

p. 82 # 2.3; p. 83 # 4.6

2. $m = 63 \text{ kg}$
 $\theta = 14^\circ$



a) $F_N = ?$

$$F_N = F_{gy} = mg \cos \theta$$

$$= (63 \text{ kg})(9.8 \text{ N/kg})(\cos 14^\circ)$$

$$= 600 \text{ N}$$

b) $a = ?$

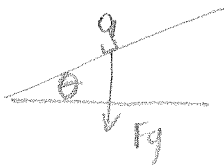
$$F_{\text{NET}} = F_{gx} = ma \rightarrow a = \frac{F_{gx}}{m}$$

$$a = \frac{mg \sin \theta}{m} = g \sin \theta$$

$$a = (9.8 \text{ m/s}^2) \sin 14^\circ$$

$$a = 2.4 \text{ m/s}^2$$

3. $a = 1.9 \text{ m/s}^2$
 $\theta = ?$
 $\mu_k = 0$



$$F_{\text{NET}} = ma = F_{gx}$$

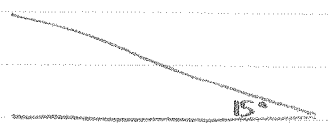
$$ma = mg \sin \theta \Rightarrow \sin \theta = \frac{a}{g}$$

$$\sin \theta = \frac{1.9 \text{ m/s}^2}{9.8 \text{ m/s}^2}$$

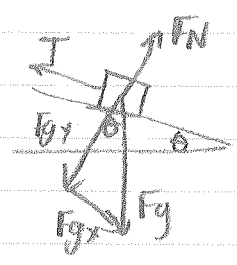
$$\theta = 11^\circ$$

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4. $m = 1.41 \times 10^3 \text{ kg}$



a) FBD



b) Vertical: $F_N = F_{gy} = mg \cos \theta$

Horizontal: $T = F_{gx} = mg \sin \theta$

c) $T = (1.41 \times 10^3 \text{ kg})(9.8 \text{ N/kg})(\sin 15^\circ)$
 $T = 3576 \text{ N}$
 $T = 3600 \text{ N}$

b. $\theta = 25^\circ$
 $m = 1.3 \text{ kg}$

a) constant v, $\therefore F_{NET} = 0$

$$F_{NET} = F_{app} - F_{gx}$$
$$F_{app} = F_{gx}$$
$$= mg \sin \theta$$
$$= (1.3 \text{ kg})(9.8 \text{ N/kg})(\sin 25^\circ)$$
$$= 5.4 \text{ N}$$

b) $a = 2.2 \text{ m/s}^2$

$$F_{NET} = ma = F_{app} - F_{gx}$$

$$F_{app} = ma + F_{gx}$$
$$= ma + mg \sin \theta$$
$$= (1.3 \text{ kg})(2.2 \text{ m/s}^2) + (1.3 \text{ kg})(9.8 \text{ N/kg}) \sin 25^\circ$$
$$= 8.2 \text{ N}$$