Problem 4-9

Determine the magnitude and directional sense of the moment of the forces about point $P$.

\[ \mathbf{F_B} := 260 \text{N} \quad e := 2 \text{m} \]
\[ a := 4 \text{m} \quad f := 12 \]
\[ b := 3 \text{m} \quad g := 5 \]
\[ c := 5 \text{m} \quad \theta := 30 \text{deg} \]
\[ d := 2 \text{m} \]
\[ \mathbf{F_A} := 400 \text{N Constant} \]

Problem 4-14

Determine the moment of each force about the bolt located at $A$.

Units Used:

Given:
\[ \mathbf{F_B} := 40 \text{lb} \]
\[ \mathbf{F_C} := 50 \text{lb} \]
\[ a := 2.5 \text{ft} \]
\[ b := 0.75 \text{ft} \]
\[ \alpha := 20 \text{deg} \]
\[ \beta := 25 \text{deg} \]
\[ \gamma := 30 \text{deg} \]
Problem 4-21

The tool at A is used to hold a power lawnmower blade stationary while the nut is being loosened with the wrench. If a force $P$ is applied to the wrench at B in the direction shown, determine the moment it creates about the nut at C. What is the magnitude of force $F$ at A so that it creates the opposite moment about C?

Given:

$P := 50 \text{N}$
$
\theta := 60^\circ$

$a := 400 \text{mm}$
$c := 5$

$b := 300 \text{mm}$
$d := 12$

Problem 4-31

The crane can be adjusted for any angle $0^\circ \leq \theta \leq 90^\circ$ and any extension $0 \leq x \leq 5 \text{m}$. For a suspended mass $m$, determine the moment developed at A as a function of $x$ and $\theta$. What values of both $x$ and $\theta$ develop the maximum possible moment at A? Compute this moment. Neglect the size of the pulley at B.

Unit Used:

$kN := 10^3 \text{N}$

Given:

$m := 120 \text{kg}$

$a := 9 \text{m}$

$b := 1.5 \text{m}$

$g = 9.81 \frac{m}{s^2}$