A 50 kg box is placed on an incline plane making an angle of 30° with the horizontal. If the coefficient of friction is 0.30, find the resultant force.

Solution:

A free-body diagram of a box is as follows
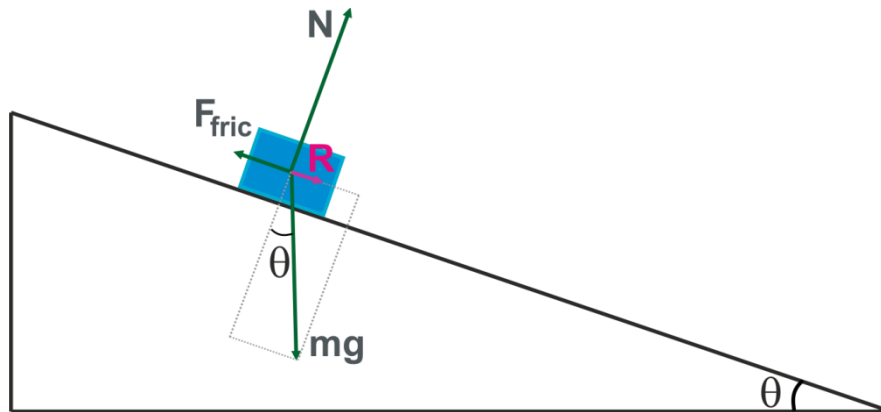
The resultant force

$$R = mg \sin\theta - F_{\text{fric}}$$

The friction force and normal reaction are given by

$$N = mg\cos\theta$$

$$F_{\text{fric}} = \mu N = \mu mg\cos\theta$$

Therefore

$$R = mg(sin\theta - \mu\cos\theta)$$

$$= 50 \times 9.8(\sin 30° - 0.30 \times \cos 30°) = 118 \text{ N}$$

Answer: 118 N