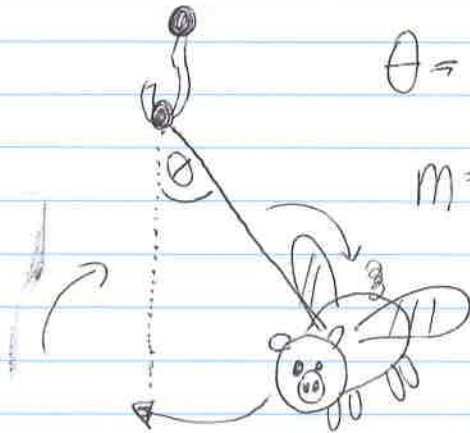


1) What is F_T ?

2) What is the \vec{v} of the pig?

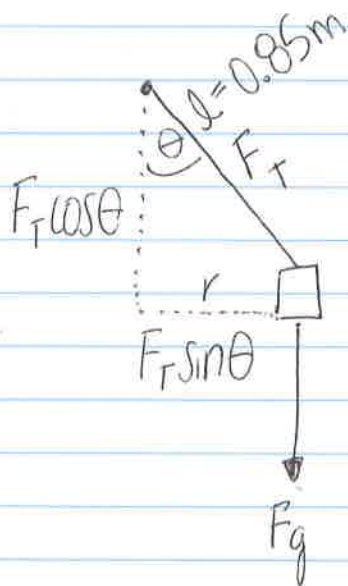


$$\theta = 20^\circ \quad l = 0.85 \text{ m}$$

$$m = 0.75 \text{ kg}$$

$$g = 9.81 \frac{\text{m}}{\text{s}^2}$$

answer to 2 s.f.



$$\sum F_{in} = F_T \sin \theta = \frac{mv^2}{r}$$

$$\sin \theta = \frac{r}{0.85 \text{ m}} \quad r = \sin 20^\circ (0.85 \text{ m})$$
$$r = 0.29 \text{ m}$$

$$F_g = F_T \cos \theta$$

$$\boxed{F_T} = \frac{F_g}{\cos \theta} = \frac{mg}{\cos \theta} = \boxed{7.8 \text{ N}}$$

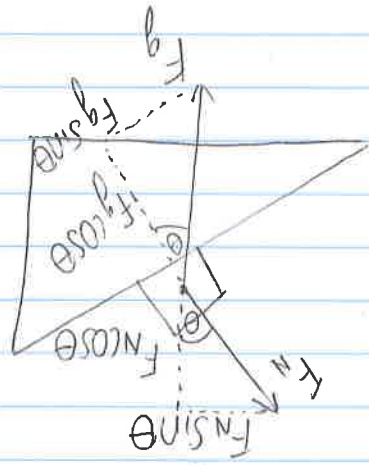
$$\boxed{v} = \sqrt{\frac{F_T \sin \theta \cdot r}{m}} = \boxed{1.0 \frac{\text{m}}{\text{s}}}$$

A car is banking along a race track at uniform speed.

What is the angle of circular motion?

mass of car = $2.5 \times 10^3 \text{ kg}$ use $g = 9.8 \frac{\text{m}}{\text{s}^2}$

$r = 59.2 \text{ m}$
 $v = 15 \frac{\text{m}}{\text{s}}$



$$F_g = F_N \cos \theta$$

$$mg = F_N \cos \theta$$

$$\frac{F_N \sin \theta}{F_N \cos \theta} = \frac{mv^2/r}{mg}$$

$$\tan \theta = \frac{rg}{v^2}$$

$$\tan^{-1} \left(\frac{rg}{v^2} \right) = \theta$$

$$\left[\tan^{-1} \left(\frac{(59.2 \text{ m})(9.8 \frac{\text{m}}{\text{s}^2})}{(15 \text{ m/s})^2} \right) \right]$$

$$\theta = 21^\circ$$