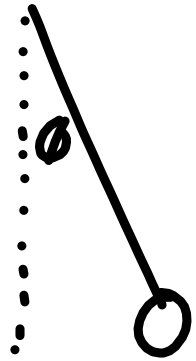
I

at rest

II

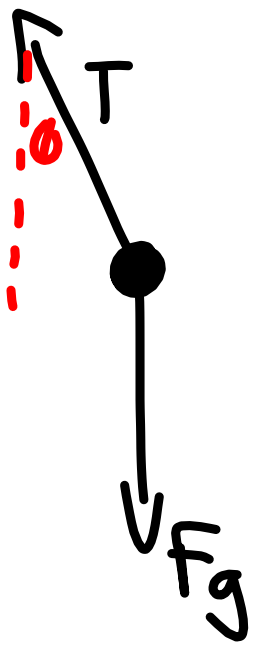


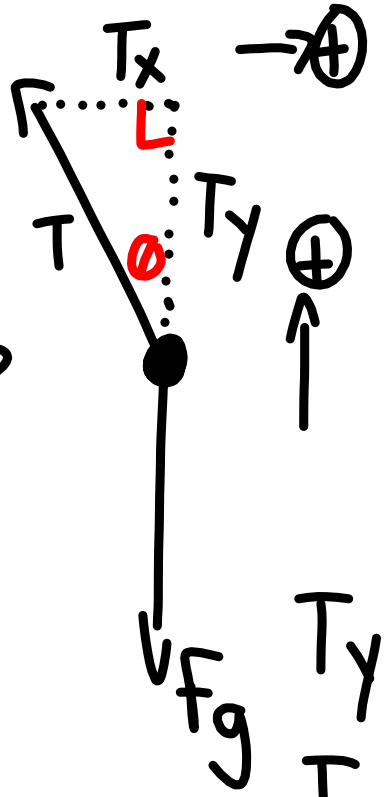
car

Direction

moving

FBD





$\Sigma \vec{F}_y = T_y - F_g = 0$

$T_y = F_g$

$\Sigma \vec{F}_x = -T_x = ma$

$T_y = T\cos\theta$

$T_x = T\sin\theta$

$$T_y = F_g \qquad -T_x = ma$$

$$T\cos\phi = mg \qquad -T\sin\phi = ma$$

$$T = \frac{mg}{\cos\phi} \qquad -T = \frac{ma}{\sin\phi}$$

$$T = -\frac{ma}{\sin\phi}$$

$$\frac{mg}{\cos\phi} = \frac{-ma}{\sin\phi}$$

$$\frac{g}{\cos\phi} = \frac{-a}{\sin\phi}$$

$$g\sin\phi = -a\cos\phi$$

$$g\frac{\sin\phi}{\cos\phi} = -a$$

$$g\tan\phi = -a$$

$$\boxed{-g\tan\phi = a}$$