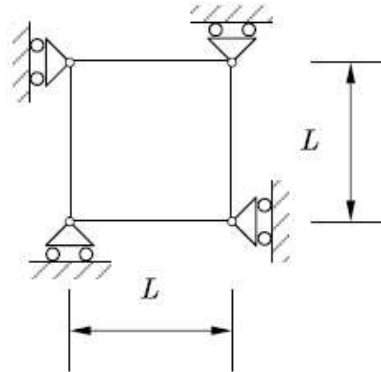


HOMEWORK 1**Problem 1:**

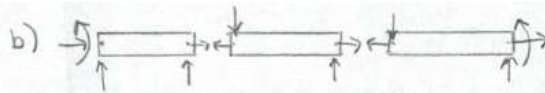
(c)

m (members)=4, r (reactions)=4, j (joints) =4

 $m+r=2j=8 \implies$ statically determinate

Because the reactions are not concurrent at a point, the structure is stable.

a)

 $r = 10$ (10 reactions) $n = 3$ (3 members) $\rightarrow 3n = 3(3) = 9$ $r > 3n$ $r - 3n = 10 - 9 = 1$ Statically indeterminate to 1° (1 pt.)

b)

- c) It is unstable from visual analysis. Reasoning- The lower support does not have the capacity (i.e. reaction as it is a roller support) to withstand horizontal forces.

$$(b) \quad m=15, j=8$$

$$r=4$$

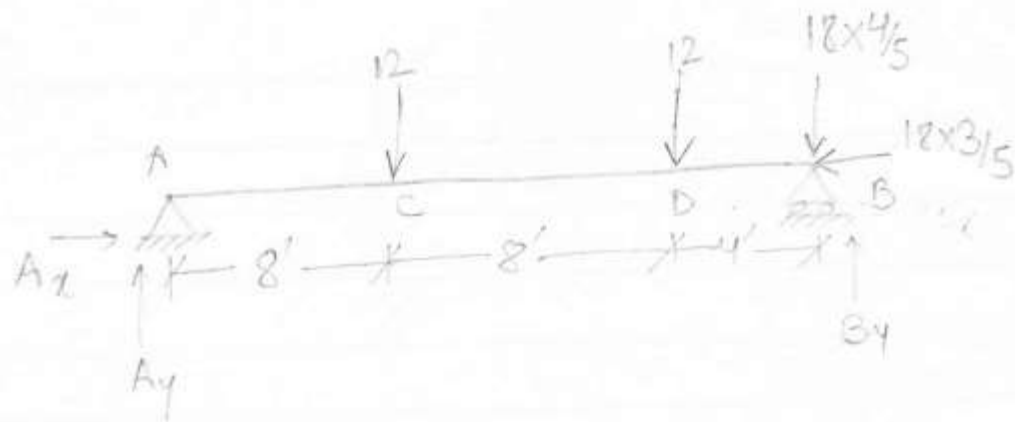
$$\text{Degree of statical indeterminacy} = m - (2j - r)$$

$$= 15 - (2(8) - 4)$$

$$= 15 - 16 + 4 = 3$$

d)

Problem 2:



$$A_x = 10.8 \text{ kips}$$

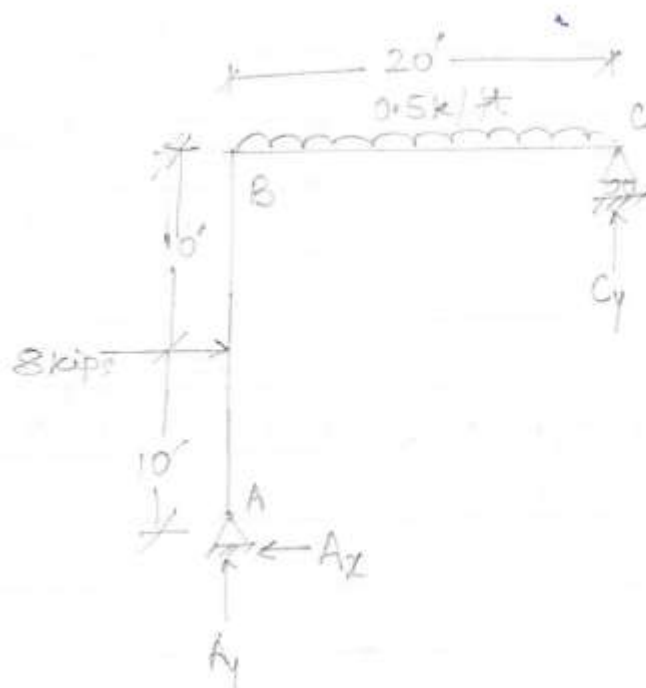
$$12(8) + 12(16) + 18 \times \frac{4}{5} \times 20 - B_y(20) = 0$$

$$20B_y = 576$$

$$B_y = 28.8 \text{ kips}$$

$$A_y = 9.6 \text{ kips}$$

a)



$$\sum M_A = 0$$

$$8(10) + (0.5)(20)(10) - C_y(20) = 0$$

$$C_y = \frac{80 + 100}{20} = 9 \text{ kips}$$

$$\sum F_y = 0$$

$$A_y + C_y - 0.5(20) = 0$$

$$A_y = 10 - 9 = 1 \text{ kip}$$

$$\sum F_x = 0$$

$$A_x - 8 = 0$$

$$A_x = 8 \text{ kips}$$

b)