HW6-5 Soln)

The hard part here is to find Tarzan's vertical motion. Let L be the length of the vine. Set the lowest point in his swing to y = 0. Then, y_i is

$$y_i = L - Lcos\theta = 25 - 25\cos(25) = 2.34\ m$$

Then,

$$W_{TOTAL} = \Delta K + \Delta U$$

$W_{Tension}$ = 0 since the tension is always perpendicular to the path

Wg = conservative

Then,

$$W_{NC} = \Delta K + \Delta U$$

$$0 = \frac{1}{2}mv_f^2 - \frac{1}{2}mv_i^2 + gmy_f - gmy_i$$

Set lowest point as y=0

$$\frac{1}{2}mv_f^2 = \frac{1}{2}mv_i^2 + gmy_i$$

$$v_f = \sqrt{v_i^2 + 2gy_i} = \sqrt{3^2 + 2(10)2.34} = 7.47\ m/s$$