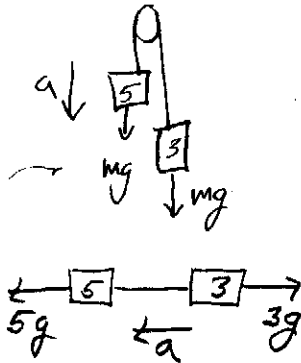


1) mass is measure of inertia and weight is a force on an object due to gravity.

2) show understanding of action reaction

3)



3)

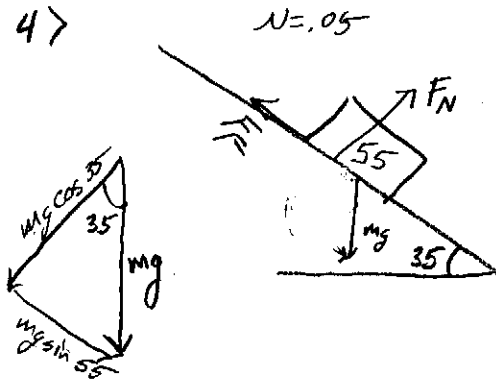
$$\sum \vec{F} = m\vec{a}$$

$$-5g + 3g = (5+3)(-a)$$

$$-2g = -8a$$

$$a = 2.45 \text{ m/s}^2$$

4)



4)

$$\sum \vec{F} = m\vec{a}$$

$$\sum F_{||} = ma_{||}$$

$$\sum F_{\perp} = ma_{\perp}$$

$$-F_f + mg \sin 55 = ma_{||}$$

$$F_N - mg \cos 55 = 0$$

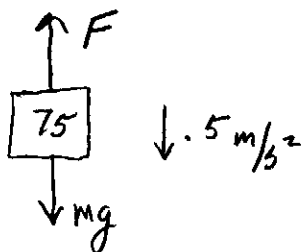
$$\Rightarrow F_N + mg \sin 55 = ma_{||}$$

$$F_N = mg \cos 55$$

$$-(0.05)(mg \cos 55) + mg \sin 55 = ma_{||}$$

$$a = 7.75 \text{ m/s}^2$$

5)



5)

$$\sum \vec{F} = m\vec{a}$$

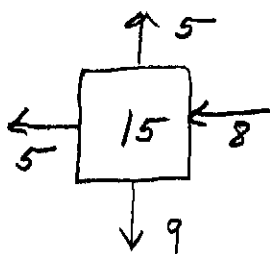
$$F - mg = m(-a)$$

$$F = mg - ma$$

$$F = 75(9.81) - 75(.5)$$

$$F = 698 \text{ N}$$

6)



6)

$$\sum \vec{F} = m\vec{a}$$

$$\sum F_x = ma_x$$

$$\sum F_y = ma_y$$

$$-5 - 8 = (15)a_x$$

$$5 - 9 = (15)a_y$$

$$a_x = -0.867 \text{ m/s}^2$$

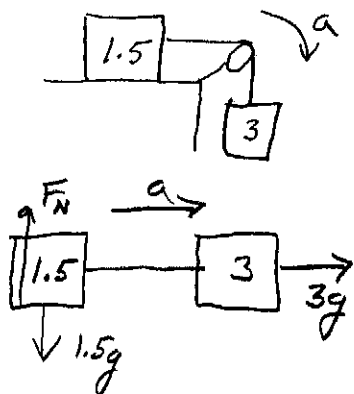
$$a_y = -0.267 \text{ m/s}^2$$



$$a^2 = (-0.267)^2 + (-0.867)^2$$

$$a = 0.907 \text{ m/s}^2$$

7)



7)

$$\sum \vec{F} = m\vec{a}$$

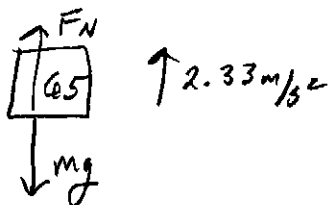
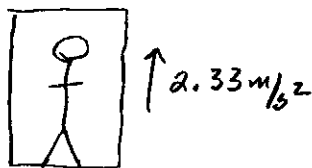
$$\sum F_x = ma_x$$

$$3g = (3 + 1.5)a$$

$$a = \frac{3g}{4.5}$$

$$a = 6.54 \text{ m/s}^2$$

8)



8)

$$\sum \vec{F} = m\vec{a}$$

$$\sum F = ma$$

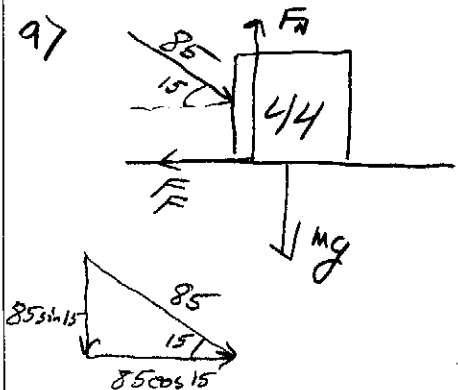
$$F_N - mg = ma$$

$$F_N = ma + mg = m(a + g)$$

$$F_N = 65(2.33 + 9.81)$$

$$F_N = 789 \text{ N}$$

9)



9)

$$\vec{F} = m\vec{a}$$

$$\sum F_y = ma_y \quad \sum F_x = ma_x$$

$$-85 \sin 15 + F_N - mg = 0$$

$$F_N = 44g + 85 \sin 15$$

$$-F_f + 85 \cos 15 = 0$$

$$F_f = 85 \cos 15$$

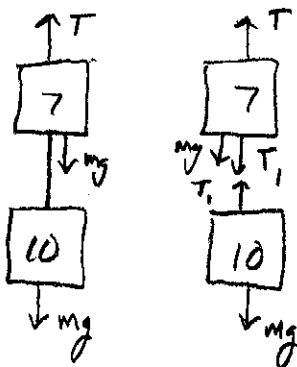
$$\mu F_N = F_f$$

$$\mu (44g + 85 \sin 15) = 85 \cos 15$$

$$\mu = .181$$

10) more friction due to there being static friction rather than kinetic friction.

11)



for 10

$$\sum F = ma$$

$$T_1 - mg = 0$$

$$T_1 = (10)(9.8)$$

$$T_1 = 98.1 \text{ N}$$

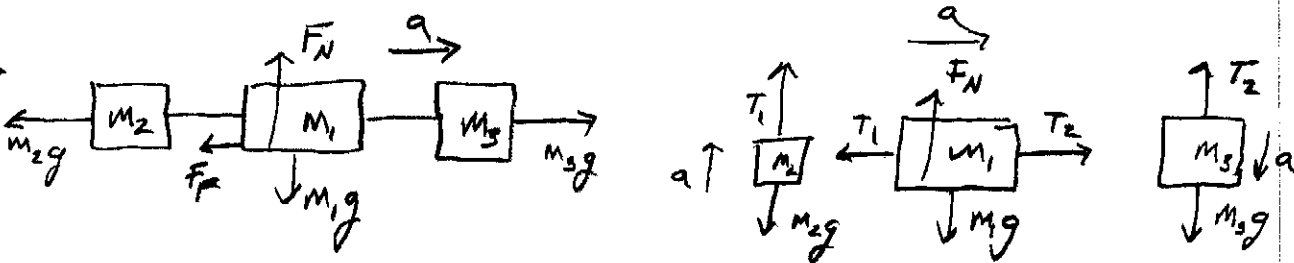
for system

$$T - m_1g + m_2g = 0$$

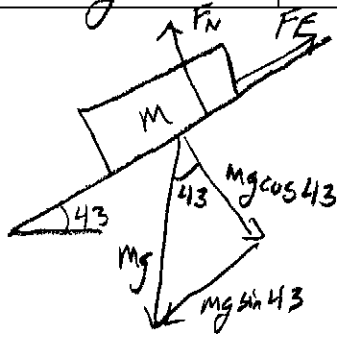
$$T = 7g + 10g$$

$$T = 167 \text{ N}$$

12)



13)



$$13) \quad \Sigma \vec{F} = m\vec{a}$$

$$\Sigma F_{\parallel} = ma_{\parallel}$$

$$F_f - mg \sin 43 = 0$$

$$\Sigma F_{\perp} = ma_{\perp}$$

$$F_N - mg \cos 43 = 0$$

$$F_N = mg \cos 43$$

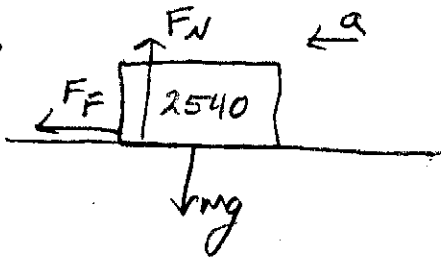
$$N F_N = mg \sin 43$$

$$N mg \cos 43 = mg \sin 43$$

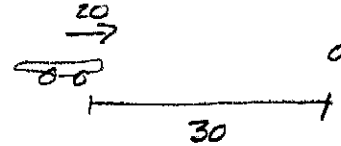
$$N = \frac{mg \sin 43}{mg \cos 43} = \tan 43$$

$$N = .932$$

14)



14)



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

$$0^2 = (20)^2 + 2(-a)(30)$$

$$a = -6.67 \text{ m/s}^2$$

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

$$-F_f = m(-a)$$

$$F_f = (2540)(6.67)$$

$$F_f = 16900 \text{ N}$$