

Constant Acceleration Challenge Problems

1. In Superman II a boy falls off Niagara Falls and falls for 28.4 s before Superman saves his life. How far does the boy fall before Superman comes to the rescue? Neglect air resistance.

The actual height of Niagara Falls is only 53.6!

2. Given air resistance on a falling body, a person in free fall will reach a terminal velocity of 55 m/s. This means that the falling boy would only accelerate until he reached a speed of 55 m/s and then he would fall at a constant speed of 55 m/s.
 - a. How long does it take the boy to reach a speed of 55 m/s?

 - b. How far did the boy fall in this time?

 - c. Given that the boy falls for a total of 28.4 seconds, how long does he fall at a constant speed?

 - d. How far does he fall at a constant speed?

 - e. What is the total distance the boy falls?

3. Mary is standing on a 10 m high cliff. She throws a ball straight up over the edge of the cliff with a speed of 18 m/s.
 - a. How long is the ball in the air?

 - b. How fast is it moving when it hits the ground?