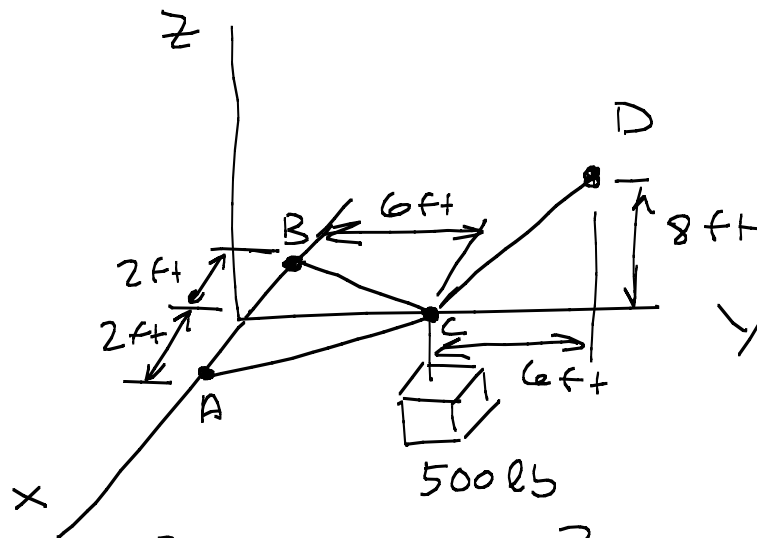


Problem 1

Determine: The force in cables CA, CB, and CD

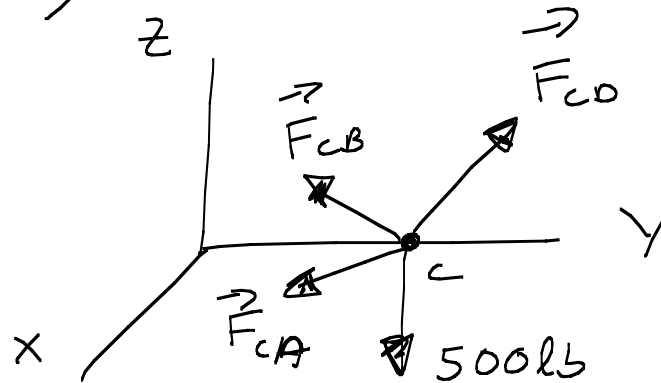


$$A(2, 0, 0) \text{ ft}$$

$$B(-2, 0, 0) \text{ ft}$$

$$C(0, 6, 0) \text{ ft}$$

$$D(0, 12, 8) \text{ ft}$$



$$\vec{r}_{CA} = \{ 2\hat{i} - 6\hat{j} + 0\hat{k} \} \text{ ft} \quad r_{CA} = 6.32 \text{ ft}$$

$$\vec{F}_{CA} = \{ 0.316 F_{CA} \hat{i} - 0.949 F_{CA} \hat{j} + 0\hat{k} \}$$

$$\vec{r}_{CB} = \{-2\hat{i} - 6\hat{j} + 0\hat{k}\}ft \quad r_{CB} = 6.32ft$$

$$\vec{F}_{CB} = \{-0.316F_{CB}\hat{i} - 0.949F_{CB}\hat{j} + 0\hat{k}\}$$

$$\vec{r}_{CD} = \{0\hat{i} + 6\hat{j} + 8\hat{k}\}ft \quad r_{CD} = 10ft$$

$$\vec{F}_{CD} = \{0\hat{i} + 0.6F_{CD}\hat{j} + 0.8F_{CD}\hat{k}\}$$

$$\sum F_x = 0 \Rightarrow 0.316F_{CA} - 0.316F_{CB} = 0 \quad F_{CA} = F_{CB}$$

$$\sum F_y = 0 \Rightarrow -0.949F_{CA} - 0.949F_{CB} + 0.6F_{CD} = 0$$

$$\sum F_z = 0 \Rightarrow 0.8F_{CD} - 500lb = 0$$

$$F_{CD} = 625lb$$
$$F_{CA} = F_{CB} = 198lb$$