

Year 2 Applied Chp 5 - Forces and Friction

Formula

$$F = ma$$

F is the resultant force
(i.e. driving forces – resistance forces)

$$\text{Friction} = \mu R$$

$$0 \leq \mu \leq 1$$

Friction forces will **always**
oppose the direction of motion.

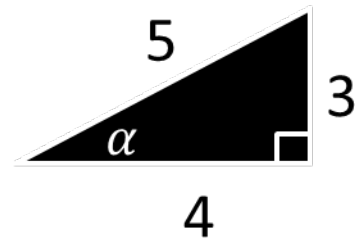
Solving

Set up two equations:

Resolve vertical to the slope

Resolve parallel to the slope

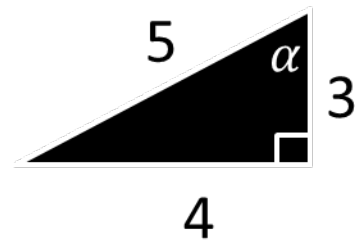
Calculating with Angles



$$\sin \alpha = \frac{\text{opp}}{\text{hyp}} = \frac{3}{5}$$

$$\cos \alpha = \frac{\text{adj}}{\text{hyp}} = \frac{4}{5}$$

$$\tan \alpha = \frac{\text{opp}}{\text{adj}} = \frac{3}{4}$$



$$\sin \alpha = \frac{\text{opp}}{\text{hyp}} = \frac{4}{5}$$

$$\cos \alpha = \frac{\text{adj}}{\text{hyp}} = \frac{3}{5}$$

$$\tan \alpha = \frac{\text{opp}}{\text{adj}} = \frac{4}{3}$$

Now simplify your calculations:

$$10 \times 2g \cos \alpha$$

Becomes

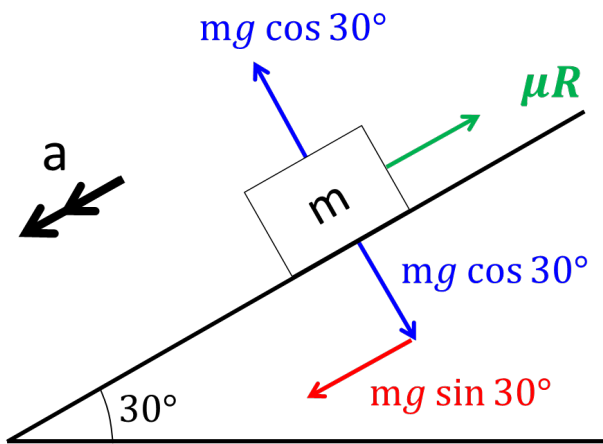
$$20g \frac{3}{5}$$

$$= 12g$$

Inclined Slopes

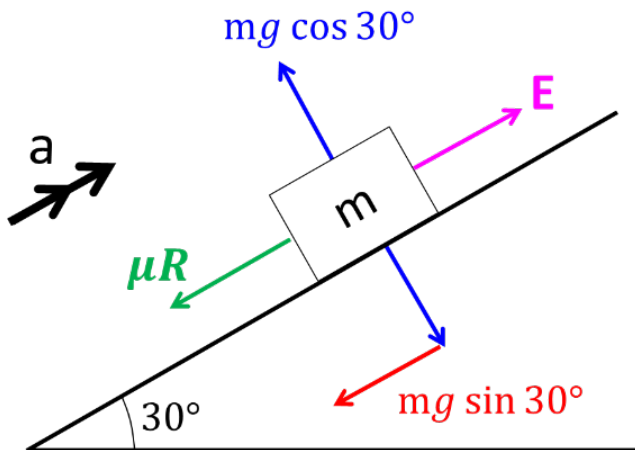
No External Forces

Sliding down



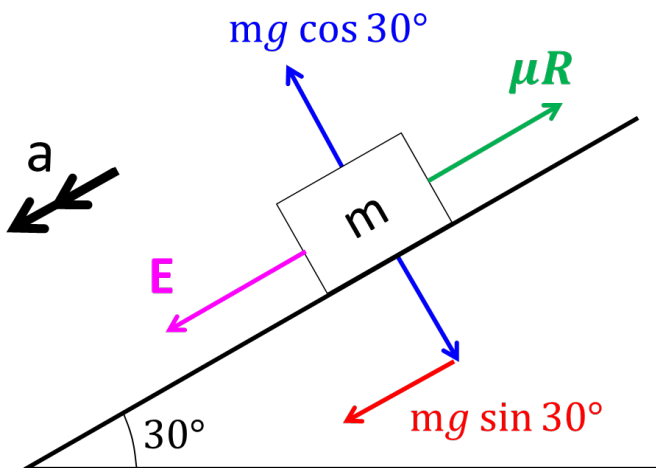
External Force - Parallel to Slope

Sliding Up



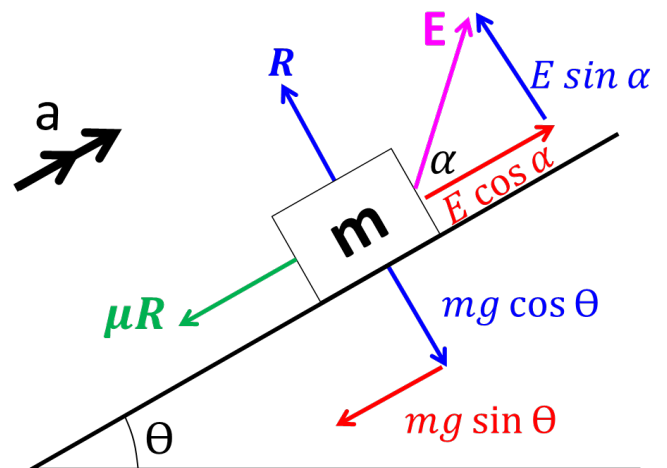
External Force - Parallel to Slope

Sliding Down



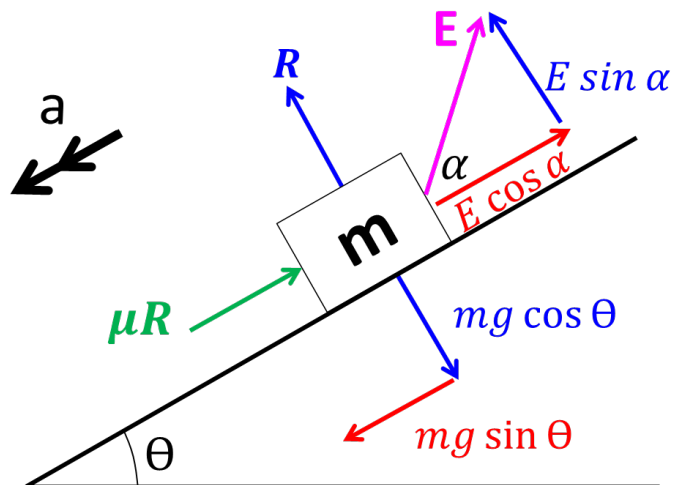
External Force - Not Parallel to Slope

Sliding Up



External Force - Not Parallel to Slope

Sliding Down



External Force - Not Parallel to Slope

Sliding Down

