

A ball is thrown upward from a height of 10 meters at a speed of 30 meters per second. The height of the ball after  $t$  seconds is given by  $s(t) = 10 + 30t - 4.9t^2$ .

1. What is the height of the ball at 3 seconds?
2. What is the height of the ball at 6 seconds?
3. What is the velocity of the ball at 3 seconds?
4. What is the velocity of the ball at 6 seconds?
5. What is the acceleration of the ball at 3 seconds?
6. What is the acceleration of the ball at 6 seconds?
7. When will the ball reach its highest point?
8. How high is the highest point the ball will reach?
9. When will the ball hit the ground?
10. How fast will the ball be moving when it hits the ground?

The height above ground of an object moving vertically is given by  $s(t) = 112 + 96t - 16t^2$ , with  $s$  in feet and  $t$  in seconds.

11. When does the maximum height occur?
12. What is the maximum height?
13. When is the position  $s = 0.38$ ?
14. What is the velocity when  $s = 0.38$ ?
15. What is the constant acceleration?

The motion of an oscillating object is given by the formula  $s(t) = 40 - \sin t$ .

16. The object will reach its maximum height at many different times. Find one of these times.

17. Find a general expression for all the times the object is at its maximum height.

18. What is the maximum height the object reaches?

19. What expression gives the acceleration of the object?

20. What is the height of the object at time  $t = \pi/4$ ?

21. What is the velocity of the object at time  $t = \pi/4$ ?

22. What is the height of the object at time  $t = 2\pi/3$ ?

23. What is the velocity of the object at time  $t = 2\pi/3$ ?