Answer on Question #56537-Physics-Other

Starting from rest, a powerful biker can achieve an acceleration of 20m/s² over a distance of 500 m.

A. Calculate the speed of a biker in kilometers/hour at the end of 500 m.

B. Express your calculated speed in ft/h.

Solution

a. Let use kinematic equation:

$$v_f^2 - v_i^2 = 2aS.$$

In our case:

$$v_i = 0; a = 20\frac{m}{s^2}; S = 500 \text{ m}.$$

The speed of a biker is

$$v_f = \sqrt{2aS} = \sqrt{2 \cdot 20 \cdot 500} = 141.42\frac{m}{s}\frac{1\,km}{1000m}\frac{3600s}{1h} = 510\frac{km}{h}.$$

B.

$$v_f = 510\frac{km}{h}\frac{3280.84ft}{km} = 1.7 \cdot 10^6\frac{ft}{h}.$$