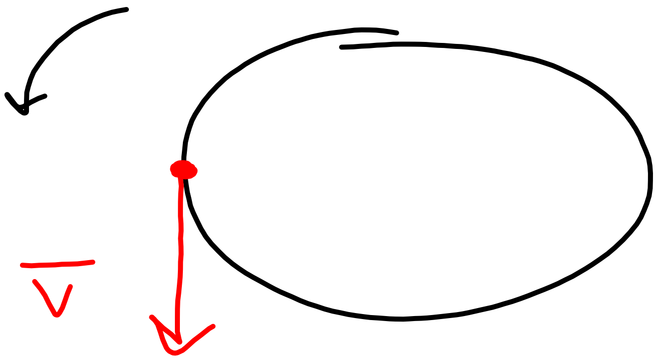
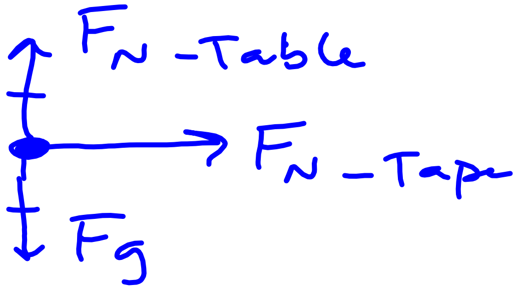
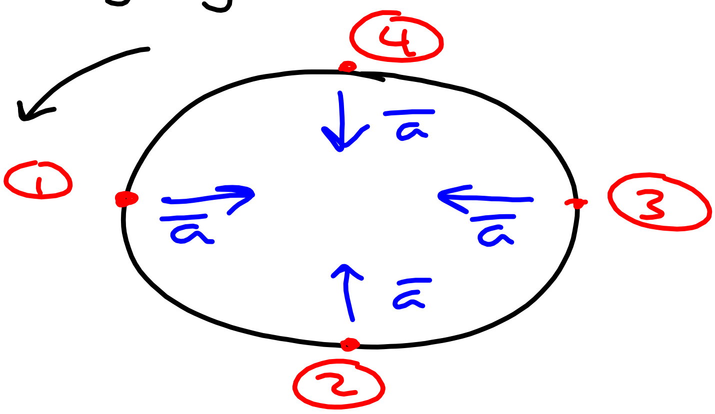
Circular Motion



Side view
of ball
inside tape

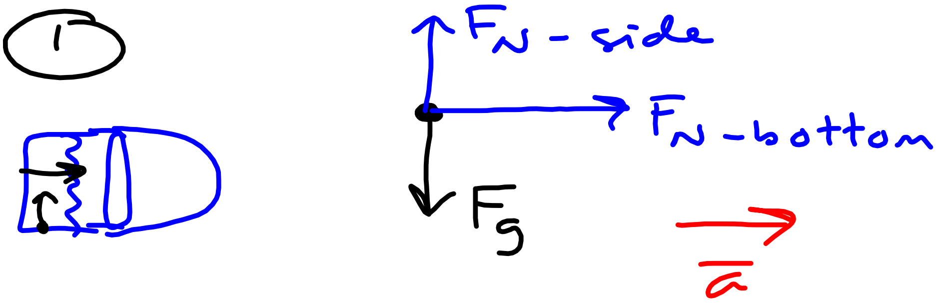


- Swinging Bucket

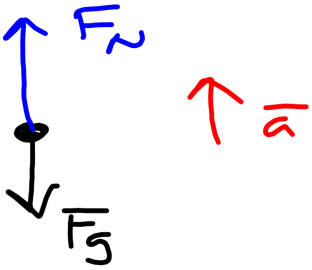


FBDs of Water

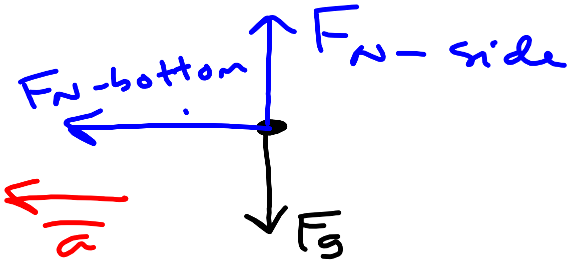
1



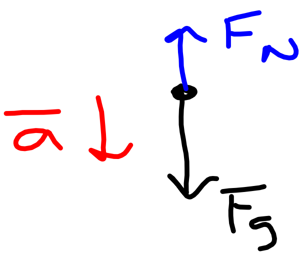
2



3



4



Mathematics

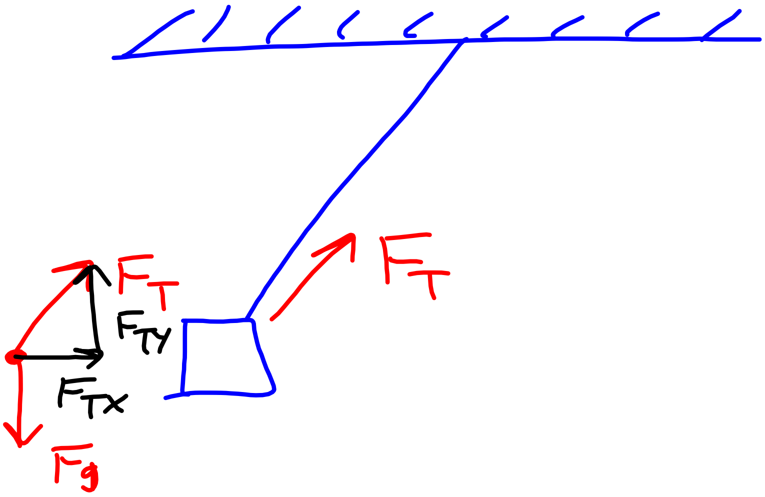
$$a_c = \frac{v^2}{r}$$

centripetal acceleration

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

centripetal force

$$\left[\frac{kg \frac{m^2}{s^2}}{m} = \frac{kg \cdot m}{s^2} \right]$$

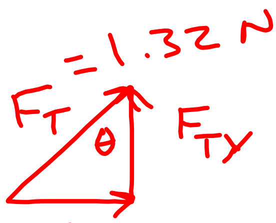


$$F_c = F_{TX} = \frac{mv^2}{r}$$

$$= \frac{m\left(\frac{\text{circumference}}{\text{time}}\right)^2}{r}$$

$$= \frac{(.125\text{ kg})\left(\frac{2.04\text{ m}}{1.8\text{ s}}\right)^2}{0.325\text{ m}}$$

$$= 0.49\text{ N}$$



$F_{TY} = 1.23$ N

$F_{TX} = 0.49$ N

$$\tan\theta = \frac{F_{TX}}{F_{TY}}$$

$$\theta = \tan^{-1}\left(\frac{0.49\text{ N}}{1.23\text{ N}}\right)$$

$$= 21.7°$$