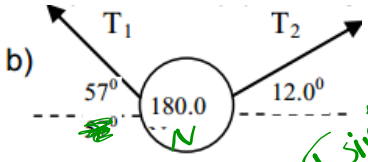
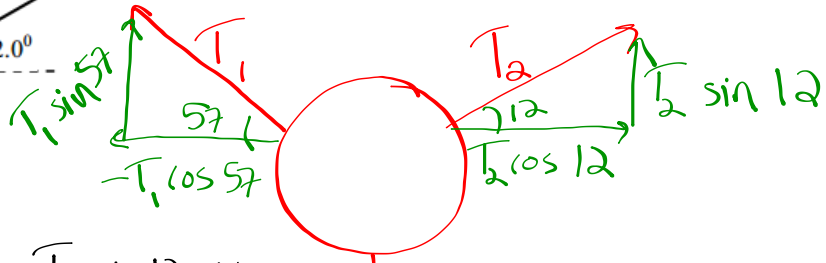
b)





$$\sum F_y = T_1 \sin 57 + T_2 \sin 12 - 180 = 0$$

$$T_1 = \frac{-T_2 \sin 12 + 180}{\sin 57}$$

$mg = 180\,N$

$$\sum F_x = T_2 \cos 12 - T_1 \cos 57 = 0$$

$$T_2 = \frac{T_1 \cos 57}{\cos 12}$$

$$T_1 = \frac{-\left(\frac{T_1 \cos 57}{\cos 12}\right) \sin 12 + 180}{\sin 57}$$

$$T_1 = \frac{\left(\frac{-0.54 T_1}{0.98}\right) 0.21 + 180}{0.84}$$

$$0.84 T_1 = -0.12 T_1 + 180$$

$$0.96 T_1 = 180$$

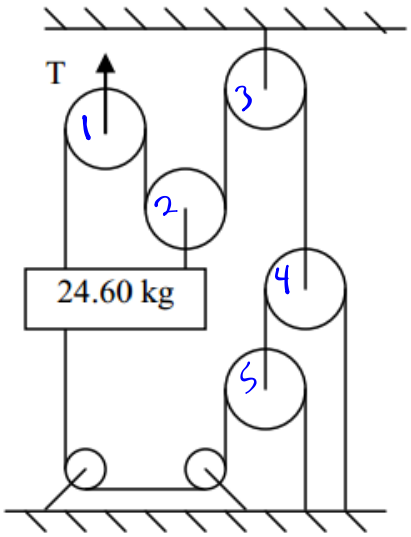
$$T_1 = 188\,N$$

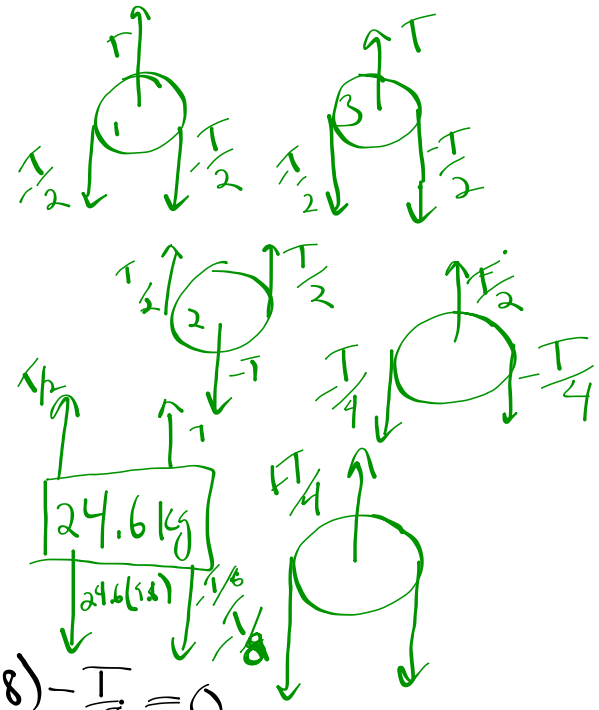
$$T_2 = \frac{188 \cos 57}{\cos 12}$$

$$T_2 = 105\,N$$

175.3 N]

)





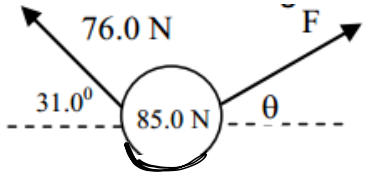
$$\sum F = \frac{T}{2} + T - 24.6(9.8) - \frac{T}{8} = 0$$

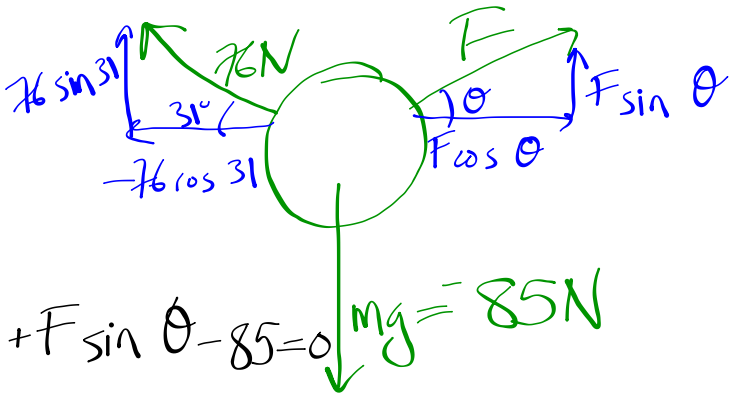
$$= 4T + 8T - 8(24.6)(9.8) - T = 0$$

$$= \frac{11T}{11} = \frac{8(24.6)(9.8)}{11}$$

$$T = 175\,N$$

c)





$$\Sigma F_y = 76\sin 31 + F\sin\theta - 85 = 0$$

$$F\sin\theta = 85 - 76\sin 31$$

$$\Sigma F_x = -76\cos 31 + F\cos\theta = 0$$

$$F\cos\theta = 76\cos 31$$

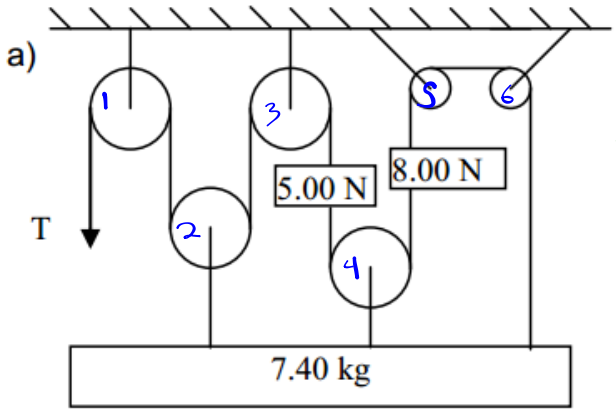
$$F = \frac{76\cos 31}{\cos\theta}$$

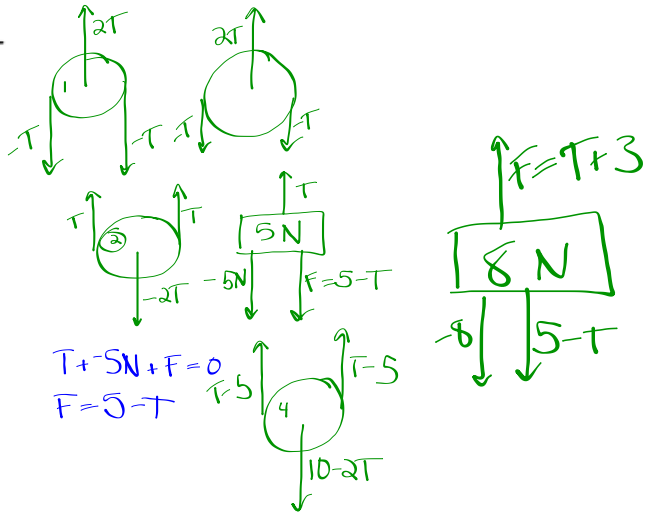
$$\frac{76\cos 31}{\cos\theta}\cdot\sin\theta = 85 - 76\sin 31$$

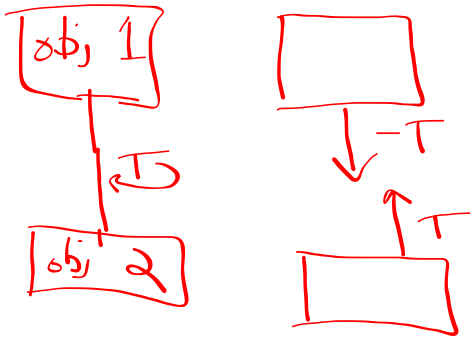
$$\frac{\sin\theta}{\cos\theta} = \frac{85 - 76\sin 31}{76\cos 31}$$

$$\tan\theta = \frac{85 - 76\sin 31}{76\cos 31}$$

... etc

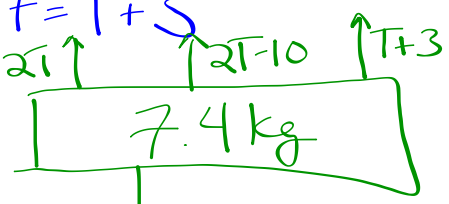






$-8+5-T+F=0$

$F=T+3$



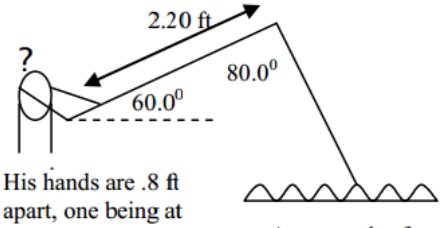
$mg=7.4\cdot-9.8$

$\Sigma F=2T+2T-10+T+3+7.4(-9.8)=0$

$5T=(7.4)(9.8)+7$

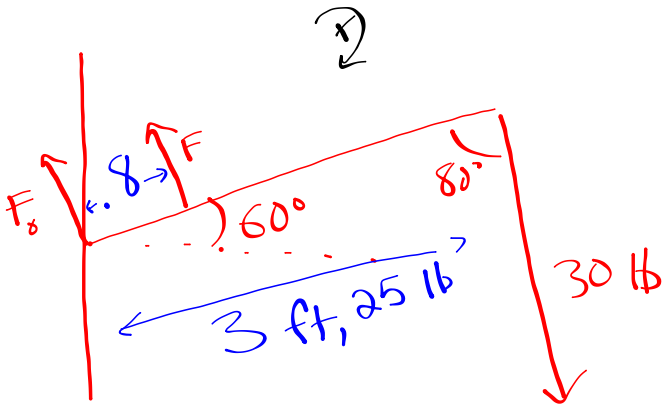
$T=15.9\,N$

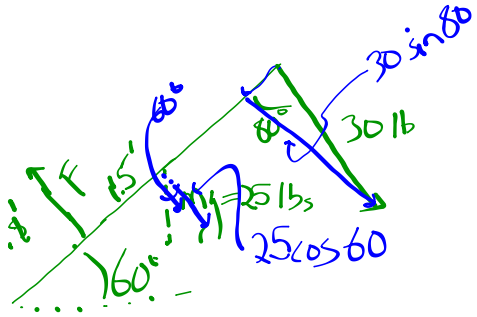
11. Cole LaDrinque snags a big one, which exerts a 30.0 pound tension in his line. What force must he apply with the upper hand to support his 25.0-lb, 3.00-ft long pole as well as the fish? (Cole holds the pole at 60.0 degrees to the horizontal). [F = 134 lb]

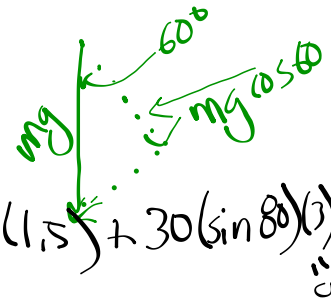


His hands are .8 ft apart, one being at the end of the pole.

Assume the force from his hand is perpendicular to the pole.





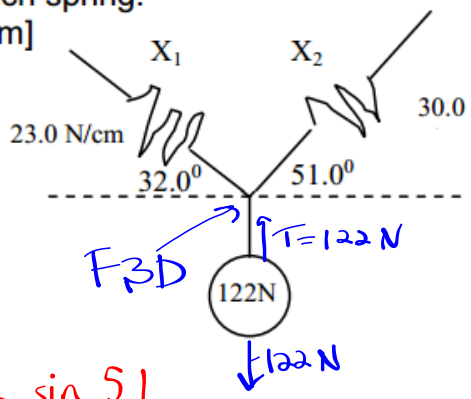


$$\Sigma \tau = \cancel{F_0 \cdot 0} - F(.8) + 25(\cos 60)(1.5) + 30(\sin 80)(3)$$

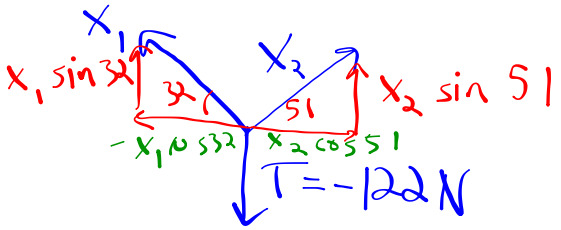
$$F = \frac{+(25)(\cos 60)(1.5) + 30(\sin 80)(3)}{.8}$$

$$= 134 \text{ lb}$$

15. Find the stretch in each spring.
[x_1 = 3.36 cm; x_2 = 3.47 cm]



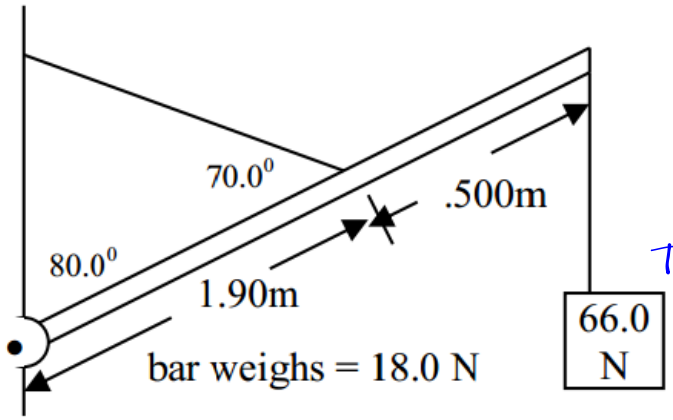
$X_1 = kx$

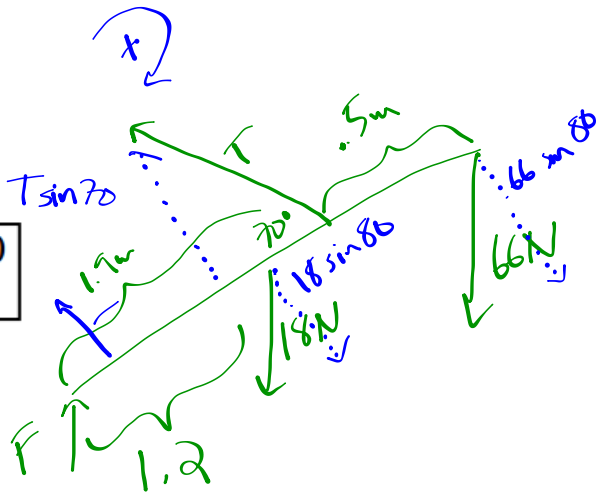


$\Sigma F_Y = -122 + X_1 \sin 32 + X_2 \sin 51 = 0$

$\Sigma F_X = -X_1 \cos 32 + X_2 \cos 51 = 0$

b)





$$\Sigma\tau = F(0) - T(\sin 70)(1.9) + 18(\sin 80)(1.2) + 66(\sin 80)(.5)$$