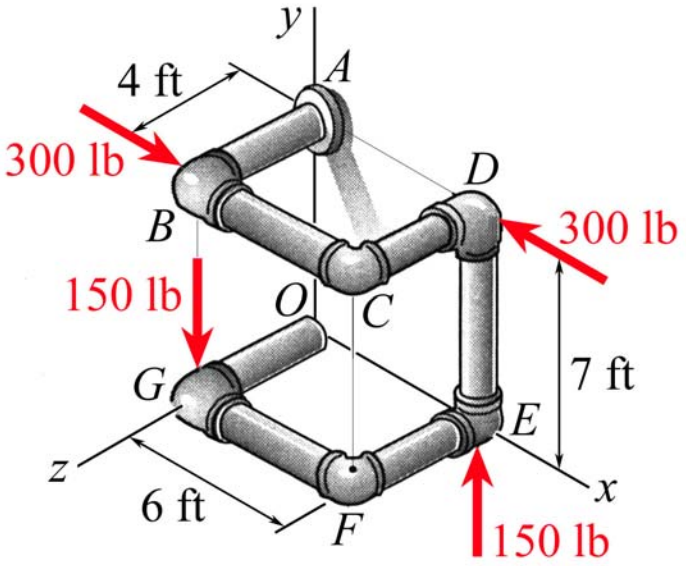
MEEG 2003 Quiz #4.m08

1. (4 points) Describe Varignon's theorem.

2. (6 points) Determine (*a*) the moment $\mathbf{M}_1$ of the couple with forces at *E* and *G*, (*b*) the moment $\mathbf{M}_2$ of the couple with forces at *B* and *D*, (*c*) the resultant moment $\mathbf{M}_A$ of the two couples about the support at point *A*.



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1. Varignon's theorem states that the moment of a force about any point is equal to the sum of the moments of its components about the same point.

④

2. $\mathbf{M}_1 = \overrightarrow{GE} \times \mathbf{F}_E = (6\mathbf{i} - 4\mathbf{k}) \times (150\,\mathbf{j})$

$$\mathbf{M}_1 = 600\mathbf{i} + 900\mathbf{k}\ \text{lb}\cdot\text{ft}$$ ②

$\mathbf{M}_2 = \overrightarrow{DB} \times \mathbf{F}_B = (-6\mathbf{i} + 4\mathbf{k}) \times (300\mathbf{i})$

$$\mathbf{M}_2 = 1200\,\mathbf{j}\ \text{lb}\cdot\text{ft}$$ ②

$\mathbf{M}_A = \mathbf{M}_1 + \mathbf{M}_2$ $\quad \mathbf{M}_A = 600\mathbf{i} + 1200\,\mathbf{j} + 900\mathbf{k}\ \text{lb}\cdot\text{ft}$

②