



PROJECTILE MOTION

1. A soccer ball is kicked from the ground with an initial upward velocity of 90 feet per second. The equation $h(t) = -16t^2 + 90t$ gives the height h of the ball after t seconds.

a. How many seconds will it take for the ball to reach its maximum height?

b. What is the maximum height of the ball?

c. Give the domain and range of the function.

2. An apple is launched directly upward at 64 feet per second from a platform 80 feet high. The equation for this apple's height h at time t seconds after launch is $h(t) = -16t^2 + 64t + 80$. What is the height of the apple after 3 seconds?

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

4. 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 $h(t) = -16t^2 + 1250$, how long would it take the penny to strike a 6 foot tall person?

1a. _____

b. _____

c. _____

2. _____

3. _____

4. _____

5. Some fireworks are fired vertically into the air from the ground at an initial speed of 80 feet per second. The equation for this object's height h at time t seconds after launch is $h(t) = -16t^2 + 80t$. Find the domain of the function.

5. _____

6. The Apollo's Chariot, a rollercoaster at Busch Gardens, moves at 101 feet per second. The equation of the ride can be represented by the equation $h(t) = -16t^2 + 101t + 10$. What is the maximum height reached by this ride?

6. _____

7. Eva is jumping on a trampoline. Her height h at time t can be modeled by the equation $h(t) = -16t^2 + 20t + 6$. Would Eva reach a height of 14 feet?

7. _____

8. A diver is standing on a platform 25 feet above the pool. He jumps from the platform at an initial velocity of 10 ft/s.

8a. _____

a. Use the formula $h(t) = -16t^2 + vt + s$ where h is his height above the water at time t seconds, v is the starting upward velocity, and s is his starting point to write an equation to model the dive.

b. _____

b. Find the diver's height after 2 seconds.

9. An astronaut on the Moon throws a baseball upward with an initial velocity of 10 meters per second, letting go of the baseball 2 meters above the ground. The equation of the baseball pathway can be modeled by $h(t) = -0.8t^2 + 10t + 2$. The same experiment is done on Earth, in which the pathway is modeled by equation $h(t) = -4.9t^2 + 10t + 2$. How much longer would the ball stay in the air on the Moon compared to on Earth?

9. _____