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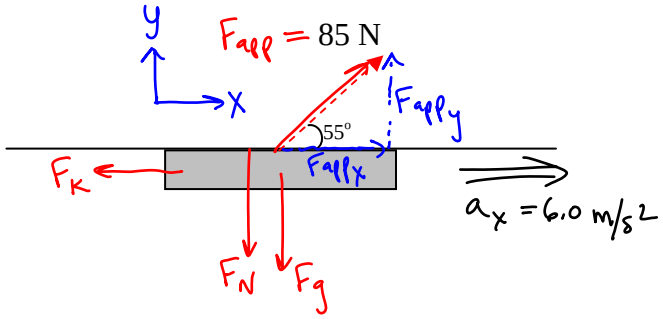
A 4.00 kg block is pushed along a ceiling with a constant applied force of 85 N that acts at an angle of 55° with the horizontal, as shown below. The block accelerates to the right at 6.00 m/s^2. Determine the coefficient of kinetic friction between the block and the ceiling.



$F_{net,x} = F_{appx} - F_K \neq 0$

$F_{net,y} = F_{appy} - F_g - F_N = 0$

1) $F_g = mg$

$F_g = (4)(9.81)$

$F_g = 39.24$ N

2) $F_{app} = 85$ N

$F_{appx} = 85 \cos 55 = 48.75$ N

$F_{appy} = 85 \sin 55 = 69.63$ N

3) $F_{net,y} = F_{appy} - F_g - F_N = 0$

$F_N = F_{appy} - F_g$

$F_N = 69.63 - 39.24$

$F_N = 30.39$ N

4) $a_x = 6.0$ m/s^2

$F_{net,x} = ma_x$

$F_{net,x} = (4)(6)$

$F_{net,x} = 24$ N

5) $F_{net,x} = F_{appx} - F_K$

$24 = 48.75 - F_K$

$F_K = 24.75$ N

6) $\mu_K = \frac{F_K}{F_N}$

$\mu_K = \frac{24.75}{30.39}$

$\mu_K = .814 \pm .003$ for rounding