

Unit 4: Quadratic Functions - Lesson 3& 4 Homework

Describe each transformation of the parent function $f(x) = x^2$

1. $g(x) = (x + 1)^2 - 5$ 2. $g(x) = 3x^2 + 2$

Write an equation for $g(x)$ which transforms $f(x)$ as indicated.

- 3. $f(x) = x^2$; shift 2 right and 1 down
- 4. $f(x) = 2(x - 1)^2 + 8$; shift 2 right and 1 down
- 5. $f(x) = -(x + 1)^2 - 2$; reflect over x-axis
- 6. $f(x) = 2(x - 7)^2 + 1$; vertical stretch by a factor of 3
- 7. $f(x) = 4x^2 + 2x + 8$; shift 5 down

Solve each quadratic word problem.

8. A toy rocket is launched vertically upward from a 12 foot platform with an initial velocity of 12 feet per second. Its height, h , at time t seconds after launch is given by the equation $h(t) = -16t^2 + 128t + 12$.

- a. How long will it take the rocket to reach the ground?
- b. What is the maximum height of the rocket?
- c. How long does it take to reach the maximum height?

9. A penny is dropped off the Empire State Building, which is 1,250 feet tall. If the penny's pathway can be modeled by the equation $h(t) = -16t^2 + 1250$

- a. How long would it take the penny to fall to 400 feet above the ground?
- b. How many feet has the penny dropped after 2 seconds?