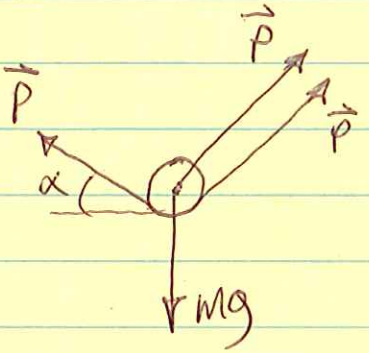
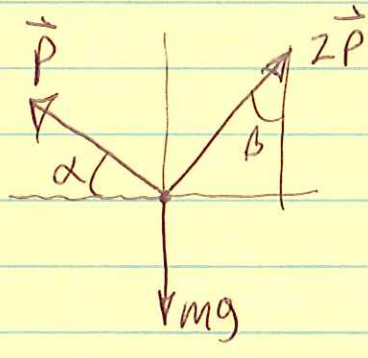
PROB. 2.65





$m = 160\ kg$

$\beta = 20°$

FIND $\vec{P}$

$$\vec{F}_1 = (2P\cos 70°)\hat{i} + (2P\sin 70°)\hat{j} = (0.684P)\hat{i} + (1.88P)\hat{j}\ N$$

$$\vec{F}_2 = (-P\cos\alpha)\hat{i} + (P\sin\alpha)\hat{j}\ N$$

$$\vec{W} = \left[-(160^{kg})\left(9.81\ \tfrac{m}{s^2}\right)\right]\hat{j} = (-1570)\hat{j}\ N$$

$$\Sigma F_x = 0: \quad 0.684P - P\cdot\cos\alpha = 0$$

$$\cos\alpha = 0.684, \quad \underline{\alpha = \cos^{-1}(0.684) = 46.8°}$$

$$\Sigma F_y = 0: \quad 1.88P + P\sin\alpha - 1570 = 0$$

$$P = \frac{1570}{1.88 + \sin 46.8°} = \underline{602\ N}$$