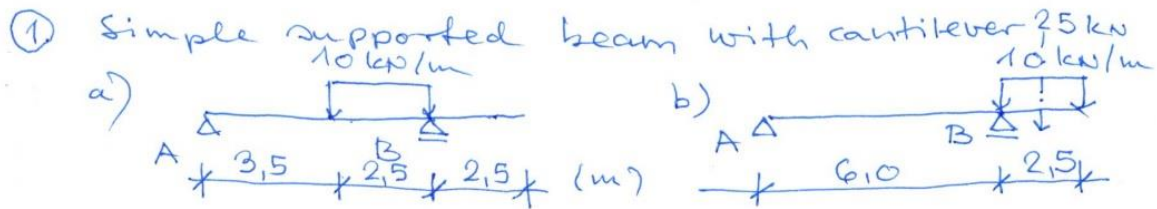


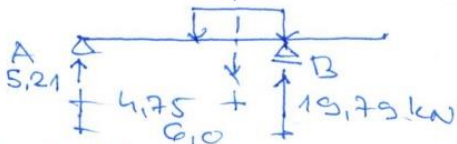
Practice problem

05.05.2020



Determine the support reaction forces of the given structures!

Solution: $2.5 \times 10 = 25 \text{ kN}$



$$\Sigma M_A = 0:$$

$$25 \times 4.75 - B \cdot 6.0 = 0$$

$$\Sigma V = 0: \quad (or \quad \Sigma Y = 0)$$

$$A = 25 - B = 25 - 19.79 = 5.21 \text{ kN} \uparrow$$

$$\Sigma M_A = 0:$$

$$25 \cdot 7.25 - B \cdot 6.0 = 0$$

$$B = \frac{7.25 \cdot 25}{6.0} = 30.21 \text{ kN} \uparrow$$

$$\Sigma V = 0:$$

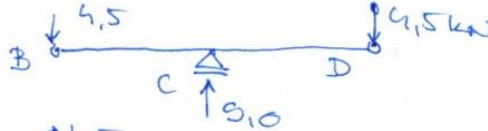
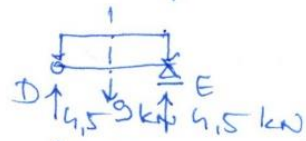
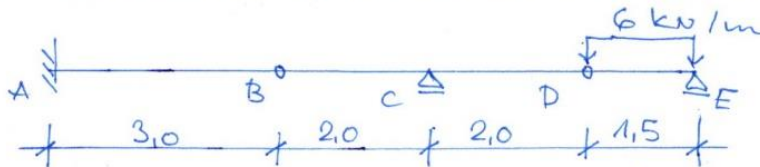
$$A = 30.21 - 25 = 5.21 \text{ kN} \downarrow$$

(Y) ↑

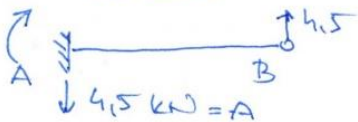
$$H(x) \quad B = 19.79 \text{ kN} \uparrow$$

② Continuous Gerber beam

Determine the support reaction forces or moments of the given complex structure! Determine the forces transmitted in the internal hinges too.

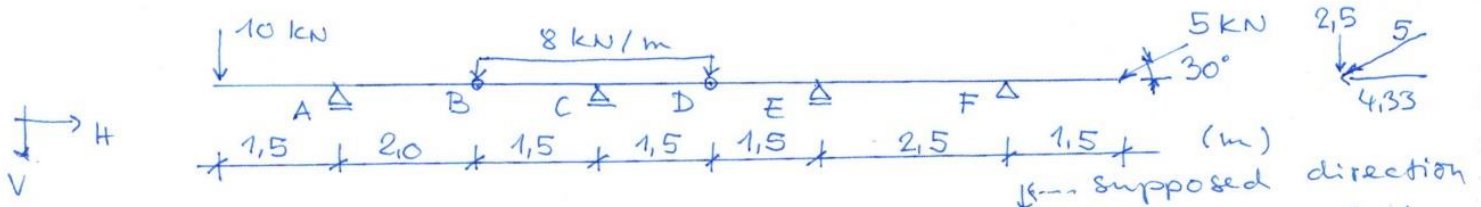


$$M_A = 13.5 \text{ kNm}$$



③ Continuous Gerber beam

Determine the support reaction forces or moments of the given complex structure!
Determine the forces transmitted in the internal hinges too!

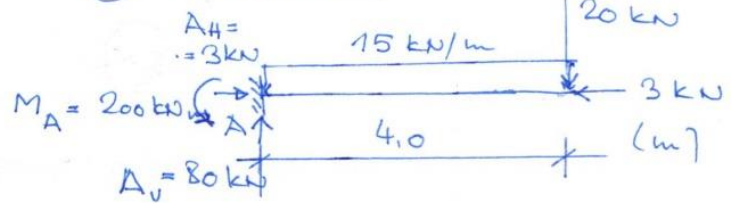


① 2 unknowns
 $\Sigma M_A = 0: -10 \cdot 1,5 + B \cdot 2,0 = 0 \quad B = 7,5 \text{ kN} \downarrow$
 supposed direction

② 3 unknowns
 $\Sigma M_C = 0: 7,5 \cdot 1,5 - D \cdot 1,5 = 0 \quad D = 7,5 \text{ kN} \uparrow$
 $\Sigma V = 0: C = 9 \text{ kN} \uparrow$

③ 3+1 unknowns
 $\Sigma H = 0: F_H = 4,33 \text{ kN} \rightarrow \quad (1,5) = 0$
 $\Sigma M_E = 0: -7,5 \cdot 1,5 + F_V \cdot 2,5 + 2,5 \cdot (2,5 + 0,5) = 0$
 $F_V = \frac{11,25 - 10}{2,5} = 0,5 \text{ kN} \downarrow$
 $\Sigma V = 0: 7,5 - E_V + 0,5 + 2,5 = 0$
 $E_V = 10,5 \text{ kN} \uparrow$

④ Cantilever



$\Sigma M_A = 0: M_A = 15 \cdot 4,0 \cdot \frac{4,0}{2} + 20 \cdot 4,0 = 200 \text{ kNm}$
 counter clockwise clockwise moment
 $\Sigma V = 0: A_V = 15 \cdot 4,0 + 20 = 80 \text{ kN} \uparrow$
 $\Sigma H = 0: A_H = 3 \text{ kN} \rightarrow$