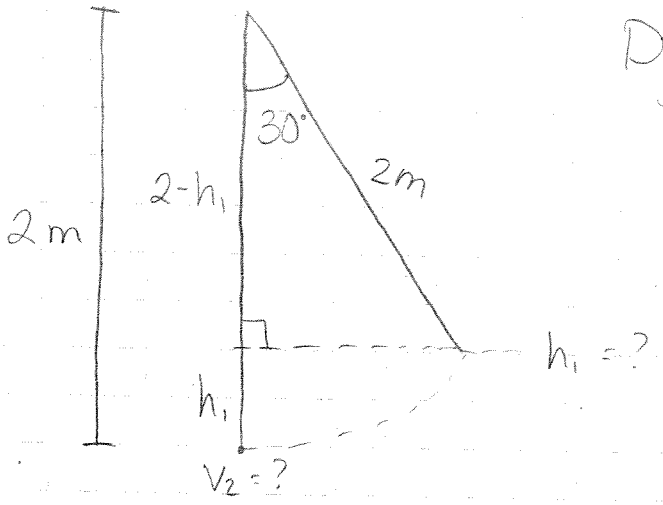
P #42

Ch 5 - pg 149

$l = 2.00\ m$

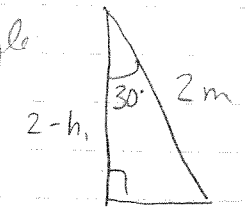
$m = 25.0\ kg$

$\theta = 30°$



Divide the length the vine into 2 sections: h_1 and $2-h_1$

First, calculate $2-h_1$ from the right triangle



$2-h_1 = (2\ m)\cdot\cos 30°$

$2-h_1 = 1.73\ m \qquad h_1 = .27\ m$

Find V_2:

$$KE_1 + PE_1 + W = KE_2 + PE_2$$

$$0 + m\cdot g\cdot h_1 + 0 = \frac{1}{2}\cdot m\cdot v_2^2 + 0$$

$$(25\ kg)(9.8\ m/s^2)(.27\ m) = \frac{1}{2}(25\ kg)(v_2^2)$$

$$\boxed{V_2 = 2.3\ m/s}$$