

68. (a) The intuitive conclusion, that the tension is greatest at the bottom of the swing, is certainly supported by application of Newton's second law there:

$$T - mg = \frac{mv^2}{R} \implies T = m \left( g + \frac{v^2}{R} \right)$$

where Eq. 6-18 has been used. Increasing the speed eventually leads to the tension at the bottom of the circle reaching that breaking value of 40 N.

- (b) Solving the above equation for the speed, we find

$$v = \sqrt{R \left( \frac{T}{m} - g \right)} = \sqrt{(0.91) \left( \frac{40}{0.37} - 9.8 \right)}$$

which yields  $v = 9.5$  m/s.