

Algebra Essentials and Applications Internet Activity

ME1 Tallest Investigations

If an object is dropped from a certain height above the ground, its height at time t is given by the equation $h(t) = -\frac{g}{2}t^2 + h_0$, where g is the acceleration of the object due to gravity and h_0 is the object's initial height above the ground. When h is measured in feet, $g = 32 \text{ ft/sec}^2$.

1. How tall is the Sears Tower in feet?

2. If an object were dropped off the top of the Sears Tower, how long would it take to hit the ground? Round to the nearest hundredth of a second. (Hint: Keep in mind that when an object is dropped, the initial velocity, v_0 , is zero.)

Some of the heights in Yong Shu Hoong's essay are given in meters. If you use an initial height in meters, you need to set $g = 9.8 \text{ m/sec}^2$.

3. Using Yong Shu Hoong's figures for the height of the Sears Tower in meters, find how long it would take an object to hit the ground when dropped from the top of the tower. Explain any discrepancies between this value and your answer to Exercise 2.

4. What is the world's tallest building?

5. Using Yong Shu Hoong's figures for the height of the world's tallest building, find how long it would take an object to hit the ground when dropped from the top.

6. If you dropped an object off the top of the tallest building in the world, how long would it take the object to reach the height of the Sears Tower?
