

# Quadratic Equations

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STUDY GUIDE

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- 1) A fireworks rocket is launched from a hill above a lake. The rocket will fall into the lake after exploding at its maximum height. The rocket's height above the surface of the lake is given by  $g(x) = -16x^2 + 64x + 80$ . What is the maximum height of the rocket?
- A) 150 feet      B) 80 feet  
C) 120 feet      D) 144 feet
- 2) A fireworks rocket is launched from a hill above a lake. The rocket will fall into the lake after exploding at its maximum height. The rocket's height above the surface of the lake is given by  $g(x) = -16x^2 + 64x + 80$ . How long will it take the rocket to hit the lake?
- A) 5 seconds      B) 8 seconds  
C) 12 seconds      D) 10 seconds
- 3) A rock is thrown from the top of a tall building. The distance, in feet, between the rock and the ground  $x$  seconds after it is thrown is given by  $f(x) = -16x^2 - 4x + 382$ . How long after the rock is thrown is it 340 feet from the ground?
- A) 2.256 seconds      B) 1.50 seconds  
C) 3.324 seconds      D) .236 seconds

Find the a) value of the discriminant, b) determine the number of roots and c) find the value of the roots.

9)  $6a^2 - 23a - 18$

10)  $9x^2 + 56x + 12$

**Solve each equation by factoring or completing the square.**

11)  $x^2 = 26x - 48$

12)  $4x^2 = -60x - 32$

5) In an effort to catch a criminal; a superhero is going to leap over a building and take a short cut down the ally. The function  $f(x) = -16x^2 + 150x$  gives the superhero's height in feet as a function of time. The building is 425 feet high. Will the superhero make it over the building?

- A) Yes, the superhero always makes it!
- B) No, the superhero can only jump half the height of the building
- C) No, the superhero will crash into the building at 351 feet
- D) No, the superhero can only jump 150 feet into the air

6) The height in feet of the curved arch support for a bridge can be modeled by  $f(x) = -0.0009x^2 + 1.24x + 1.65$ . You are standing on a platform 2 feet above the maximum height of the arch. If you bungee from this point, and your bungee will stretch to 420 feet before retracting; are you safe to jump?

- A) Yes you are totally safe!
- B) No, you will hit the ground before your bungee retracts
- C) Who cares! you have insurance!
- D) I'm not sure, I never thought I would have to use math!