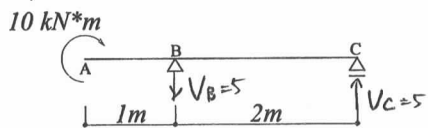


# 第3回

下記のM図、Q図をかけ。



$$M_C = 10 \text{ kN}\cdot\text{m} - V_B \times 2 \text{ m} = 0$$

$$\therefore V_B = 5 \text{ kN}$$

$$\sum Y = -V_B + V_C = 0$$

$$\therefore V_C = 5 \text{ kN}$$

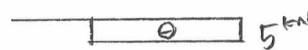
$$A \sim B : 10 \text{ kN}\cdot\text{m} \left(-\frac{x}{1}\right), \quad Q_x = 0$$

$$B \sim C : M_x = 10 - 5(x-1) = 15 - 5x$$

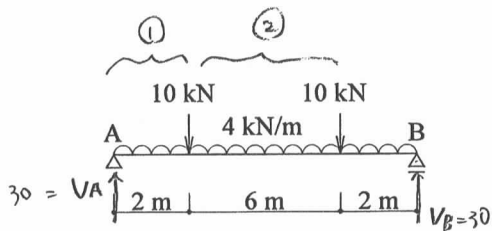
$$Q_x = -5$$



M图



Q图



対称性より

$$V_A = V_B = \frac{(10+10+4 \times 6)}{2} = 30 \text{ kN}$$

$$\textcircled{1} : M_x = 30x - 4x \cdot \frac{x}{2}$$

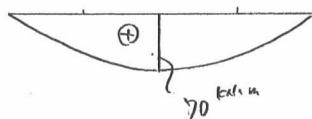
$$= 30x - 2x^2$$

$$Q_x = 30 - 4x$$

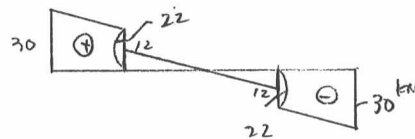
$$\textcircled{2} : M_x = 30x - 10(x-2) - 4x \cdot \frac{x}{2}$$

$$= 20 + 20x - 2x^2, \quad x=5 \text{ m} \quad M_{\max} = 70 \text{ kN}\cdot\text{m}$$

$$Q_x = 20 - 4x$$



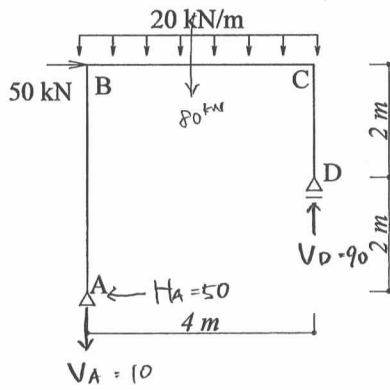
M图



Q图

# 第3回

下記のMQN図をかけ。



反力を求めよ。

$$\sum X = 50 - H_A = 0 \therefore H_A = 50 \text{ kN}$$

$$M_A = 50 \times 4 + 80 \times 2 - V_D \times 4 = 0$$

$$\therefore V_D = 90 \text{ kN}$$

$$\sum Y = 90 - 80 - V_A = 0 \therefore V_A = 10 \text{ kN}$$

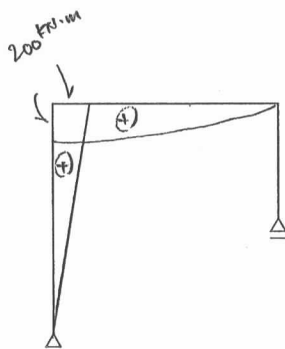
$$A \sim B : M_x = 50x, \quad Q_x = 50$$

$$B \sim C : M_x = 50 \cdot 4 - 10x - 20x \cdot \frac{x}{2}$$

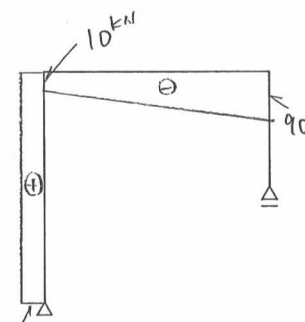
$$= 200 - 10x - 10x^2$$

$$Q_x = -10 - 20x$$

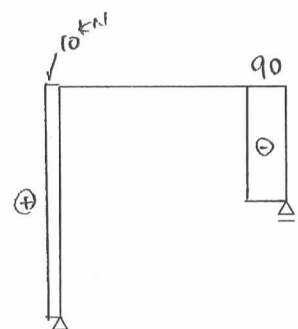
$$D \sim C : \text{材に垂直な力が無いので } M, Q = 0$$



M图

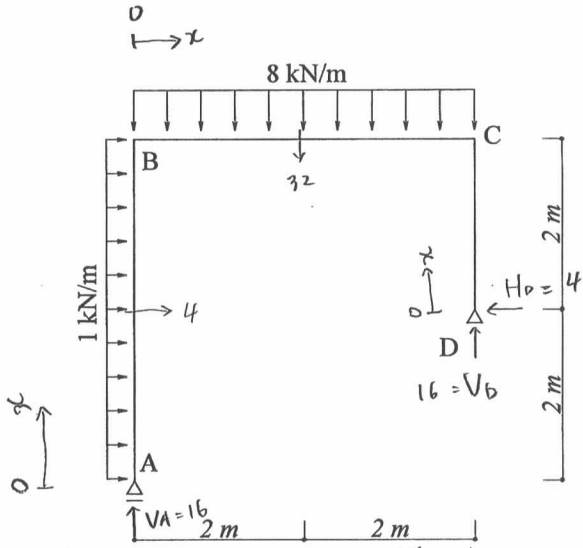


Q图



N图

下記のMQN図をかけ。



$$\sum X = 4 - H_D = 0 \quad \therefore H_D = 4 \text{ kN}$$

$$M_A = 4 \times 2 + 32 \times 2 - V_D \times 4 - 4 \times 2 = 0$$

$$\therefore V_D = 16$$

$$\sum Y = 16 - 32 + V_A = 0 \quad \therefore V_A = 16$$

$$A \sim B: M_x = -1 \cdot x \cdot \frac{x}{2} = -\frac{x^2}{2}$$

$$Q_x = -x$$

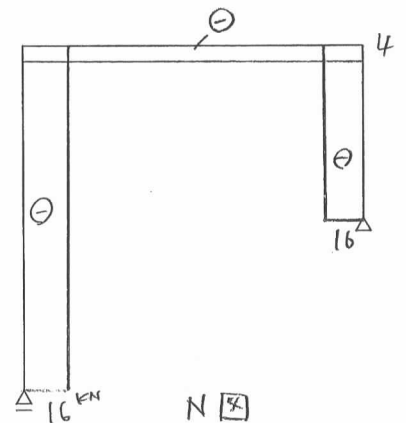
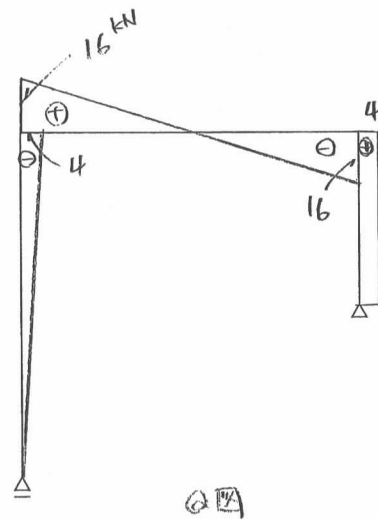
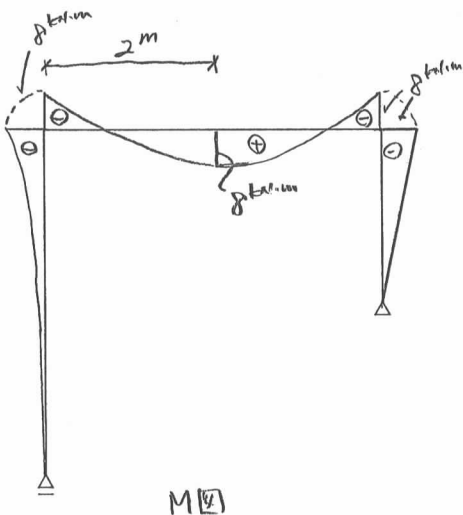
$$B \sim C: M_x = -4 \times 2 + 16 \cdot x - 8x \cdot \frac{x}{2}$$

$$= -8 + 16x - 4x^2$$

$$Q_x = 16 - 8x$$

$$D \sim C: M_x = -4x$$

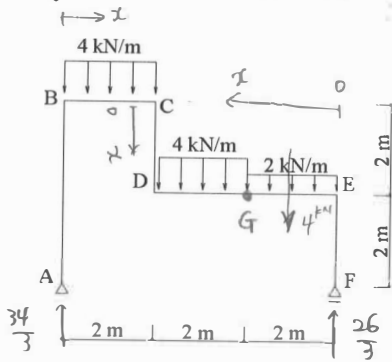
$$Q_x = -(-4x) = 4$$



第3回 学籍番号:

氏名

下記のMQN図をかけ。



$$Q_{GD} = 0 \text{ かつ } x = \frac{19}{6} \text{ のとき}$$

$$M_{max} = \frac{289}{18}$$

反力を求める。

$$M_A = 8 \cdot 1 + 8 \cdot 3 + 4 \cdot 5 - V_F \cdot 6 = 0 \quad \therefore V_F = \frac{26}{3}$$

$$\sum Y = V_A - 8 - 8 - 4 - \frac{26}{3} = 0 \quad \therefore V_A = \frac{34}{3}$$

$M_{AB}$  は 材に 直交方向の力が 0 であるから  $M, Q$  とは  $0$

$$M_{BC} = \frac{34}{3}x - 4x \cdot \frac{x}{2} = -2x^2 + \frac{34}{3}x$$

$$Q_{BC} = -4x + \frac{34}{3}$$

$$M_{CD} = \frac{34}{3} \cdot 2 - 4 \cdot 2 \cdot 1 = \frac{44}{3}, \quad Q_{CD} = 0$$

$M_{FE}$  は  $M, Q$  とは  $0$

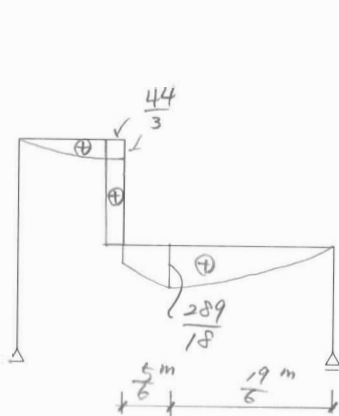
$$M_{EG} = \frac{26}{3}x - 2x \cdot \frac{x}{2} = \frac{26}{3}x - x^2$$

$$Q_{EG} = -(M') = -\frac{26}{3} + 2x$$

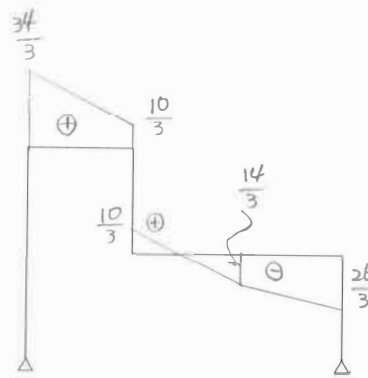
$$M_{GD} = \frac{26}{3}x - 4 \cdot (x-1) - 4(x-2) \cdot \frac{x-2}{2}$$

$$= -2x^2 + \frac{38}{3}x - 4$$

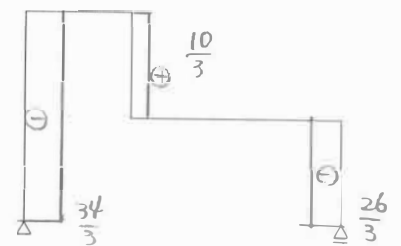
$$Q_{GD} = -(M') = 4x - \frac{38}{3}$$



M (kN.m)



Q (kN)



N (kN)