

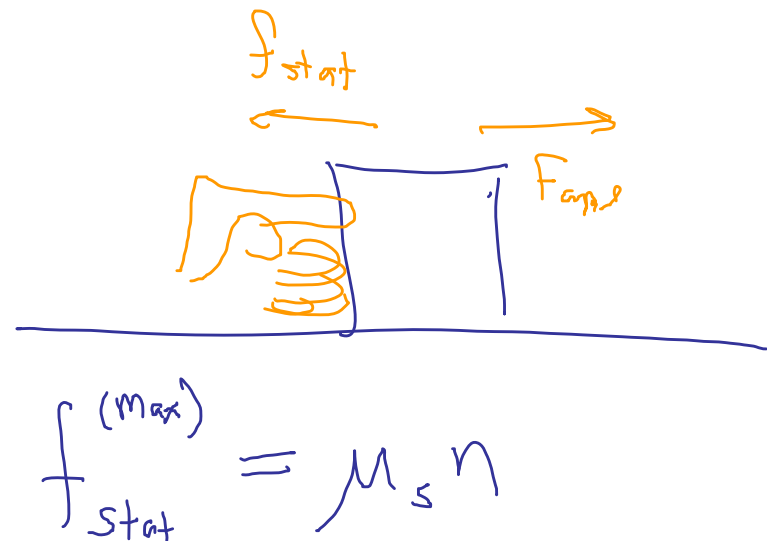
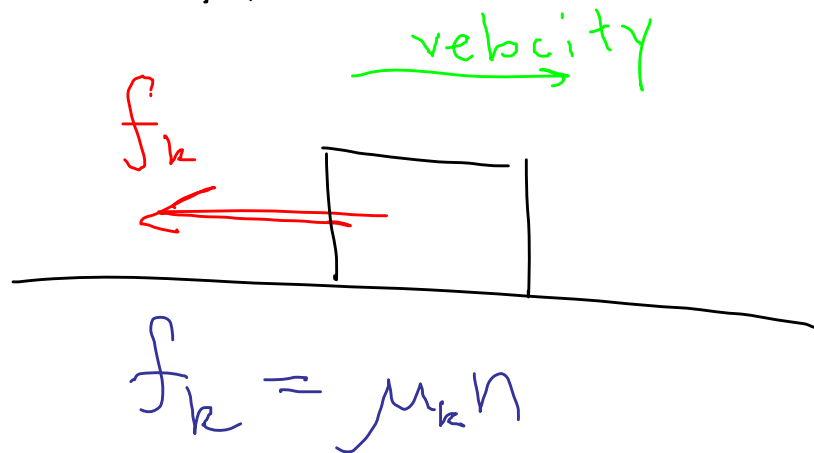
Phys 2110-4 9/30/11

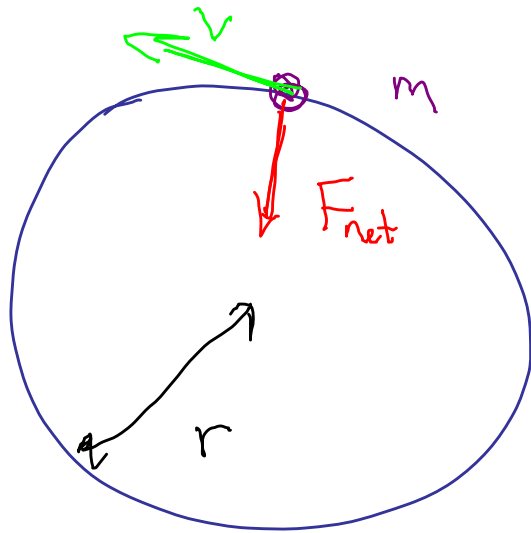
Note Title

9/30/2011

Examples force problems

Friction

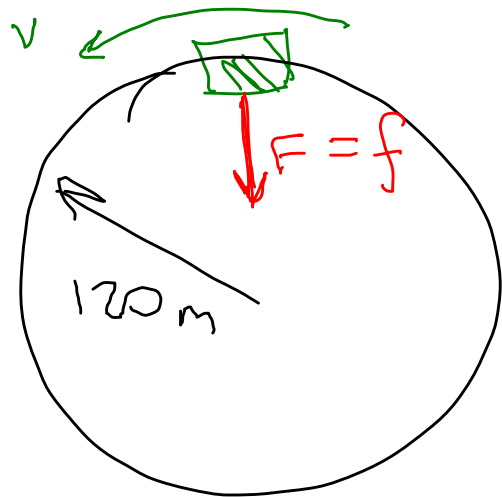




$$F_{\text{net}} = F_c = \frac{mv^2}{r}$$

$$a_c = \frac{v^2}{r}$$

5.31 What frictional coefficient is needed to keep a car moving at $90 \frac{\text{km}}{\text{hr}}$ on a 120-m - radius unbanked turn?



$$V = 90 \frac{\text{km}}{\text{hr}} = 25 \frac{\text{m}}{\text{s}}$$

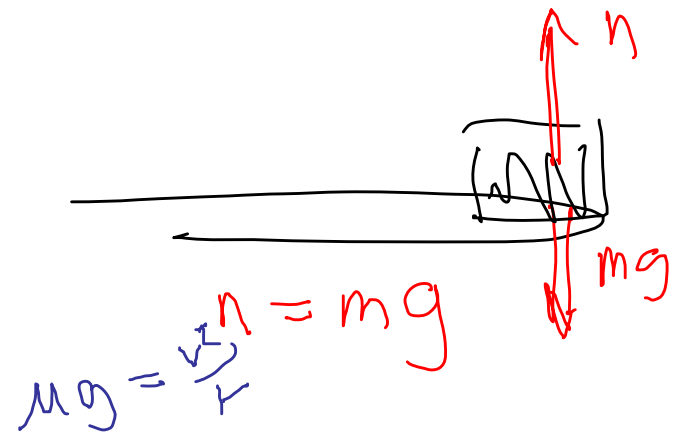


Turn is limited by fact f_{stat} has max value.

$$f_{\text{stat}} = f_{\text{stat}}^{\text{max}} = \mu_s n$$

$$= F_c = \mu_s m g$$

$$= \frac{mv^2}{r}$$

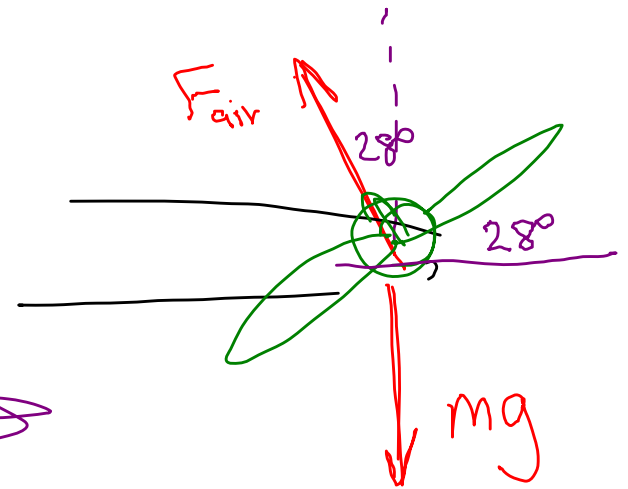


$$mg = \frac{v^2}{r} \quad n = mg$$

$$\mu_g = \frac{v^2}{r} \quad \mu_s = \frac{v^2}{gr} = \frac{(25 \frac{m}{s})^2}{(9.8 \frac{m}{s^2})(120m)}$$

$$= 0.53$$

5.27 An airplane goes into a turn 3.6 km in radius. If the banking angle is 28° from the horizontal. What is plane's speed!



Vertical force
cancel.

$$F_{\text{mward}} = \frac{mv^2}{r}$$