-intercept(s), y-intercept, and the axis of symmetry:
(a) $y = \frac{1}{3}x - \frac{1}{2}x^2 + \frac{2}{3}$
(b) $y = x^2 - 2x + 1$
- Find the equation of a quadratic function with vertex $(2, -5)$ passing through point $(4, 1)$.

Advanced

- Sketch the graph of the given quadratic function. Label the vertex, x-intercept(s), y-intercept, and the axis of symmetry:
 $y = x^2 - 3x + 5$
- A projectile is fired straight up with a velocity of 64 ft/s. Its altitude (height) h after t seconds is given by $h(t) = -16t^2 + 64t$.
 - When will the projectile reach its maximum height? What is the maximum height?
 - When does the projectile hit the ground?
 - When will the projectile's height be half of its maximum height?