

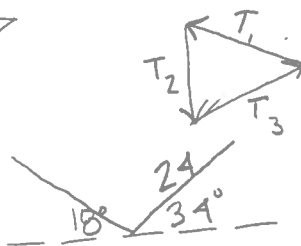
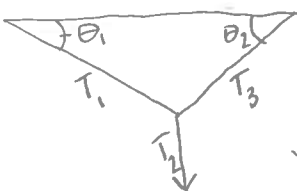
Quiz A

1) All FBDs Not to Scale

$$\theta_1 = 18^\circ$$

$$\theta_3 = 34^\circ$$

$$T_3 = 24 \text{ N}$$



$$T_3 \cos \theta_3 = T_1 \cos \theta_1$$

$$24 \cos 34 = T_1 \cos 18$$

$$24 \frac{\cos 34}{\cos 18} = T_1$$

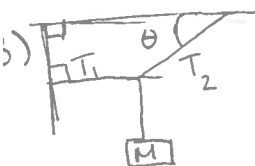
$$T_1 = 20.92$$



$$\sum T = 0 = T_1 + T_3 + mg \quad mg = T_1 \sin \theta_1 + T_3 \sin \theta_3$$

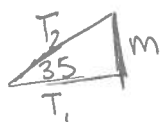
$$mg = 20.92 \sin 18 + 24 \sin 34$$

$$mg = 19.88$$



$$\theta = 35^\circ$$

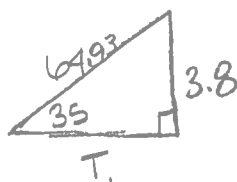
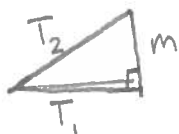
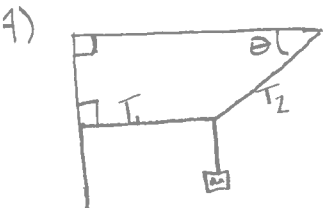
$$M = 3.8$$



$$T_2 \sin \theta = mg$$

$$T_2 = \frac{mg}{\sin \theta}$$

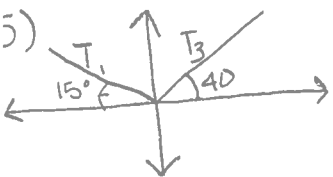
$$\frac{3.8(9.8)}{\sin 35} = T_2 = 64.93$$



$$T_1 = T_2 \cos \theta$$

$$T_1 = 64.93 \cos 35$$

$$T_1 = 53.19$$



$$T_{3x} = T_3 \cos \theta_3$$

$$T_{1x} = T_1 \cos \theta_1$$

$$T_{3y} = T_3 \sin \theta_3$$

$$T_{1y} = T_1 \sin \theta_1$$

$$W_y = -mg$$

$$x \rightarrow T_3 \cos \theta_3 - T_1 \cos \theta_1 = 0$$

$$y \rightarrow T_3 \sin \theta_3 - T_1 \sin \theta_1 - mg = 0$$

$$(T_1 \frac{\cos \theta_1}{\cos \theta_3}) \sin \theta_3 - T_1 \sin \theta_1 = mg$$

$$T_1 \frac{\cos \theta_1 \sin \theta_3}{\cos \theta_3} + T_1 \sin \theta_1 = mg$$

$$T_1 (\frac{\cos \theta_1 \sin \theta_3}{\cos \theta_3} + \sin \theta_1) = mg$$

$$T_1 (\frac{\cos 15 \sin 40}{\cos 40} + \sin 15) = 26$$

$$T_1 (1.07) = 26$$

$$T_1 = \frac{26}{1.07} = 24.3$$

$$T_3 \cos \theta_3 - T_1 \cos \theta_1 = 0$$

$$+ T_1 \cos \theta_1 + T_1 \cos \theta_1$$

$$T_3 \cos \theta_3 = T_1 \cos \theta_1$$

$$T_3 = T_1 \frac{\cos \theta_1}{\cos \theta_3}$$

04 - Tensions