

Physics 30S – Free Fall Review

1. I throw an object into the air and it goes up to a height of 59 m before falling back to the ground. How fast did I initially throw it?
2. I throw an object upward at 30 km/h. How high does it go? How long is it in the air?
3. I drop a rock from a height of 50m. How long does it take to reach the ground? How fast is the rock traveling just as it hits the ground?
4. Felix Baumgartner reached a world record by stepping off a helium balloon 38km above the earth. He reached a top speed of 1340km/h. Find the following
 - a. The time it would take him to reach this speed if there was no air resistance
 - b. The velocity he would reach earth if there was no air resistance
 - c. The total time he would be in the air if there was no air resistance.
5. A ball is dropped from a roof to the ground 8.0 m below. A rock is thrown down from the roof 0.600 s later. If they both hit the ground at the same time, what was the initial speed of the rock?
6. An apple thrown straight upward rises to 24 m above its launch point. At what height has apple's speed decreased to one-half of its initial value?
7. If I throw a ball up from the edge of a 75m cliff with a velocity of 27m/s what is
 - a. The total time the ball is in the air
 - b. The velocity as the ball hits the ground
 - c. The time it takes for the ball to reach a height of 20m above the ground

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ANSWERS

1. $v_0 = 34.0\text{m/s}$

2.

a. $d = 3.51\text{m}$

b. $t = 1.70\text{s}$

3. $t = 3.19\text{s}$ $v = -31.3\text{m/s}$

4.

a. $t = 38.0\text{s}$

b. $v = 863\text{m/s}$

c. $t = 88.1\text{s}$

5. $v_0 = 8.43\text{m/s}$

6. $d = 18.1\text{m}$

7.

a. $t = 7.54\text{s}$

b. $v = 46.9\text{m/s}$

c. $t = 7.09\text{s}$