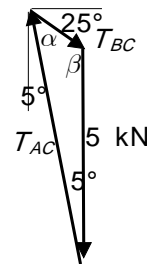
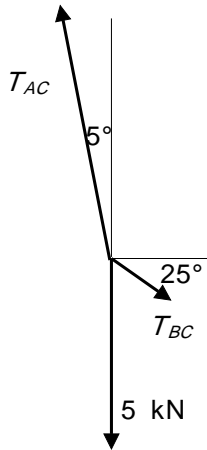


<2.9~2.11 >

2.44



$$\alpha = 90^\circ - (5^\circ + 25^\circ) = 60^\circ$$

$$\beta = 90^\circ + 25^\circ = 115^\circ$$

$$\text{sine } \frac{5 \text{ kN}}{\sin \alpha} = \frac{T_{AC}}{\sin \beta} = \frac{T_{BC}}{\sin 5^\circ}$$

$$(a) T_{AC} = \frac{(5 \text{ kN}) \sin \beta}{\sin \alpha} = \frac{(5 \text{ kN}) \sin 115^\circ}{\sin 60^\circ} = 5.23 \text{ kN}$$

$$(b) T_{BC} = \frac{(5 \text{ kN}) \sin 5^\circ}{\sin \alpha} = \frac{(5 \text{ kN}) \sin 5^\circ}{\sin 60^\circ} = 0.503 \text{ kN}$$

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$$F_x = -T_{AC} \sin 5^\circ + T_{BC} \cos 25^\circ = 0 \quad \dots$$

$$F_y = T_{AC} \cos 5^\circ - T_{BC} \sin 25^\circ - (5 \text{ kN}) = 0 \quad \dots$$

$$(a) \sin 25^\circ x + \cos 25^\circ x$$

$$(-\sin 25^\circ \sin 5^\circ + \cos 25^\circ \cos 5^\circ) T_{AC} = (5 \text{ kN}) \cos 25^\circ \quad T_{AC} = 5.23 \text{ kN}$$

$$(b) \cos 5^\circ x + \sin 5^\circ x$$

$$(\cos 5^\circ \cos 25^\circ - \sin 5^\circ \sin 25^\circ) T_{BC} = (5 \text{ kN}) \sin 5^\circ \quad T_{BC} = 0.503 \text{ kN}$$

2.55

$$\alpha = 40^\circ, \quad \beta = 35^\circ$$

$$F_x = 0;$$

$$T_{ACB} \cos \beta - (T_{ACB} + T_{DE}) \cos \alpha = 0$$

$$T_{ACB} (\cos \beta - \cos \alpha) - T_{DE} \cos \alpha = 0$$

$$T_{ACB} (\cos 35^\circ - \cos 40^\circ) - T_{DE} \cos 40^\circ = 0$$

$$0.0531 T_{ACB} - 0.766 T_{DE} = 0 \quad \dots$$

$$F_y = 0;$$

$$(T_{ACB} + T_{DE}) \sin \alpha - T_{ACB} \sin \beta - (24.8 \text{ kN}) = 0$$

$$T_{ACB} (\sin \alpha - \sin \beta) + T_{DE} \sin \alpha = 24.8 \text{ kN}$$

$$T_{ACB} (\sin 40^\circ - \sin 35^\circ) + T_{DE} \sin 40^\circ = 24.8 \text{ kN}$$

$$0.0692 T_{ACB} + 0.643 T_{DE} = 24.8 \text{ kN} \quad \dots$$

$$(a) 0.643x + 0.766x$$

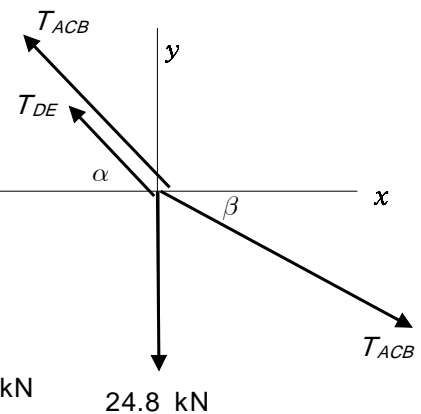
$$0.643 (0.0531 T_{ACB}) + 0.766 (0.0692 T_{ACB}) = 0.766 (24.8 \text{ kN})$$

$$T_{ACB} = 218 \text{ kN}$$

$$(b) 0.0692x - 0.0531x$$

$$0.0692 (-0.766 T_{DE}) - 0.0531 (0.643 T_{DE}) = -0.0531 (24.8 \text{ kN})$$

$$T_{DE} = 15.1 \text{ kN}$$



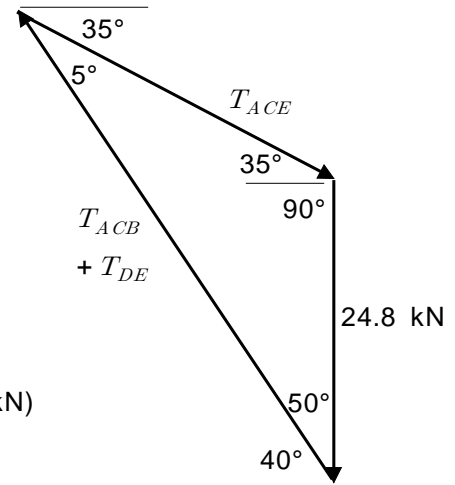
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$$\text{sine } \frac{24.8 \text{ kN}}{\sin 5^\circ} = \frac{T_{ACB} + T_{DE}}{\sin 125^\circ} = \frac{T_{ACB}}{\sin 50^\circ}$$

$$(a) T_{ACB} = \frac{(24.8 \text{ kN}) \sin 50^\circ}{\sin 5^\circ} = 218.0 \text{ kN}$$

$$(b) T_{ACB} + T_{DE} = \frac{(24.8 \text{ kN}) \sin 125^\circ}{\sin 5^\circ} = 233.1 \text{ kN}$$

$$T_{DE} = (233.09 \text{ kN}) - T_{ACB} = (233.1 \text{ kN}) - (218.0 \text{ kN}) \\ = 15.1 \text{ kN}$$



$$2.65 \quad k = 660 \text{ N/m}, \quad L_{AB'} = 0.5 \text{ m}, \quad L_{AB} = 0.3\sqrt{2} \text{ m}$$

$$F_s = k (L_{AB'} - L_{AB}) = (660 \text{ N/m}) (0.5 \text{ m} - 0.3\sqrt{2} \text{ m}) \\ = 49.986 \text{ N}$$

$$F_y = 0; \quad -W + \frac{4}{5}(49.986 \text{ N}) = 0$$

$$W = 40.0 \text{ N}$$

