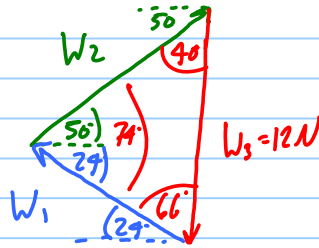
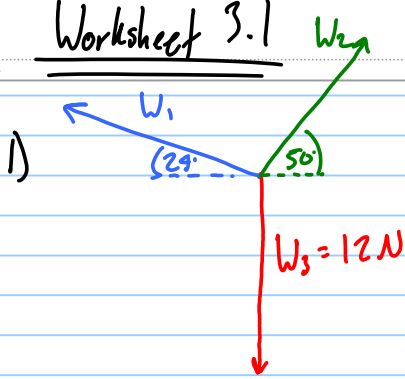


# Worksheet 3.1

Note Title

09/11/2009

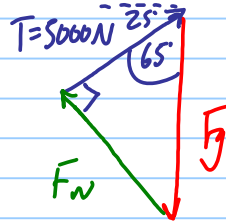
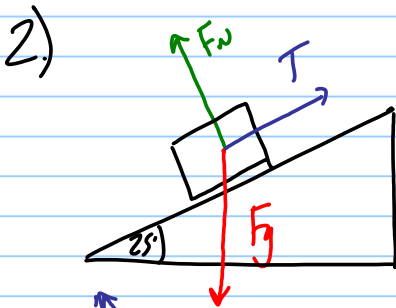


$$\frac{W_1}{\sin 40^\circ} = \frac{12}{\sin 74^\circ}$$

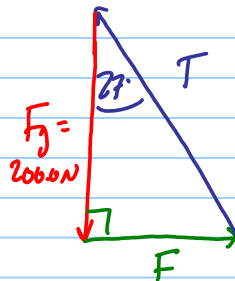
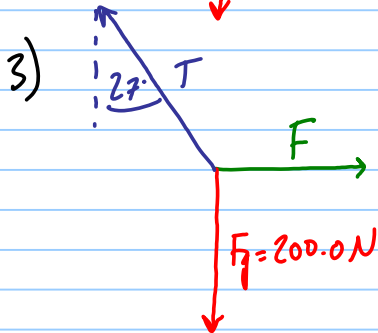
$$\frac{W_2}{\sin 66^\circ} = \frac{12}{\sin 74^\circ}$$

$$W_1 = 12 \frac{\sin 40^\circ}{\sin 74^\circ} = \boxed{8.0 \text{ N}}$$

$$W_2 = 12 \frac{\sin 66^\circ}{\sin 74^\circ} = \boxed{11.9 \text{ N}}$$

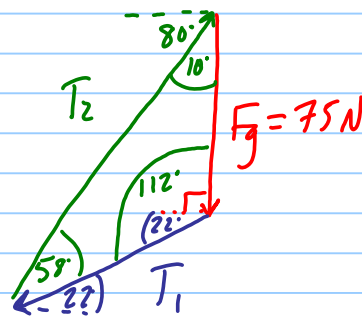
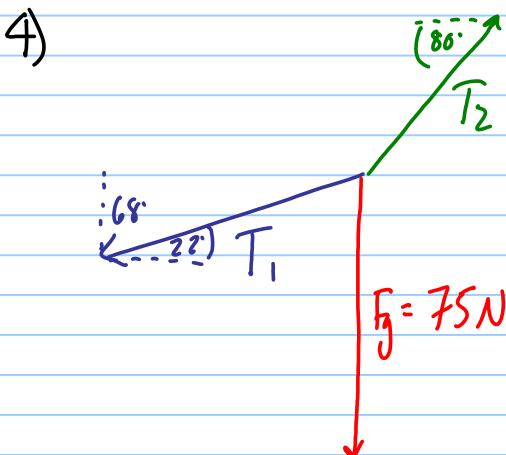


$$F_g = \frac{T}{\cos 65^\circ} = \boxed{11800 \text{ N}}$$



$$T = \frac{F_g}{\cos 27^\circ} = \boxed{229 \text{ N}}$$

$$F = F_g \tan 27^\circ = \boxed{102 \text{ N}}$$

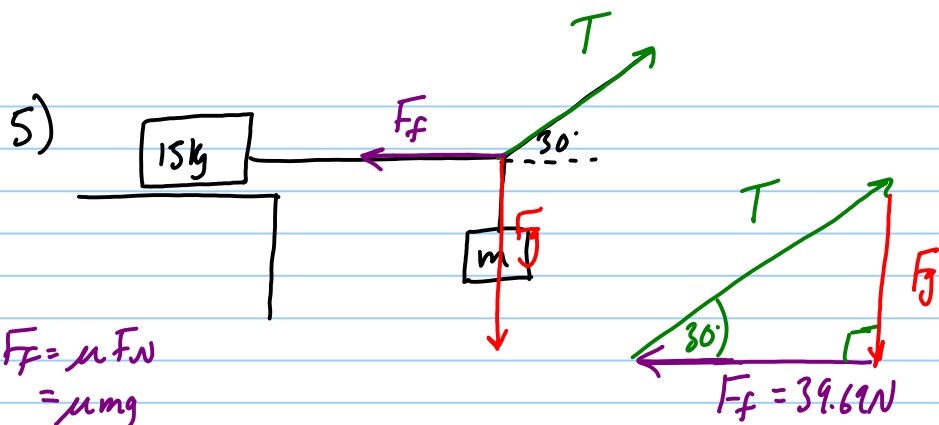


$$\frac{T_1}{\sin 10^\circ} = \frac{75}{\sin 58^\circ}$$

$$\frac{T_2}{\sin 112^\circ} = \frac{75}{\sin 58^\circ}$$

$$T_1 = \frac{75 \sin 10^\circ}{\sin 58^\circ} = \boxed{15 \text{ N}}$$

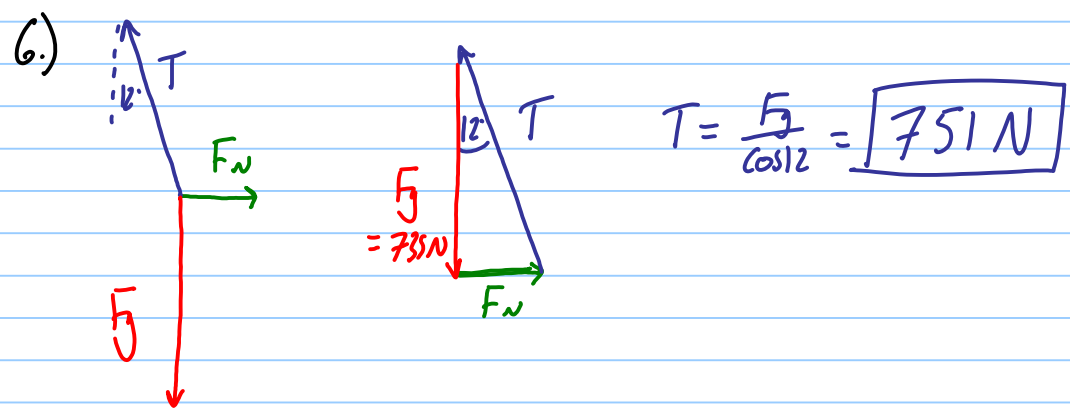
$$T_2 = \frac{75 \sin 112^\circ}{\sin 58^\circ} = \boxed{82 \text{ N}}$$



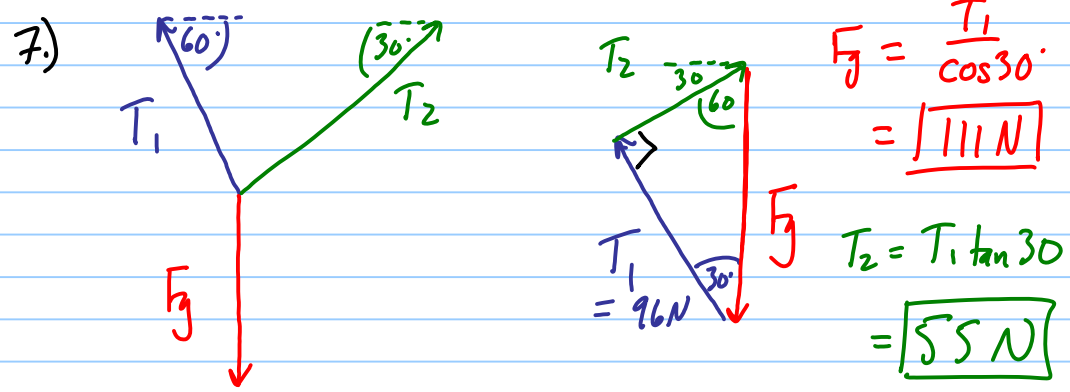
$$\begin{aligned}
 F_f &= \mu F_N \\
 &= \mu mg \\
 &= (0.27)(15)(9.80) \\
 &= 39.69 \text{ N}
 \end{aligned}$$

$$\begin{aligned}
 \tan 30^\circ &= \frac{F_g}{F_f} & F_g &= F_f \tan 30^\circ \\
 & & &= 22.92 \text{ N}
 \end{aligned}$$

$$F_g = mg \quad m = \frac{F_g}{g} = \boxed{2.34 \text{ kg}}$$

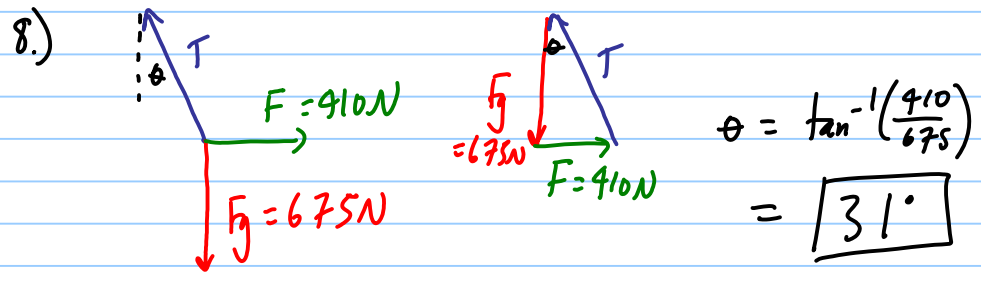


$$T = \frac{F_g}{\cos 12^\circ} = \boxed{751 \text{ N}}$$



$$\begin{aligned}
 F_g &= \frac{T_1}{\cos 30^\circ} \\
 &= \boxed{1111 \text{ N}}
 \end{aligned}$$

$$\begin{aligned}
 T_2 &= T_1 \tan 30^\circ \\
 &= \boxed{55 \text{ N}}
 \end{aligned}$$



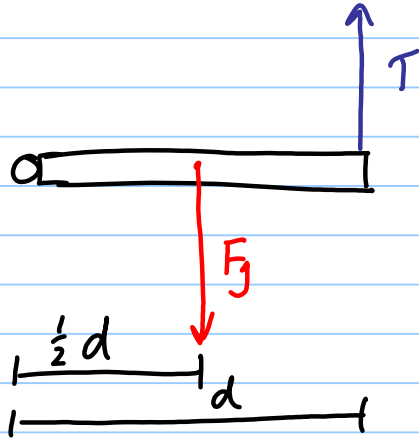
$$\begin{aligned}
 \theta &= \tan^{-1}\left(\frac{410}{675}\right) \\
 &= \boxed{31^\circ}
 \end{aligned}$$

# Worksheet 3.2

1.)

$$\tau = Fd \quad F = \frac{\tau}{d} = \frac{45 \text{ N}\cdot\text{m}}{0.35 \text{ m}} = \boxed{129 \text{ N}}$$

2.)

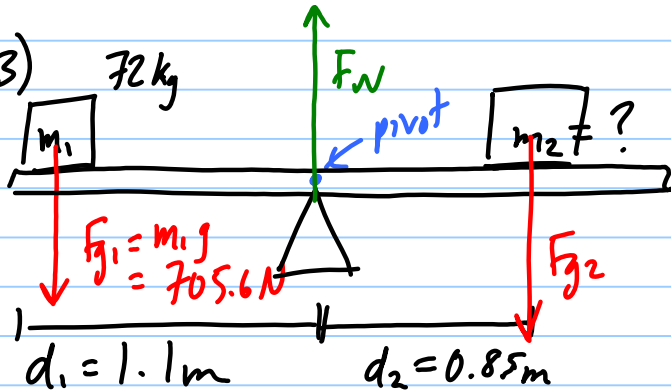


$$\tau_c = \tau_{cc}$$

$$F_g \left(\frac{1}{2}d\right) = Td$$

$$T = \frac{1}{2}F_g = \boxed{200 \text{ N}}$$

3.)



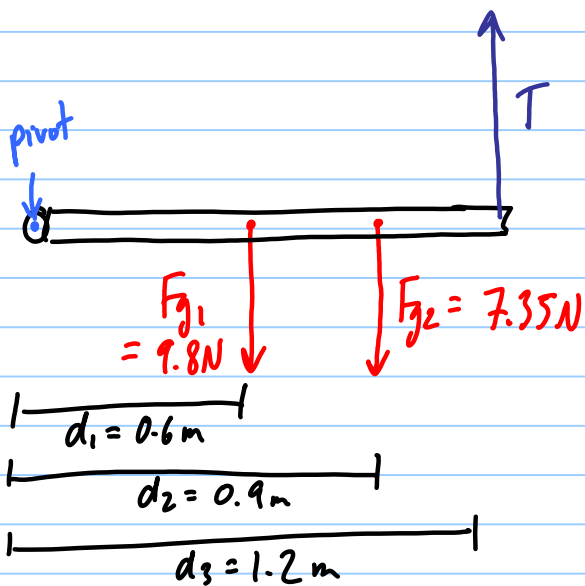
$$\tau_c = \tau_{cc}$$

$$F_{g1} d_1 = F_{g2} d_2$$

$$F_{g2} = \frac{F_{g1} d_1}{d_2} = 913 \text{ N}$$

$$m_2 = \frac{F_{g2}}{g} = \boxed{93 \text{ kg}}$$

4.)



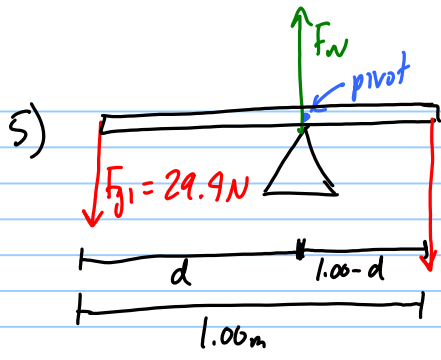
$$\tau_c = \tau_{cc}$$

$$F_{g1} d_1 + F_{g2} d_2 = T d_3$$

$$T = \frac{F_{g1} d_1 + F_{g2} d_2}{d_3}$$

$$= \frac{(9.8)(0.6) + (7.35)(0.9)}{1.2}$$

$$= \boxed{10.4 \text{ N}}$$



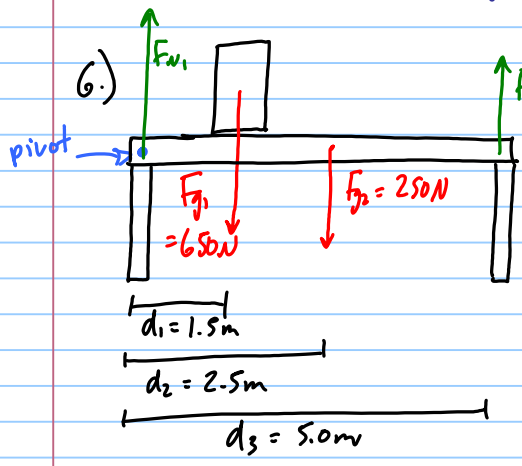
$$\tau_c = \tau_{cc}$$

$$F_2(1-d) = F_1 d$$

$$F_2 - F_2 d = F_1 d$$

$$F_1 d + F_2 d = F_2$$

$$d(F_1 + F_2) = F_2 \quad d = \frac{F_2}{F_1 + F_2} = \boxed{0.625 \text{ m}}$$



$$\tau_c = \tau_{cc}$$

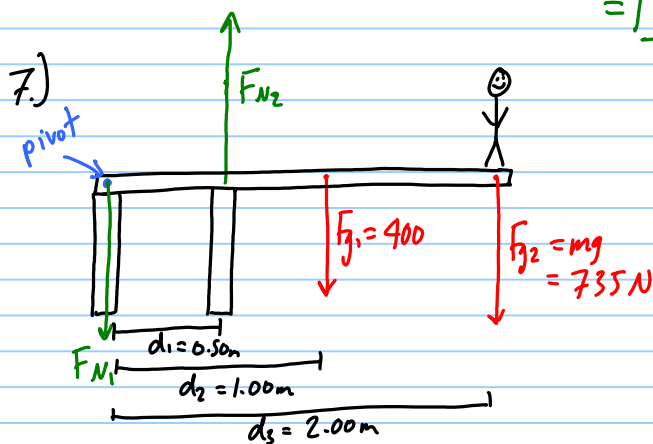
$$F_1 d_1 + F_2 d_2 = F_{w2} d_3$$

$$F_{w2} = \frac{F_1 d_1 + F_2 d_2}{d_3} = \boxed{320 \text{ N}}$$

$$\sum F_y = F_{w1} + F_{w2} - F_1 - F_2 = 0$$

$$F_{w1} = F_1 + F_2 - F_{w2}$$

$$= \boxed{580 \text{ N}}$$



$$\tau_c = \tau_{cc}$$

$$F_1 d_2 + F_2 d_3 = F_{w1} d_1$$

$$F_{w1} = \frac{F_1 d_2 + F_2 d_3}{d_1}$$

$$= \boxed{3740 \text{ N}}$$

$$\sum F_y = F_{w1} - F_1 - F_2 - F_{w2} = 0$$

$$F_{w1} = F_1 + F_2 + F_{w2}$$

$$= 400 + 735 + 2610$$

$$= \boxed{3740 \text{ N}}$$