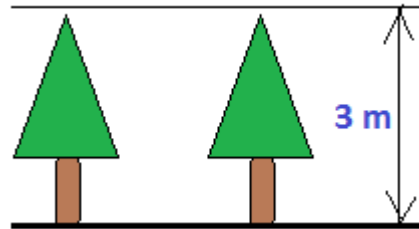# Answer on question #61712, Physics, Mechanics, Relativity

In World War II, there were several reported cases of airmen who jumped from their flaming airplanes with no parachute to escape certain death. Some fell about 20,000 feet (6000 m), and some of them survived, with few life-threatening injuries. For these lucky pilots, the tree branches and snow drifts on the ground allowed their deceleration to be relatively small. If we assume that a pilot's speed upon impact was 123 mph (54 m/s), then what was his deceleration? Assume that the trees and snow stopped him over a distance of 3.0 m.

Solution:

So we can use this equation:

$$v^2 = v_0^2 + 2ax$$

Whence,

$$a = \frac{v^2 - v_0^2}{2x},$$

Where v = 0, v_0 = 54m/s and x = 3 m

Finally,

$$a = -\frac{v_0^2}{2x},$$

$$a = -\frac{(54\frac{m}{s})^2}{2 \times 3\,m} = -\frac{2916\left(\frac{m}{s}\right)^2}{6m} = -486\frac{m}{s^2}$$

Negative acceleration means that the pilot was decelerating at a rate of 486 m/s every second.

Answer: 486 m/s² the deceleration of the pilot.