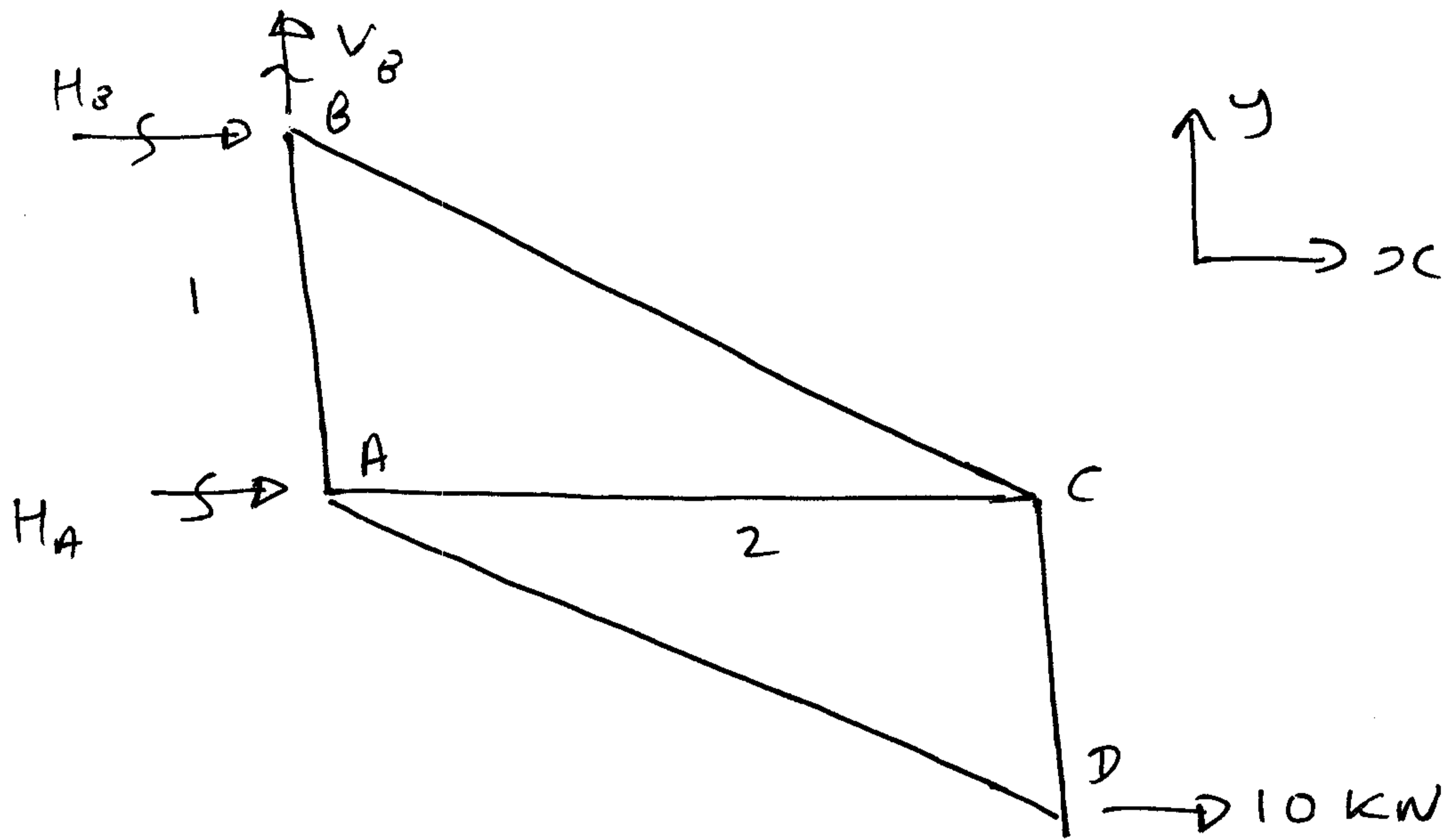


M9



$$\sum \vec{F}_x = 0: 10 + H_B + H_A = 0 \quad (1)$$

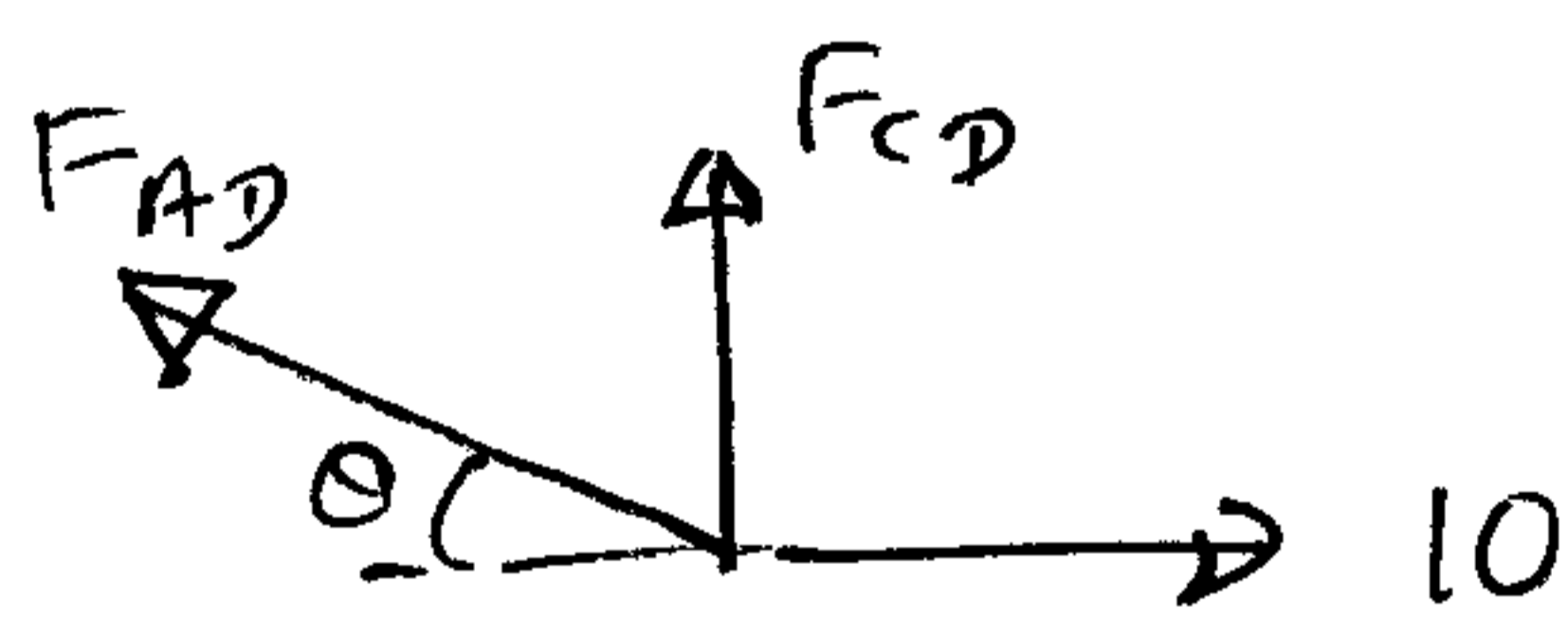
$$\sum F_y \uparrow = 0: V_B + 0 = 0 \Rightarrow V_B = 0 \quad (2)$$

$$\sum (M_B) = 0: H_A \cdot 1 + 10 \cdot 2 = 0 \Rightarrow H_A = -20 \text{ kN} \quad (3) \Leftarrow$$

Substitute in (1) $H_B = +10 \text{ kN} \Leftarrow$

Bar Forces

MOJ @ D



$$\cos \theta = \frac{2}{\sqrt{5}}$$

$$\sin \theta = \frac{1}{\sqrt{5}}$$

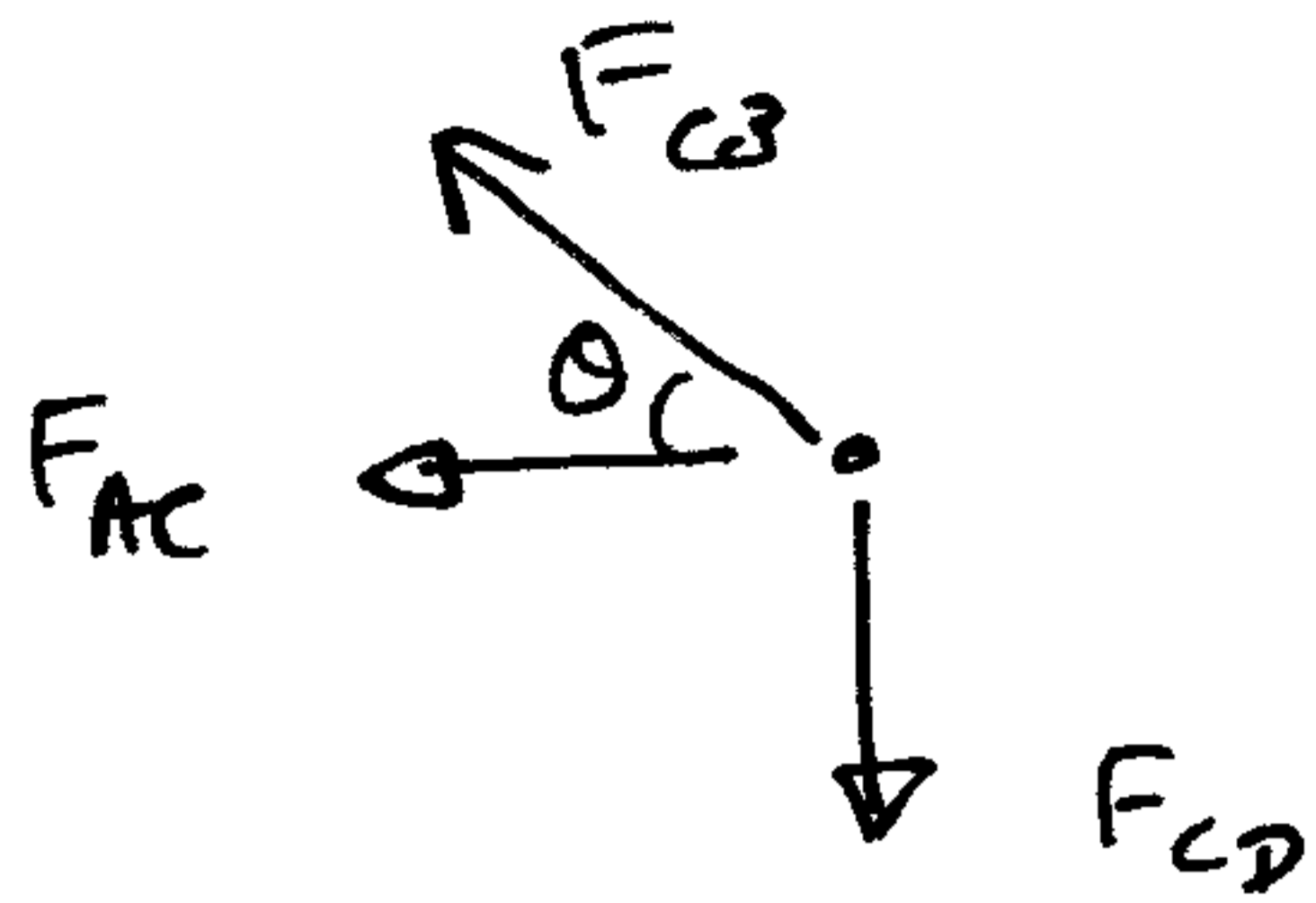
$$\sum \vec{F}_x = 0 \quad -F_{AD} \cos \theta + 10 = 0 \Rightarrow F_{AD} = \frac{10 \cdot \sqrt{5}}{2} = +11.2 \text{ kN}$$

$$\sum F_y \uparrow = 0 \quad F_{AD} \sin \theta + F_{CD} = 0$$

$$F_{CD} = -F_{AD} \sin \theta = -\frac{10 \cdot \sqrt{5}}{2} \cdot \frac{1}{\sqrt{5}} = -5 \text{ kN} \Leftarrow$$

MOS @ C .

Σ



$$\sin \theta = \frac{1}{\sqrt{5}}$$

$$\cos \theta = \frac{2}{\sqrt{5}}$$

$$\Sigma F_y \uparrow = 0$$

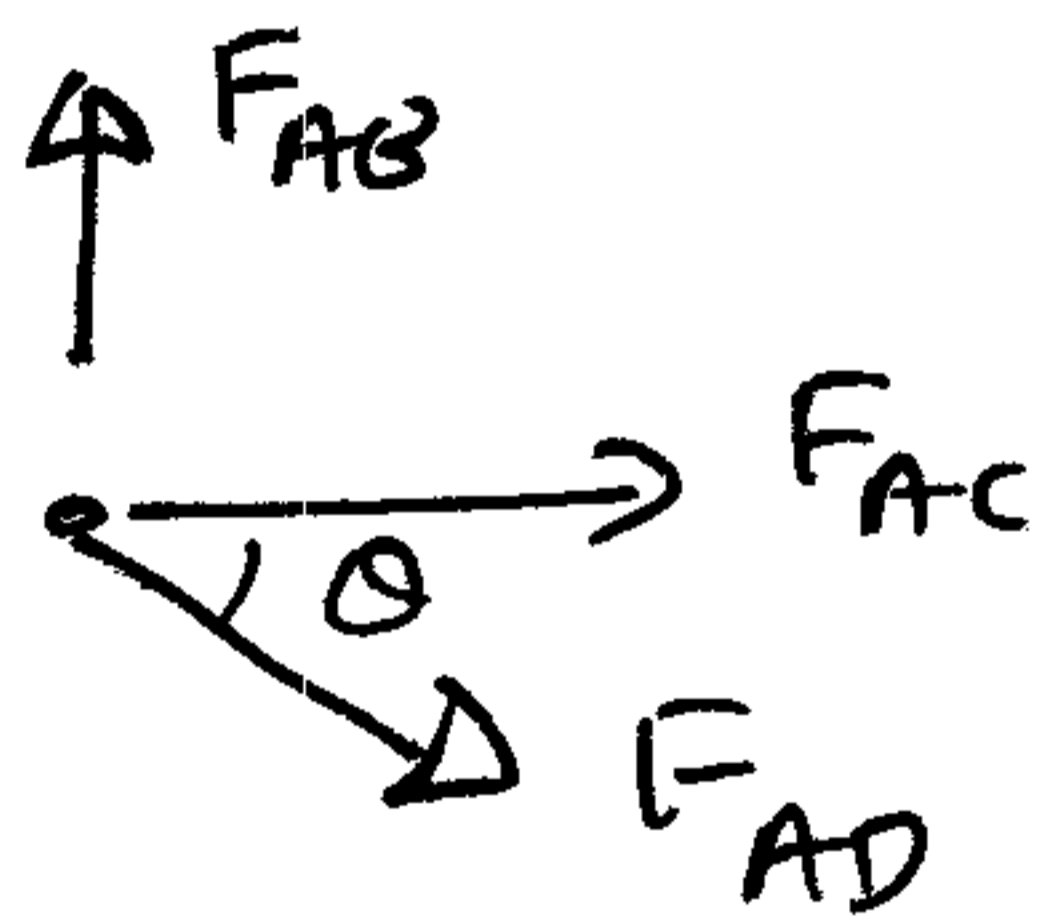
$$F_{CB} \sin \theta - F_{CD} = 0$$

$$F_{CB} = + \frac{F_{CD}}{\sin \theta} = \underline{-5\sqrt{5} \text{ KN} \in}$$

$$\Sigma \vec{F}_x = 0 : -F_{AC} - F_{CD} \cos \theta = 0$$

$$F_{AC} = -F_{CD} \cos \theta = +5\sqrt{5} \cdot \frac{2}{\sqrt{5}} = +10 \text{ KN} \in$$

MOS @ A



$$\cos \theta = \frac{2}{\sqrt{5}}$$

$$\sin \theta = \frac{1}{\sqrt{5}}$$

$$\Sigma F_y \uparrow = 0$$

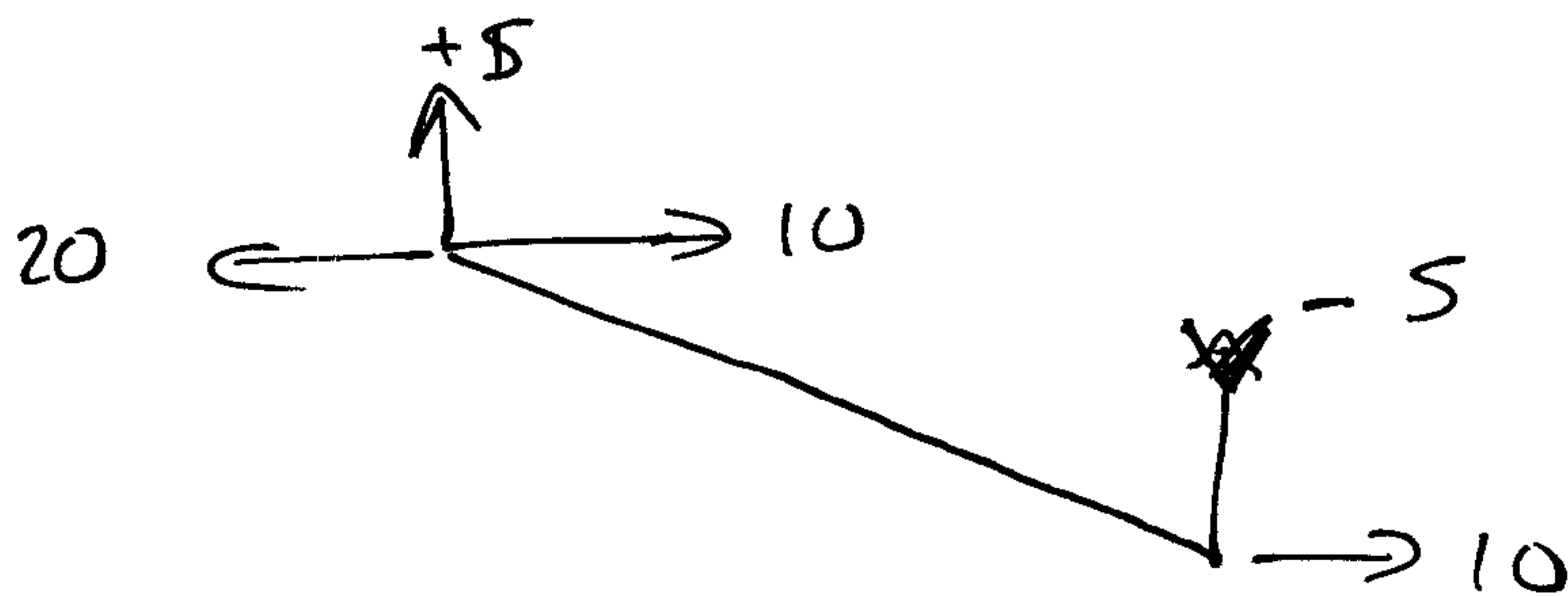
$$F_{AB} - F_{AD} \sin \theta = 0$$

$$\Sigma \vec{F}_x = 0$$

$$F_{AB} = F_{AD} \sin \theta$$

$$= 2 + 5\sqrt{5} \cdot \frac{1}{\sqrt{5}} = +5 \text{ KN} \in$$

check MOS



OK !

Bar	Force (kN)	F/P	Length	Length/l	$\delta / PL/AE$	$\frac{\delta}{AE} \times 10^3$
AB	+5	$+\frac{1}{2}$	1	1	$+\frac{1}{2}$	+5
AC	+10	+1	2	2	+2	+20
BC	$-5\sqrt{5}$	$-\sqrt{5}/2$	$\sqrt{5}$	$\sqrt{5}$	$-\frac{5}{2}$	-25
AD	$+5\sqrt{5}$	$+\sqrt{5}/2$	$\sqrt{5}$	$\sqrt{5}$	$+\frac{5}{2}$	+25
CD	-5	$-\frac{1}{2}$	1	1	$-\frac{1}{2}$	-5

Draw displacement diagram (see attached)

$$\text{Vertical deflection} = \frac{92.5 \times 10^3}{AE} = 2.64 \times 10^{-3} \text{ m} \\ = 2.64 \text{ mm} \Leftarrow$$

$$\text{Horizontal deflection} = \frac{75 \times 10^3}{AE} = 2.14 \times 10^{-3} \text{ m} \\ = 2.14 \text{ mm} \Leftarrow$$

