

Chapter 8Problem 36

$$v_0 = 9.0 \text{ m/s}$$

a) How high can Tarzan swing?

Using Conservation of Energy

$$K_0 + U_0 = K_f + U_f$$

let ~~his~~ his initial height be  $y=0$

The kinetic energy is converted into gravitational potential energy

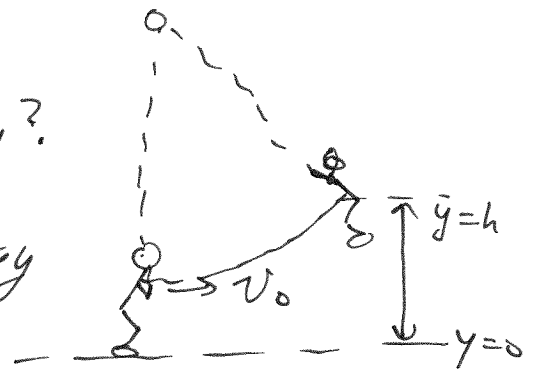
$$\rightarrow \frac{1}{2} m v_0^2 + mg(0) = \frac{1}{2} m (0)^2 + mgh$$

$$\frac{1}{2} m v_0^2 = mgh$$

$$\frac{\frac{1}{2} m v_0^2}{mg} = h$$

$$\frac{v_0^2}{2g} = h$$

$$h = \frac{(9.0 \text{ m/s})^2}{2(9.80 \text{ m/s}^2)} = \boxed{4.1 \text{ m}}$$



b) Does the length of the vine affect the height?

The height is the vertical change of Tarzan.

If the vine is longer, he will swing outward a different distance to achieve this height, but it won't change the height.