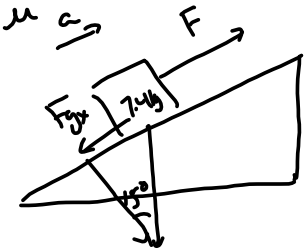
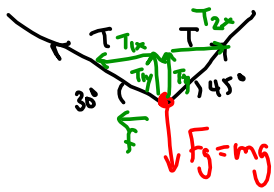
2. 

$\Sigma F = F - F_{gx} = ma$

8.4N 0.42N

$F = 8.8N$

$F_{g_x} = F_g \sin\theta$

3. 

$\Rightarrow \Sigma F = \odot$

$\Rightarrow T_{1y} + T_{2y} = F_g$

$T\sin 30° + T\sin 45° = 19.6$

$T(1.207) = 19.1$

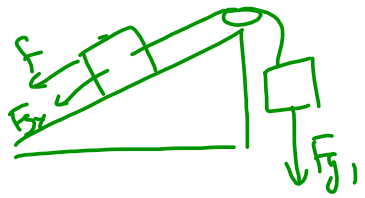
$T = 16.2N$

$\Rightarrow T_{1x} + f = T_{2x}$

$T\cos 30° + f = T\cos 45°$

$f = 16.2(\cos 45 - \cos 30)$

$= 2.6N$

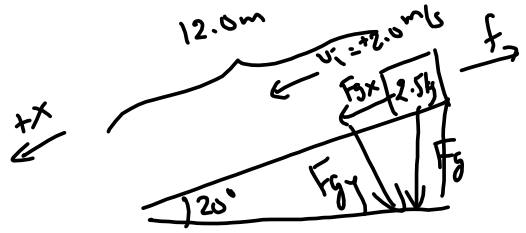


$F_{g_1} = f + F_{g_2}$

$m_1 g$

$m_1 = 5.31\ kg$

$\Sigma F = 0$ $T = F_{g1} = m_1 g = 52N$



$\Sigma F = F_{gx} - f = ma$

$8.4N - f = (2.5)(-0.167 m/s^2)$

$f = 8.8N$

$v_f^2 = v_i^2 + 2ad$

$(0)^2 = (2)^2 + 2a(+12)$

$a = -0.167 m/s^2$

$\mu = \frac{f}{N} = \frac{8.8N}{2.5 \cdot g \cos 20^\circ} = 0.382$

$E_i = E_f + W_f$

$h = 12.0m \sin 20^\circ$

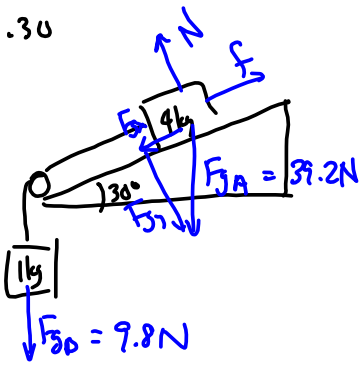
$\frac{1}{2}mv_i^2 + mgh = fd$

$\frac{1}{2}(2.5)(2)^2 + (2.5)g(12.0)\sin 20^\circ = f(12)$

$f = 8.8N$

$\mu = \frac{f}{N}$

6. $\mu = 0.30$



$$\Sigma F = F_{gB} + F_{gx} - f = (m_A + m_B)a$$

$$9.8N + 39.2N\sin 30° - (39.2N\cos 30°)(0.30) = 5kg\ a$$

$$29.4 - 9.8N = 5kg\ a$$

$$19.6 = 5a$$

$$a = 4.0\ m/s^2$$

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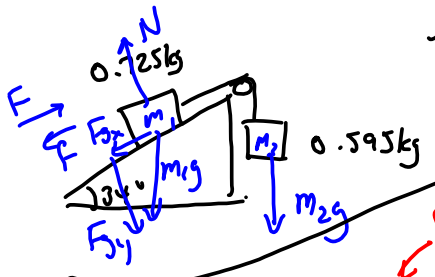
28.

$\mu_s = 0.47$
$\mu_k = 0.12$



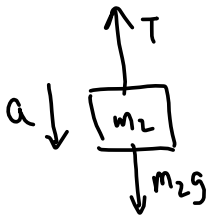
a) $\Sigma F = (F + m_2 g) - (F_{g_x} + f) = 0$ $\quad f_s = \mu_s N$

$F = (F_{g_x} + f) - m_2 g$

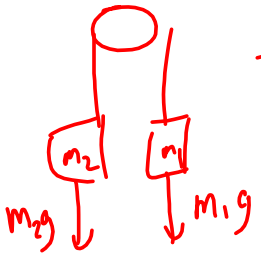
$f_k = \mu_k N$

b) $\Sigma F = (F + m_2 g) - (F_{g_x} + f) = (m_1 + m_2)\, a$

c)

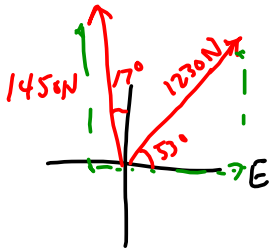


$\Sigma F = m_2 g - T = m_2 a$



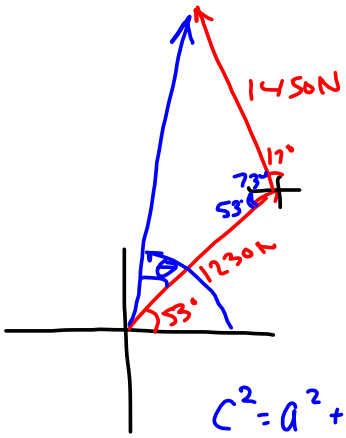
$\frac{m_1 - m_2}{m_1 + m_2} g = a$

$\Sigma F = m_1 g - m_2 g = (m_1 + m_2) g$



$\frac{\sin\theta}{1450} = \frac{\sin 126}{2390}$

$\theta = 29°$



$c^2 = a^2 + b^2 - 2ab\cos C$

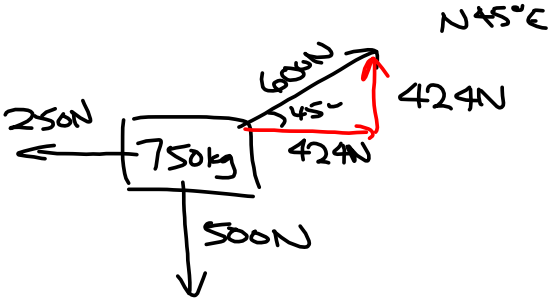
$c^2 = (1230)^2 + (1450)^2 - 2(1230)(1450)\cos 126°$

$C = 2390N$ 82° CCW from E

E 82° N

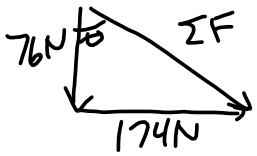
N 8° E

008°

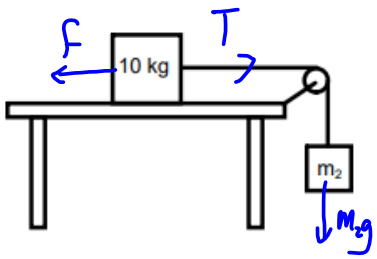


$\Sigma F_x = 424 - 250N$
$= 174N \quad = 174N\ E$

$\Sigma F_y = -76N \quad = 76N\ S$



$a = \frac{\Sigma F}{m}$



If there is a static coefficient of friction, μ_s=0.40 and a kinetic coefficient, μ_k=0.25 between the 10 kg mass and the table:

Determine the minimum mass, m_2, needed to get the system started. Once moving, determine the acceleration of the system, the tension in the rope, and the speed after 1.5 s.

$\Sigma F = m_2g - f = 0$

$m_2g = \mu_s m_1 g$

$m_2 = 4.0kg$

$\Sigma F = m_2g - f = (m_1+m_2)a$ (use μ_k)

$39.2N - 24.5N = 14kg\,a$

$\frac{14.7N}{14kg} = a$

$a = 1.05 m/s^2$

$\Sigma F = T - f = m_1 a$

$T - 24.5N = 10(1.05)$

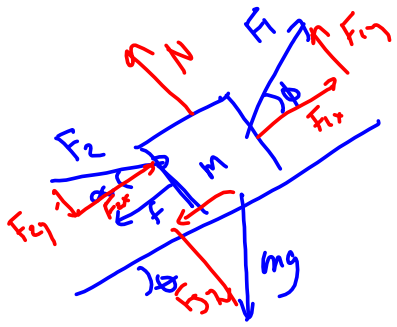
$T = 35N$

(i) $v_f = v_i + at$

$= (1.05)(1.5s)$

$= 1.65 m/s$

μ



$\Sigma F = F_{1x} + F_{2x} - (F_{gx} + f) = ma$

$N + F_{1y} = F_{gy} + F_{2y}$