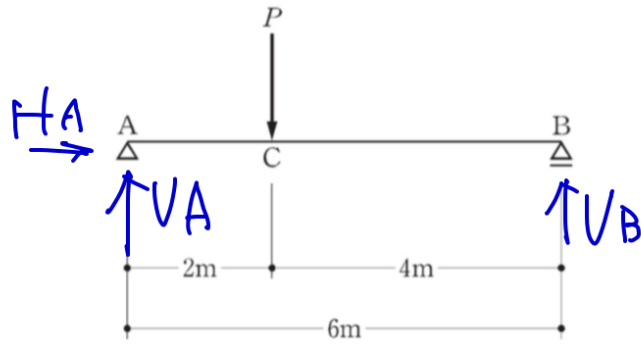


問題演習

A-C間、B-C間のせん断力、C点の曲げモーメントを求める



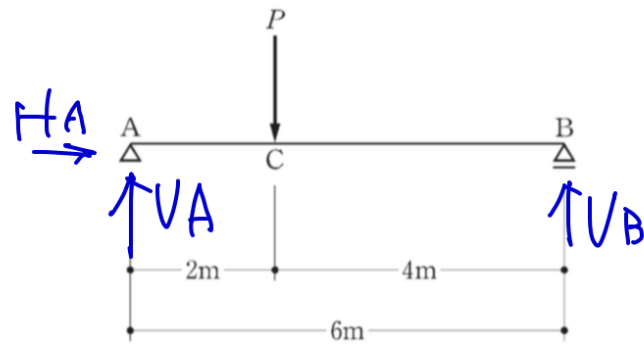
1. 反力を求める

・ 反力の向きを正に仮定



問題演習

A-C間、B-C間のせん断力、C点の曲げモーメントを求める

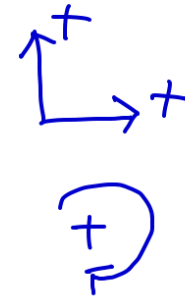


1. 反力を求める

- ・ 反力の向きを±に仮定
- ・ つり合い式で求める

$$\begin{aligned} \sum Y=0 \text{ より} \\ \uparrow V_A + \uparrow V_B - \downarrow P = 0 \\ V_A + V_B = P \end{aligned}$$

$$\begin{aligned} \sum M_A=0 \text{ より} \\ \curvearrowleft -V_B \times 6 + \curvearrowright P \times 2 = 0 \\ -6V_B = -2P \\ V_B = \frac{1}{3}P \end{aligned}$$

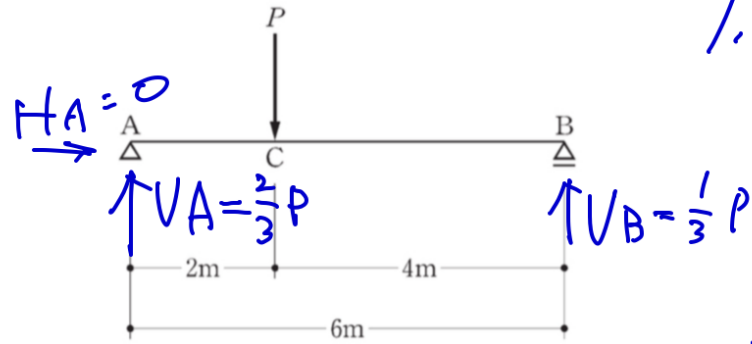


$$V_A + \frac{1}{3}P = P$$

$$V_A = P - \frac{1}{3}P = \underline{\underline{\frac{2}{3}P}}$$

問題演習

A-C間、B-C間のせん断力、C点の曲げモーメントを求める



1. 反力を求める

・ 反力の向きを+に仮定  
つり合い式で求める

2. 応力を求めたい位置で切断  
応力を+に仮定

$\frac{2}{3}P \uparrow$   
 $\downarrow Q_{AC}$

$\Sigma Y = 0 \text{ より}$   
 $-Q_{AC} + \frac{2}{3}P = 0$   
 $Q_{AC} = \frac{2}{3}P$

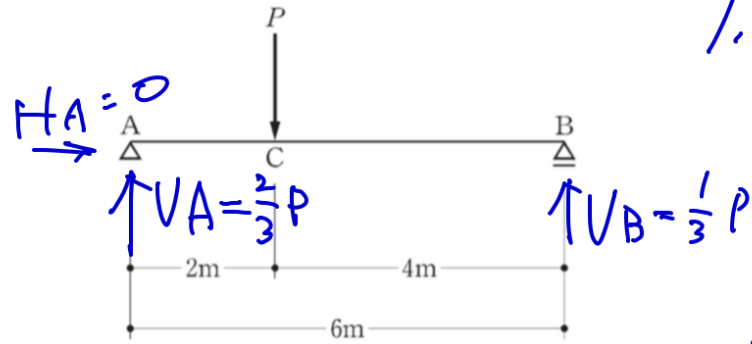
$Q_{BC} \uparrow$   
 $\uparrow \frac{1}{3}P$

$\Sigma Y = 0 \text{ より}$   
 $Q_{BC} + \frac{1}{3}P = 0$   
 $Q_{BC} = -\frac{1}{3}P$



問題演習

A-C間、B-C間のせん断力、C点の曲げモーメントを求める

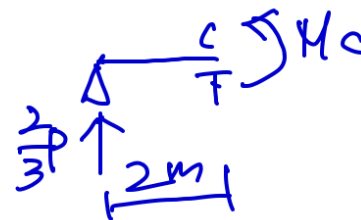
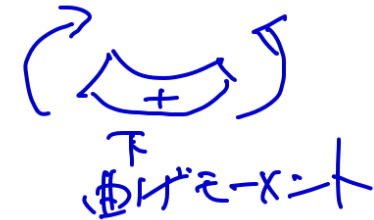
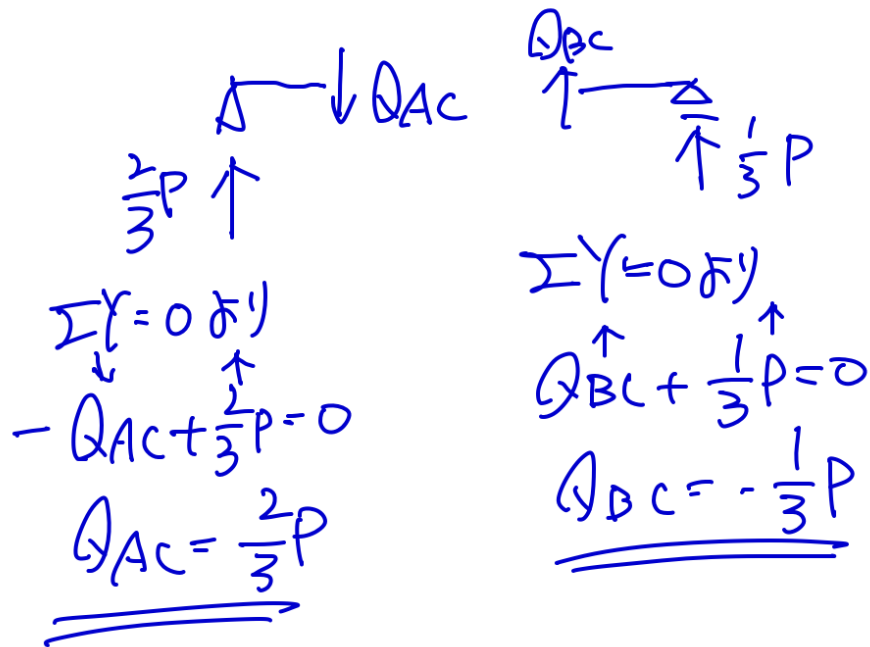


1. 反力を求める

・ 反力の向きを+に仮定  
つり合い式で求める

2. 応力を求めたい位置で切断

応力を+に仮定



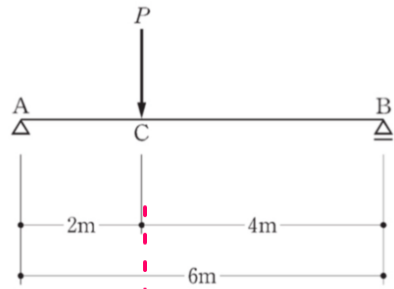
Equilibrium equation for the AC section:

$$\Sigma M_c = 0 \text{ より } M_c + \frac{2}{3}P \times 2 = 0$$

$$M_c = -\frac{4}{3}P \text{ (下向き)}$$

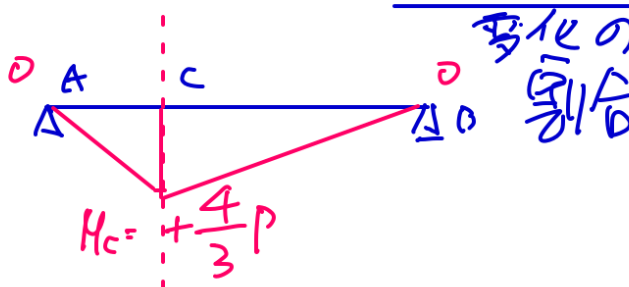
問題演習

A-C間、B-C間のせん断力、C点の曲げモーメントを求める

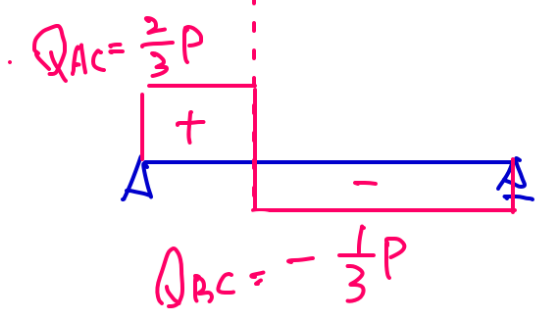


	A-C間	C-B間
変化量	$+\frac{4}{3}P - 0 = \frac{4}{3}P$	$0 - \frac{4}{3}P = -\frac{4}{3}P$
区間	2m	4m
変化の割合	$\frac{\frac{4}{3}P}{2} = \frac{2}{3}P$ $\Delta AC$	$\frac{-\frac{4}{3}P}{4} = -\frac{1}{3}P$ $\Delta BC$

M(V)

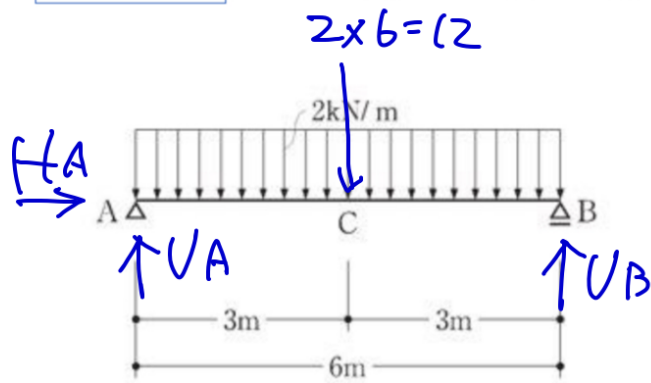


Q(V)



問題演習

A-C間、B-C間の中央のせん断力、C点の曲げモーメントを求める



1. 反力を+/-=仮定

2. 釣り合方程式

$$\sum Y = 0 \text{ (↑)}$$

$$V_A + V_B - 12 = 0$$

$$V_A + V_B = 12$$

$$V_A + 6 = 12$$

$$V_A = 6 \text{ kN}$$

$$\sum M_A = 0 \text{ (↑)}$$

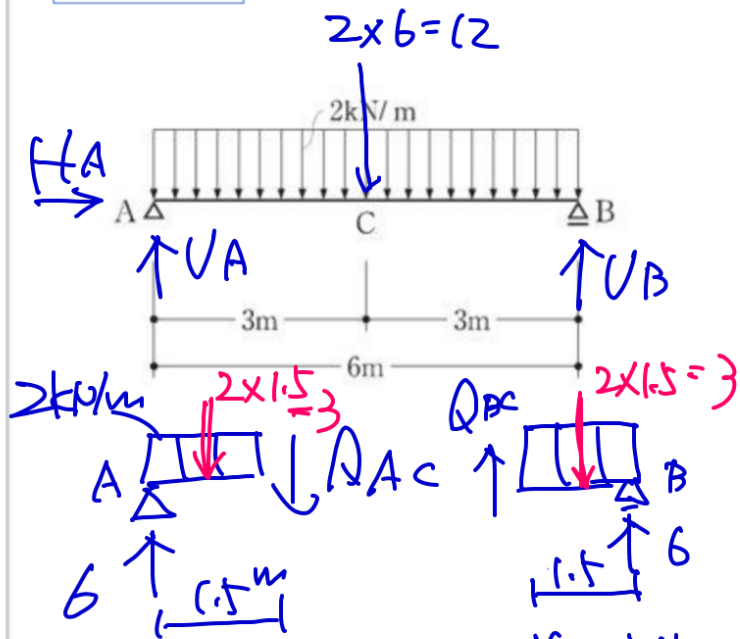
$$-V_B \times 6 + 12 \times 3 = 0$$

$$-6V_B = -36$$

$$V_B = 6 \text{ kN}$$

問題演習

A-C間、B-C間の中央のせん断力、C点の曲げモーメントを求める



$\sum Y = 0$  より  
 $-Q_{AC} + 6 - 3 = 0$   
 $Q_{AC} = 3 \text{ kN}$

$\sum Y = 0$  より  
 $+Q_{BC} + 6 - 3 = 0$   
 $Q_{BC} = -3 \text{ kN}$

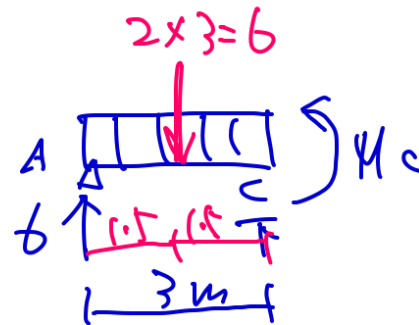
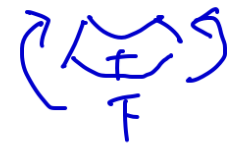
1. 応力を求めたい位置で切断

2. 応力を + に仮定

せん断力



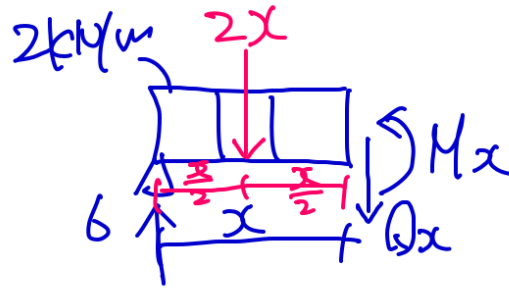
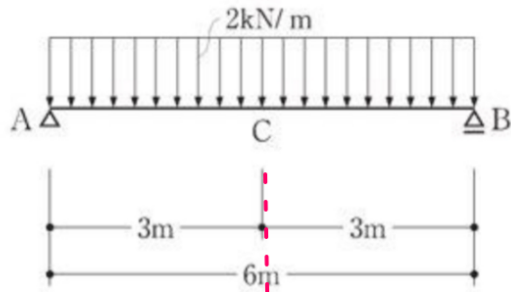
曲げモーメント



$\sum M_C = 0$  より  
 $-M_C + 6 \times 3 - 6 \times 1.5 = 0$   
 $M_C = 18 - 9 = 9 \text{ kN}\cdot\text{m}$  (下向き)

問題演習

A-C間、B-C間の中央のせん断力、C点の曲げモーメントを求める



$$\sum M_x = 0 \text{ (clockwise)}$$

$$-M_x + 6x - 2x \times \frac{x}{2} = 0$$

$$M_x = 6x - x^2$$

$$\begin{cases} M(1) = 6 - 1 = 5 \\ M(2) = 12 - 4 = 8 \\ M(3) = 18 - 9 = 9 \end{cases}$$

$$\sum Y = 0 \text{ (up)}$$

$$-Q_x + 6 - 2x = 0$$

$$Q_x = 6 - 2x$$

$$Q(1) = 6 - 2 = 4$$

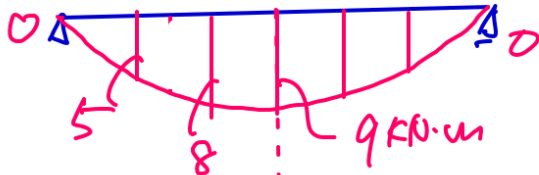
$$Q(1.5) = 6 - 3 = 3$$

$$Q(2) = 6 - 4 = 2$$

$$Q(3) = 6 - 6 = 0$$

$$Q(6) = 6 - 0 = 6$$

M (kNm)



Q (kN)

