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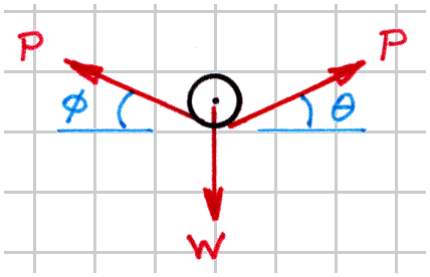
$$W = 50(9.81) = 490.50 \text{ N}$$

The cable is continuous, therefore the tension in the cable is continuous (equal to the force P); and from a free-body diagram of the pulley, the equations of equilibrium give

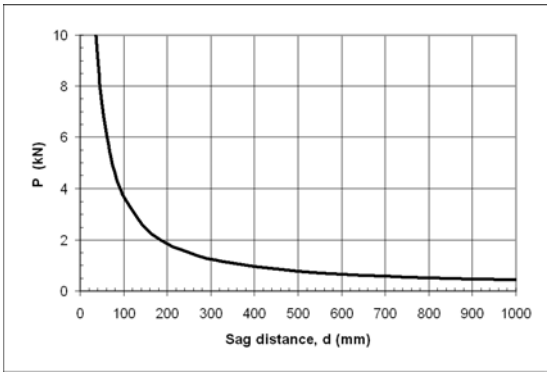


$$\rightarrow \Sigma F_x = 0: \qquad P\cos\theta - P\cos\phi = 0$$

$$\uparrow \Sigma F_y = 0: \qquad P\sin\theta + P\sin\phi - W = 0$$

$$\phi = \theta = \tan^{-1}\frac{d}{1.5}$$

$$P = \frac{W}{2\sin\theta}$$



(a) $P < 2W$ $d > 387$ mm ..... **Ans.**

(b) $P < 4W$ $d > 189$ mm ..... **Ans.**

(c) $P < 8W$ $d > 94$ mm ..... **Ans.**