

16. We choose $+x$ horizontally rightwards and $+y$ upwards and observe that the 15 N force has components $F_x = F \cos \theta$ and $F_y = -F \sin \theta$.

(a) We apply Newton's second law to the y axis:

$$N - F \sin \theta - mg = 0 \implies N = (15) \sin 40^\circ + (3.5)(9.8) = 44$$

in SI units. With $\mu_k = 0.25$, Eq. 6-2 leads to $f_k = 11$ N.

(b) We apply Newton's second law to the x axis:

$$F \cos \theta - f_k = ma \implies a = \frac{(15) \cos 40^\circ - 11}{3.5} = 0.14$$

in SI units (m/s^2). Since the result is positive-valued, then the block is accelerating in the $+x$ (rightward) direction.