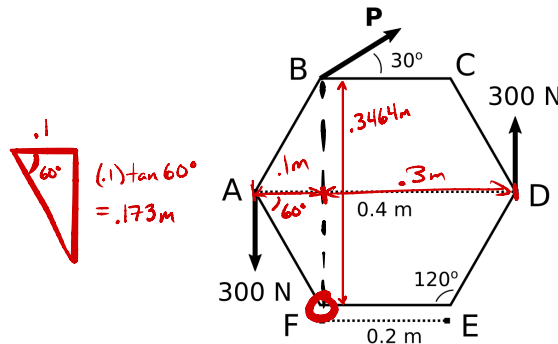


Name: \_\_\_\_\_ Section: \_\_\_\_\_

AEM 2011 Quiz #4  
Tuesday, February 14, 2023

A non-communicating calculator is allowed. Full credit will only be given if all steps used are clearly communicated (free body diagrams, algebra, etc).

A hexagonal plate is acted upon by the forces shown, where  $\bar{P} = 50\text{N}$ . Determine an equivalent force-couple system for the rigid body acting at the corner  $F$ .



$$\hookrightarrow \sum M_F = (300\text{N})(.1\text{m}) + (300\text{N})(.3\text{m}) - P\cos 30^\circ (.3464\text{m})$$

$$= 105\text{N}\cdot\text{m} \quad \hookrightarrow$$

or,

$$M_F = (-.1\hat{i} + .173\hat{j}) \times (-300\hat{j}) = 90\text{N}\cdot\text{m}$$

$$+ (.3\hat{i} + .173\hat{j}) \times (300\hat{j}) = 30\text{N}\cdot\text{m}$$

$$+ (.343\hat{j}) \times (P\cos 30^\circ \hat{i} + P\sin 30^\circ \hat{j}) = -15\text{N}\cdot\text{m}$$

$$= 105\hat{k}\text{N}\cdot\text{m}$$