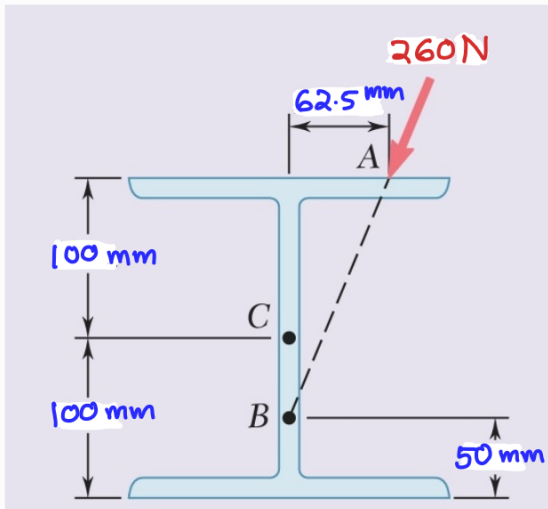


Tutorial 4 (Part A)

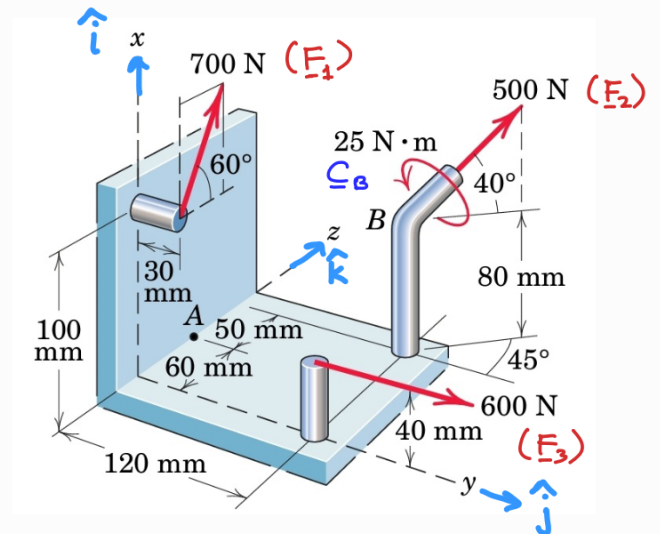
1>



A 260 N force is applied at A to the rolled-steel section.

Replace that force with an equivalent force-couple system at the center C of the section.

2> Find the equivalent force system at point A

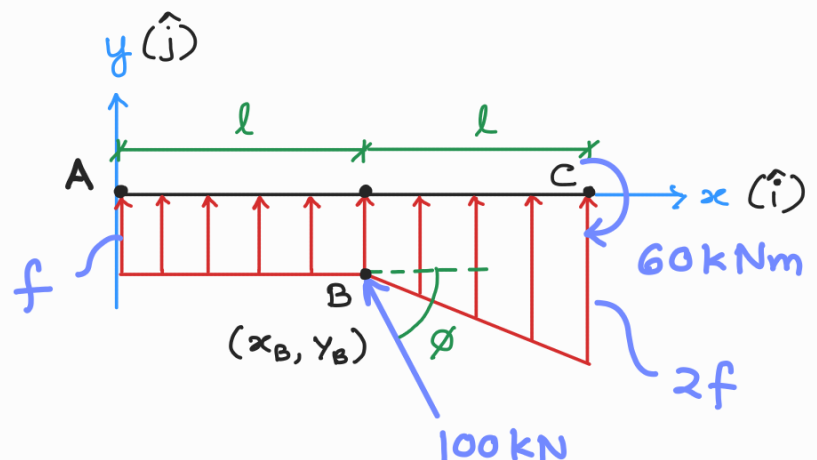


3> Find the equivalent force system at point A and the wrench location.

Given: $l = 6 \text{ m}$, $f = 10 \text{ kN}$

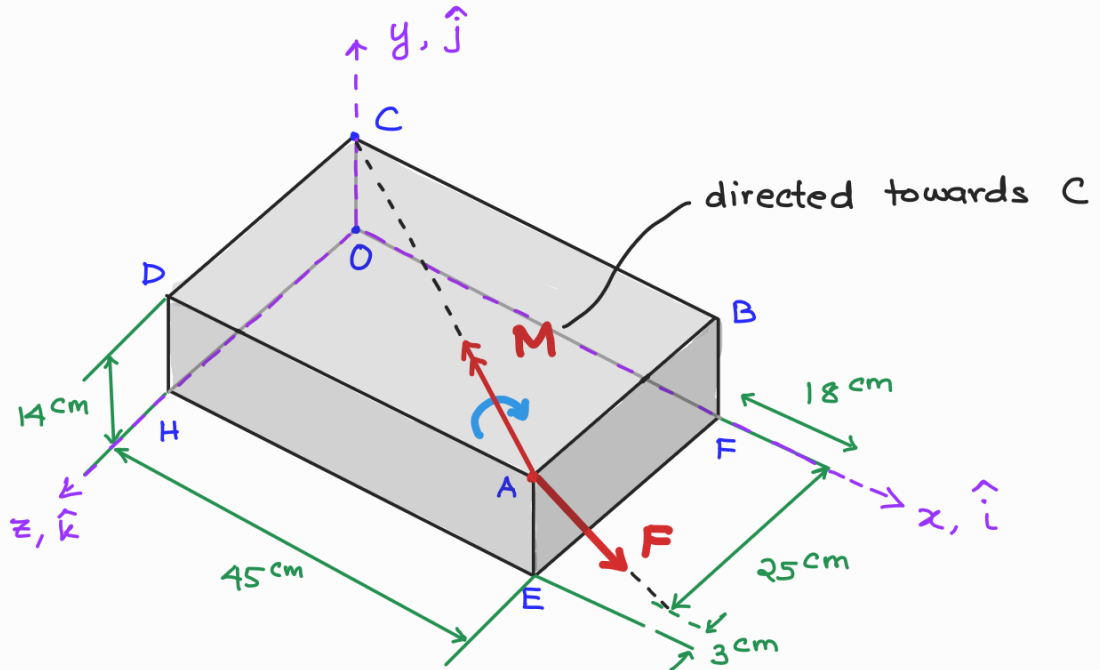
$$\cos \phi = 0.8 \Rightarrow \sin \phi = 0.6$$

$$x_B = 6 \text{ m}, \quad y_B = -5 \text{ m}$$



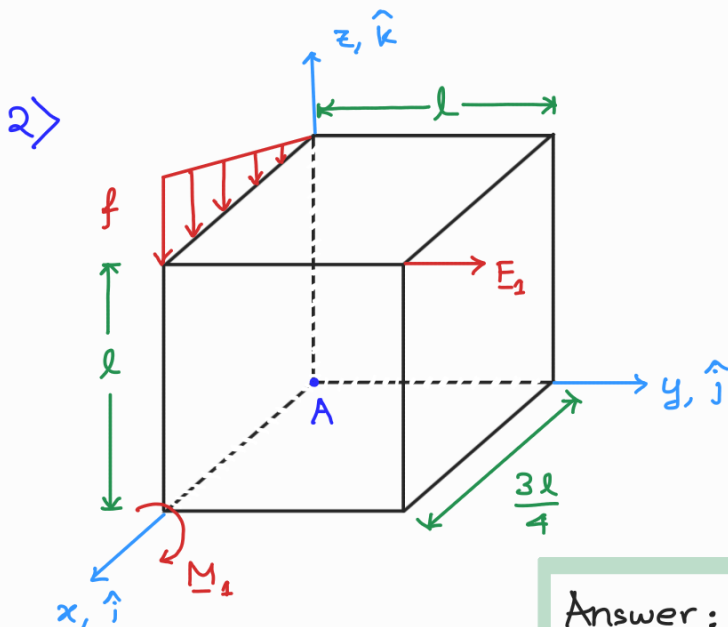
Part B

- 1) A 46 N force F and a 21.2 N-m torque M are applied to corner A of the block shown. Replace the force system with the resultant force system at corner H.



Ans: $(\mathbf{F}_R)_H = 36\hat{i} - 28\hat{j} - 6\hat{k} \text{ (N)}$

$(\mathbf{C}_R)_H = -18.8\hat{i} + 2.7\hat{j} - 28.8\hat{k} \text{ (Nm)}$



Given: $F_1 = 20 \text{ kN}$

$M_1 = 40 \text{ kNm}$

$l = 8 \text{ m},$

$f = 4 \text{ kN/m}$

Find the resultant force system at point A

Answer: $\mathbf{F}_R = 20\hat{j} - 12\hat{k} \text{ (N)}$

$(\mathbf{C}_R)_A = -200\hat{i} + 48\hat{j} + 120\hat{k} \text{ (Nm)}$