**#9 QUADRATIC WORD PROBLEMS**

**Example 1:** Chris Bosh’s air ball was shot up in the air from an initial height of 49 meters with an initial velocity of 14.7 meters per second. The height of the ball in meters, h, can be modeled by the following quadratic equation, *h = -4.9t2 + 14.7t + 49*, where t is the time in seconds after the ball was thrown.

a.) How long after the ball was thrown did it reach its maximum height?

b.) What was the maximum height of the ball?

c.) How long after the ball was thrown did it completely miss the basket and hit the ground?

**Example 2:** A company’s expenses in **millions** of dollars, d, can be modeled by the following quadratic equation, d = 2t2 – 8t + 9, where t is the time in years after the company started.

a.) How long after the company started did it pay its minimum expense?

b.) What was the minimum expense of the company?

c.) What was the expense of the company 5 years after the company started?

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| **RED**  A dolphin jumps up in the air with an initial velocity of 104 ft/s. The height, h, of the dolphin at any given time, t, in seconds, can be modeled by the equation h = -16t2 + 104t + 56.  a.) How long will it take the dolphin to reach its maximum height?  b.) What is the dolphin’s maximum height?  c.) How long will it take for the dolphin to land back in the water? | **ORANGE** The height, h(t), in feet of an object thrown into the air with an initial upward velocity of 63 feet per second is given by the formula h(t) = -16t2 + 63t, where t is the time in seconds.  a.) What is the height of the object after 3 seconds?  b.) What was the maximum height of the ball?  c.) How long does it take the ball to reach its maximum height? | **YELLOW** The function y = -2x2 + 32x + 150 models the monthly flour expense last year at Antonio’s bakery, where x = 1 represents January.  a.) During the month of May, what is the expense of flour?  b.) What was the maximum flour expense?  c.) What month does the maximum flour expense occur? |
| **GREEN** A rocket is launched straight up into the air from a 25-foot high platform with a velocity of 198 feet per second. The height of the rocket in feet, h, is a function of the time after the rocket has been launched in seconds, t: *h = -16t2 + 198t + 25*.  a.) What was the height of the rocket 6 seconds after it has been launched?  b.) How long did it take for the rocket to hit the ground?  c.). What was the maximum height of the rocket? | **BLUE**  The height of Neville’s remembrall after Draco threw it from 160 meters in the air can be modeled by the equation h = -16t2 + 48t + 160 where h is height in meters and t is time in seconds.  a.) If Harry didn’t catch it, how long would it have taken the remembrall to hit the ground?  b.) What was the maximum height of the remembrall?  c.) How long did it take the remembrall to reach its maximum height? | **PURPLE**  Tiger Woods hits his gold ball out of a sand trap at a tournament. The height of the ball is modeled by the equation h = -16t2 – 16t + 60 where h is height in meters and t is seconds.  a.) How long will it take for the ball to hit the ground?  b.) What is the highest the golf ball will reach?  c.) How long will it take for the golf ball to hit its highest point? |
| **TEAL**  In the 74th Hunger Games, a parachute donation is dropped from the sky from Katniss’s sponsor. The height of the package can be modeled by the equation h = -16t2 + 1600, where h is height in feet and t is time in seconds.  a.) How long it will take the parachute to reach Katniss on the ground?  b.) How long will it take the parachute to reach its maximum height?  c.) What is the maximum height of the parachute? | **PINK**  A student was acting out in class, so Ms. Santos threw her out the window. The student’s height, h, in feet can be modeled by h = -16t2+ 20t – 4 where t is seconds.  a.) Find the maximum height of the student out the window.  b.) How long did it take for the student to reach her maximum height?  c.) How long will it take the student to land on the ground? | **BROWN** Nick’s height in meters above the water *t* seconds after diving from a diving board into a pool can be modeled by f(t) = -4.9t2 + 4.9t + 5.  a.) What is Nick’s maximum height above the water?  b.) How long did it take Nick to reach his maximum height?  c.) How long will it take Nick to hit the water again? |