

Name: _____

Class #: _____

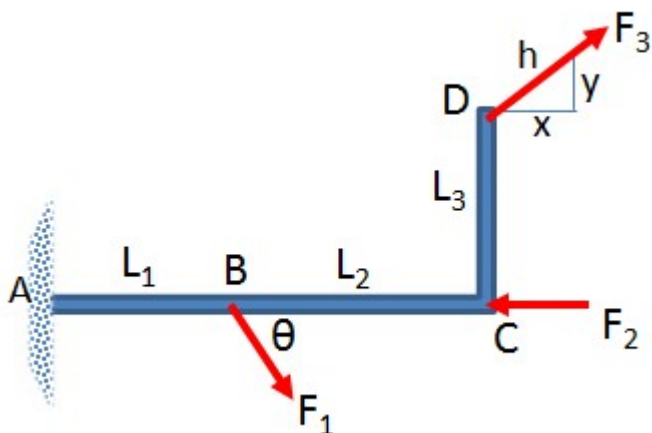
Instructor: Parker Schnepf

Class: _____

Section #: _____

Assignment: 5.1 Homework Exercises

Question 1: (10 points)

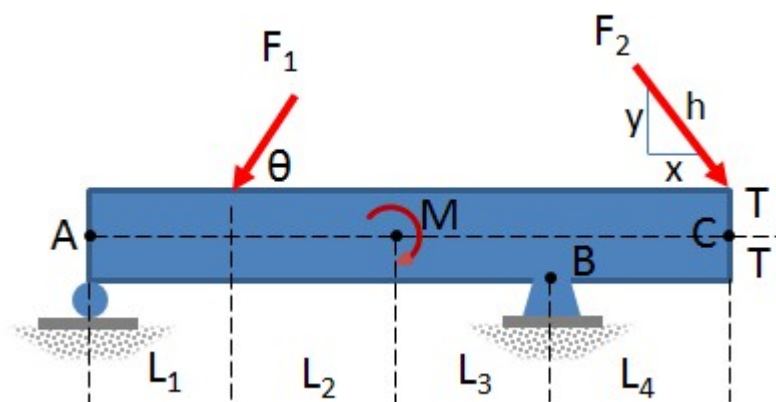


Replace the force system acting on the structure with an equivalent resultant force and couple system at point **A**, given:

$F_1 = 100 \text{ N}$, $F_2 = 75 \text{ N}$, $F_3 = 125 \text{ N}$, $L_1 = 4 \text{ m}$, $L_2 = 6 \text{ m}$, $L_3 = 3 \text{ m}$, $\theta = 50^\circ$, $x, y, h = 12, 5, 13$, respectively

(ans: $F_R = 108 \text{ N}$, $\Phi = -15.2^\circ$, $M_A = -172 \text{ N}\cdot\text{m}$)

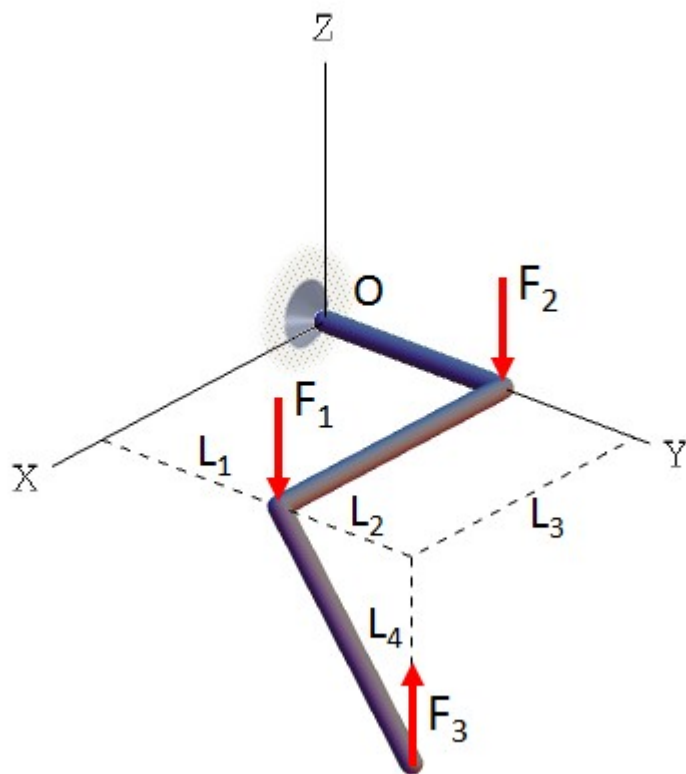
Select problem completion status from drop-down list:

Question 2: (10 points)

Replace the force and couple system acting on the beam with an equivalent resultant force and couple system at point **A**, given:

$M = 75 \text{ lb}\cdot\text{ft}$, $F_1 = 35 \text{ lbs}$, $F_2 = 50 \text{ lbs}$, $L_1 = 1 \text{ ft}$, $L_2 = 2 \text{ ft}$, $L_3 = 3 \text{ ft}$, $L_4 = 4 \text{ ft}$, $T = 0.5 \text{ ft}$, $\theta = 50^\circ$, $x, y, h = 3, 4, 5$, respectively
 (ans: $F_R = 67.2 \text{ lbs}$, $\phi = -83.6^\circ$, $M_A = -506 \text{ lb}\cdot\text{ft}$)

Select problem completion status from drop-down list:

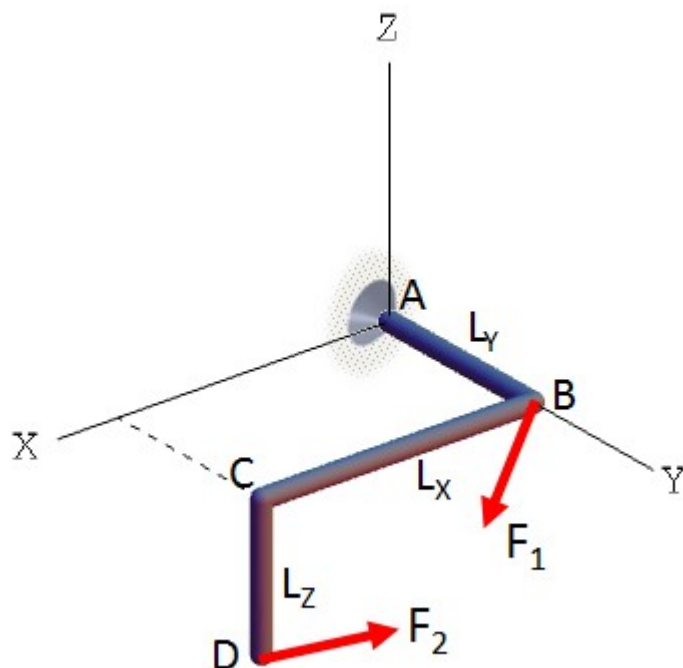
Question 3: (10 points)

Three forces act on the pipe as shown. Replace this force system with an equivalent resultant force and couple system at point **O**. Express your answers as Cartesian vectors. All forces are parallel to the z-axis. Given forces and lengths are:

$$\mathbf{F}_1 = 150 \text{ lbs}, \quad \mathbf{F}_2 = 125 \text{ lbs}, \quad \mathbf{F}_3 = 250 \text{ lbs}, \quad L_1 = 2 \text{ ft}, \quad L_2 = 1 \text{ ft}, \quad L_3 = 3 \text{ ft}, \quad L_4 = 2 \text{ ft}$$

(ans: $\mathbf{\bar{F}}_R = \langle 0, 0, -25 \rangle \text{ lbs}$, $\mathbf{\bar{M}}_O = \langle 200, -300, 0 \rangle \text{ lb}\cdot\text{ft}$)

Select problem completion status from drop-down list:

Question 4: (10 points)

Two forces act on the pipe as shown. Replace this force system with an equivalent resultant force and couple system at point **A**. Express your answers as Cartesian vectors. Given forces and lengths are:

$$\vec{F}_1 = \langle -50, 100, 90 \rangle \text{ N}, \quad \vec{F}_2 = \langle -60, 50, -20 \rangle \text{ N}, \quad L_X = 10 \text{ m}, \quad L_Y = 6 \text{ m}, \quad L_Z = 10 \text{ m}$$

(ans: $\vec{F}_R = \langle -110, 150, 70 \rangle \text{ N}$, $\vec{M}_R = \langle 920, 800, 1,160 \rangle \text{ N}\cdot\text{m}$)

Select problem completion status from drop-down list:
