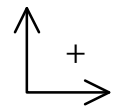


P12 - 4.2 - Trig Torque Notes



Find the Tension the string and force on the pole/wall.

$$A = \frac{O}{\tan\theta}$$

$$F_1 = \frac{\tan\theta}{25(9.8)}$$

$$F_1 = \frac{\tan 40}{291.86N}$$

Up=Down

$$A = H\cos\theta$$

$$T_{2x} = T_2\cos\theta$$

$$T_{2x} = 381.15\cos 40$$

$$T_{2x} = 291.86N$$

Left=Right

$$O = H\sin\theta$$

$$T_{2y} = T_2\sin\theta$$

$$T_2 = \frac{T_{2y}}{\sin\theta}$$

$$T_2 = \frac{245}{\sin 40}$$

$$T_2 = 381.15N$$

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

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

Left=Right

$T_{2x} = T_2\cos\theta_2$

$T_{2y} = T_2\sin\theta_2$

$$T_{1x} = T_{2x}$$

$$T_1\cos\theta_1 = T_2\cos\theta_2$$

$$T_1\cos 35 = T_2\cos 25$$

$$T_1 = \frac{T_2\cos 25}{\cos 35}$$

$$T_1 = \frac{(231.74)\cos 25}{\cos 35}$$

$$T_1 = 256.4N$$

Up=Down

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

$$T_1\sin\theta_1 + T_2\sin\theta_2 = 245$$

$$T_1\sin 35 + T_2\sin 25 = 245$$

$$\left(\frac{T_2\cos 25}{\cos 35}\right)\sin 35 + T_2\sin 25 = 245$$

$$0.6346 T_2 + 0.4226 T_2 = 245$$

$$1.057 T_2 = 245$$

$$T_2 = 231.74 N$$

Sin Law

$90^\circ - 35^\circ = 55^\circ$

$180^\circ - 55^\circ - 65^\circ = 60^\circ$

$$\frac{a}{\sin A} = \frac{b}{\sin B}$$

$$\frac{\sin 65}{T_1} = \frac{\sin 60}{F_g}$$

$$T_1 = \frac{F_g}{\sin 60} \times \sin 65$$

$$T_1 = 256.4 N$$

$$\frac{T_2}{\sin 55} = \frac{F_g}{\sin 60}$$

$$T_2 = \frac{F_g}{\sin 60} \times \sin 55$$

$$T_2 = 231.74 N$$