

<4.6~4.7 >

4.63

$$\theta = \tan^{-1} \frac{75}{100} = 36.87^\circ$$

$$= \sqrt{(75 \text{ mm})^2 + (100 \text{ mm})^2} = 125 \text{ mm}$$

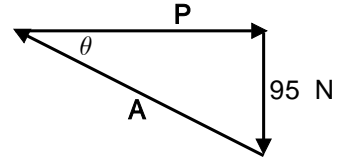
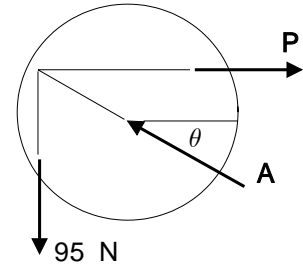
$$\frac{F_A}{125 \text{ mm}} = \frac{95 \text{ N}}{75 \text{ mm}} = \frac{P}{100 \text{ mm}}$$

$$\left( \frac{F_A}{\sin 90^\circ} = \frac{95 \text{ N}}{\sin 36.87^\circ} = \frac{P}{\sin 53.13^\circ} \right)$$

$$P = \frac{(95 \text{ N})(100 \text{ mm})}{75 \text{ mm}} = 126.7 \text{ N}$$

$$F_A = \frac{(95 \text{ N})(125 \text{ mm})}{75 \text{ mm}} = 158.3 \text{ N}$$

$$\mathbf{F}_A = 158.8 \text{ N } \underline{36.9^\circ}$$



4.73

$$W = (90 \text{ kg})(9.81 \text{ m/s}^2) = 882.9 \text{ N}$$

$$y_{DE} = (0.45 \text{ m}) \tan 35^\circ = 0.315 \text{ m}$$

$$y_{BE} = 0.45 + 0.15 - 0.315 \text{ (m)} = 0.385 \text{ m}$$

$$\tan \beta = \frac{y_{BE}}{a} = \frac{0.285 \text{ m}}{0.45 \text{ m}} = 0.6333$$

$$\beta = \tan^{-1} 0.6333 = 32.35^\circ$$

$$\alpha = 90^\circ - 32.35^\circ = 57.65^\circ$$

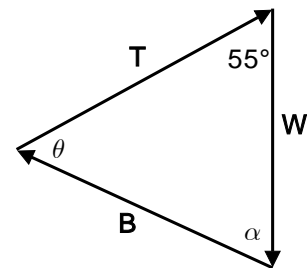
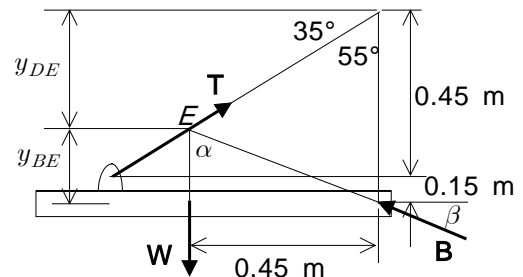
$$\theta = 180^\circ - (55^\circ + 57.65^\circ) = 67.35^\circ$$

$$\text{sine } \frac{T}{\sin \alpha} = \frac{W}{\sin \theta} = \frac{B}{\sin 55^\circ}$$

$$(a) T = \frac{W \sin \alpha}{\sin \theta} = \frac{(882.9 \text{ N}) \sin 57.65^\circ}{\sin 67.35^\circ} = 808 \text{ N}$$

$$(b) B = \frac{W \sin 55^\circ}{\sin \theta} = \frac{(882.9 \text{ N}) \sin 55^\circ}{\sin 67.35^\circ} = 784 \text{ N}$$

$$\mathbf{B} = 784 \text{ N } \underline{32.3^\circ}$$



4.76

$$W = (20 \text{ kg})(9.81 \text{ m/s}^2) = 196.2 \text{ N}$$

$$\cos \theta = \frac{92}{100} \quad \theta = \cos^{-1} 0.92 = 23.1^\circ$$

$$\alpha = 180^\circ - 60^\circ - 23.1^\circ = 96.9^\circ$$

$$\text{sine } \frac{P}{\sin \theta} = \frac{W}{\sin \alpha}$$

$$P = \frac{W \sin \theta}{\sin \alpha} = \frac{(196.2 \text{ N}) \sin 23.1^\circ}{\sin 96.9^\circ} = 77.5 \text{ N}$$

$$\mathbf{P} = 77.5 \text{ N } \underline{30^\circ}$$

