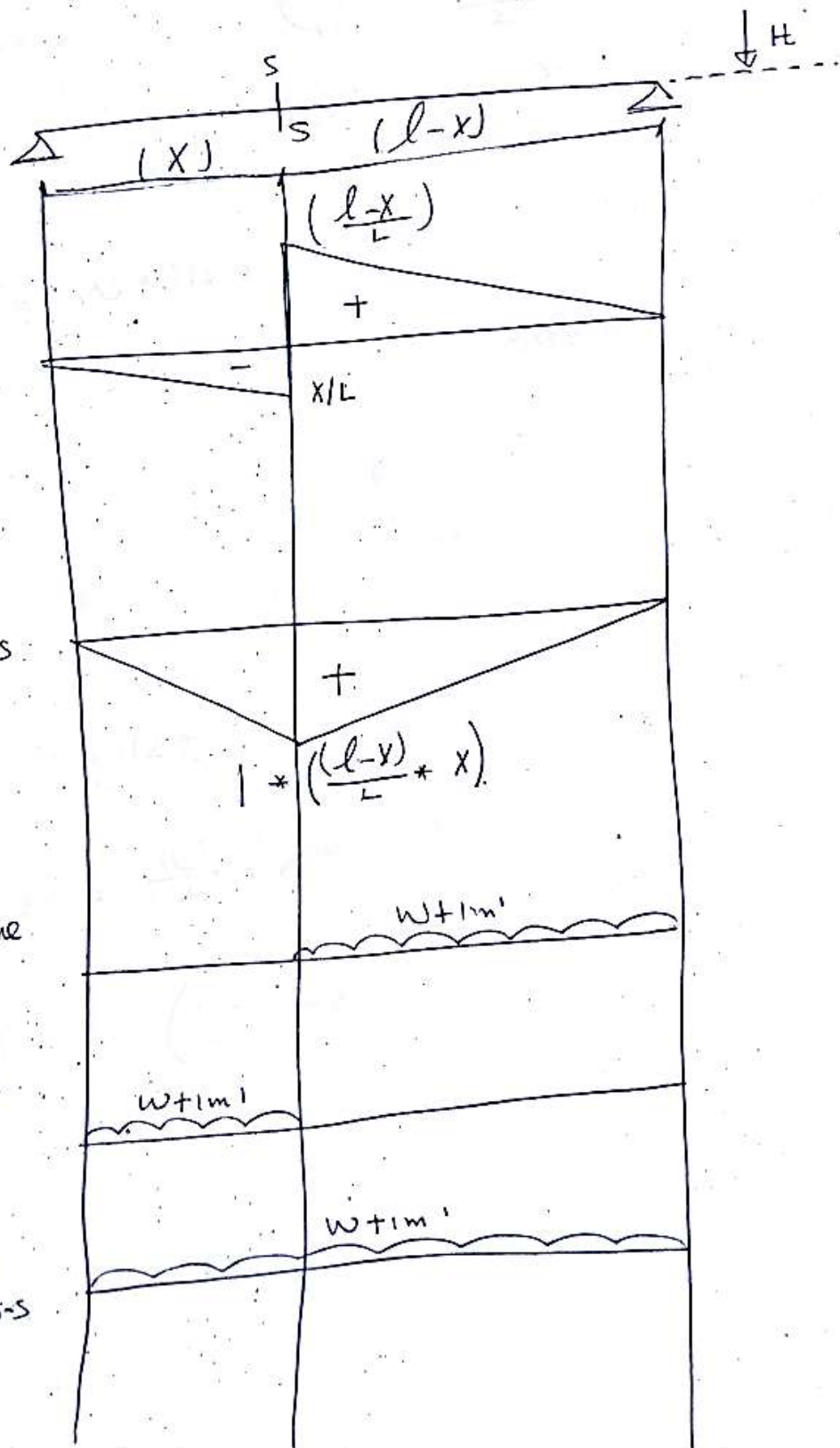


# \* Moving loads on statically determinate \* beams

→ Max & Min Curves due to uniform moving loads  
longer than the span.

1)



For max  $Q_{s-s}^{+ve}$

For max  $Q_{s-s}^{-ve}$

For max  $M_{s-s}$

at sec's :

$$\begin{aligned} Q^{+ve} &= w \times \left[ \frac{1}{2}(L-x) \left( \frac{l-x}{L} \right) \right] \\ &= \frac{w}{2L} (L-x)^2 \quad (\text{2nd. Degree}) \end{aligned}$$

at  $x=0.0$

$$Q^{+ve} = \frac{wL}{2}$$

$x=L$

$$Q^{+ve} = 0.0.$$

$$\begin{aligned} Q^{-ve} &= -w \times \frac{1}{2} \times x \times \frac{x}{L} \\ &= -\frac{wx^2}{2L} \quad (\text{2nd. Degree}). \end{aligned}$$

at  $x=0.0$

$$Q^{-ve} = 0.0.$$

$x=l$

$$Q^{-ve} = -\frac{wL}{2}.$$

$$M = w \times \left[ \frac{1}{2} \times l \times \frac{l-x}{L} \cdot x \right]$$

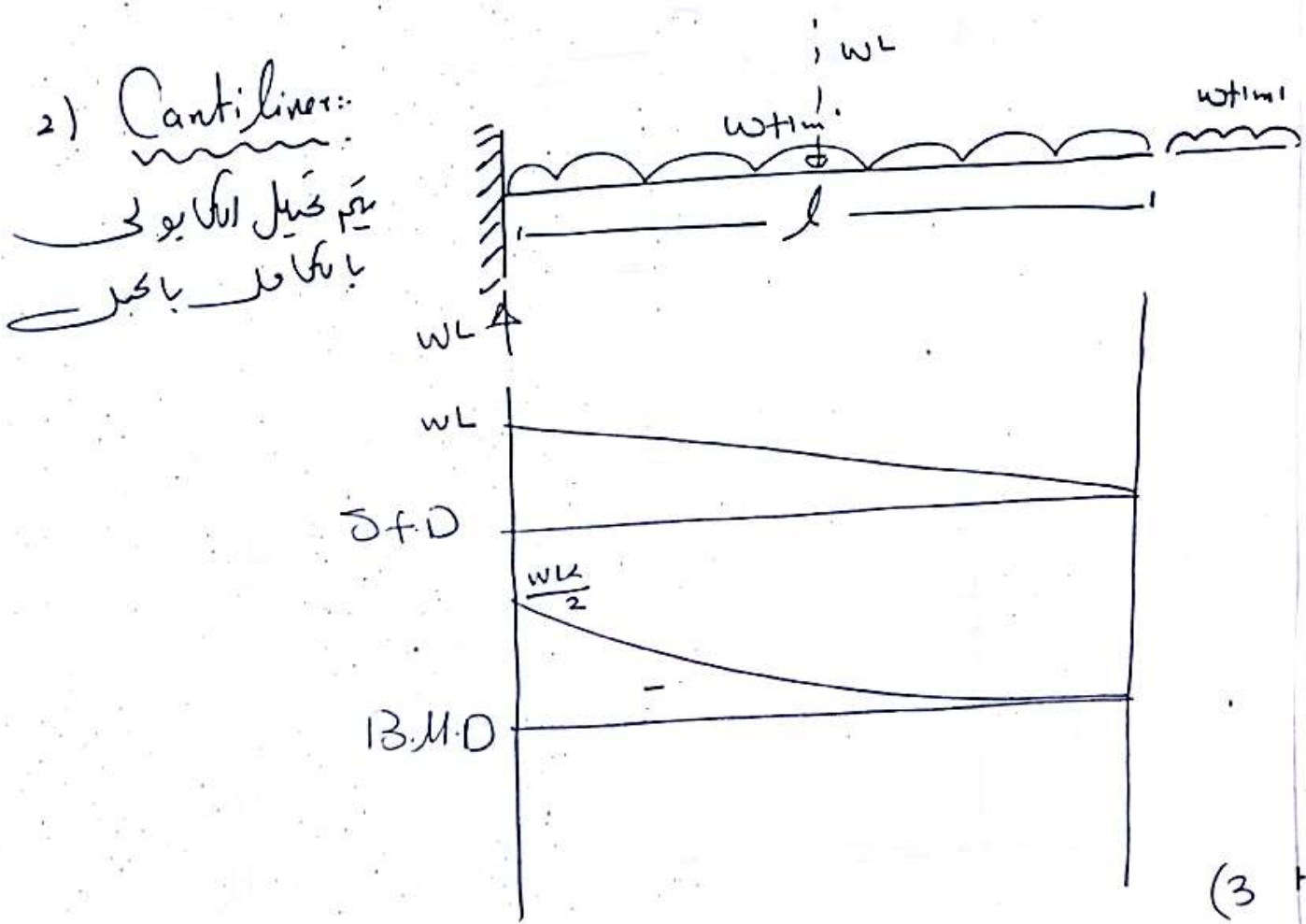
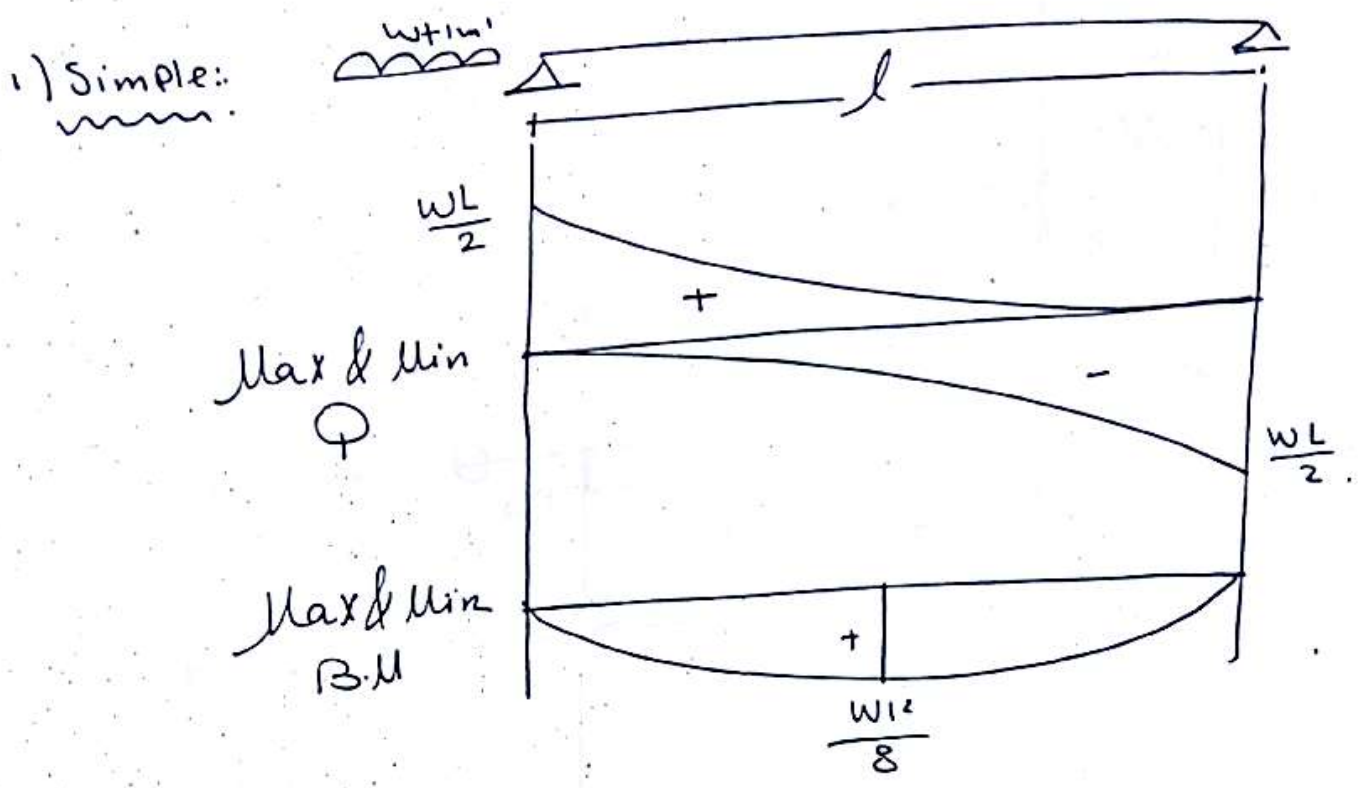
$$M = \frac{w}{2} (l-x) \cdot x$$

at  $x = \frac{l}{2}$

$$M_{\max} = \frac{wL^2}{8}$$



# → Max & Min Curves due to uniform moving load $w + w'$



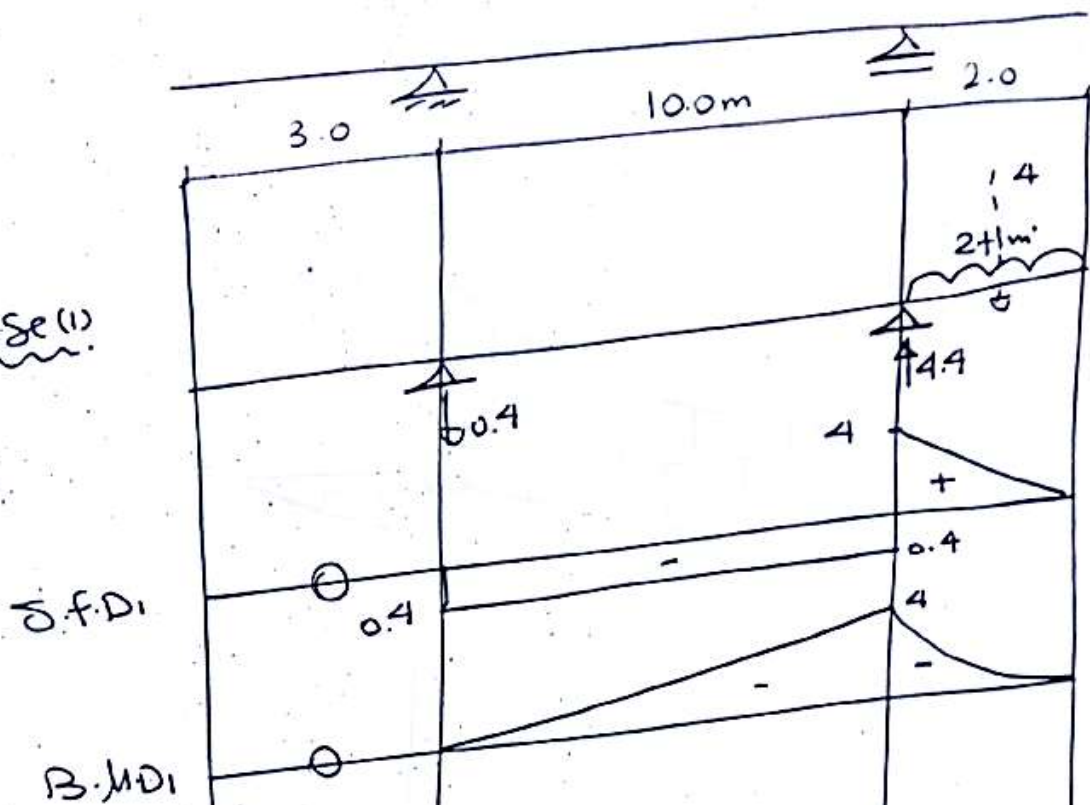
EX:1

Draw Max & Min SFD & B.M.D due to

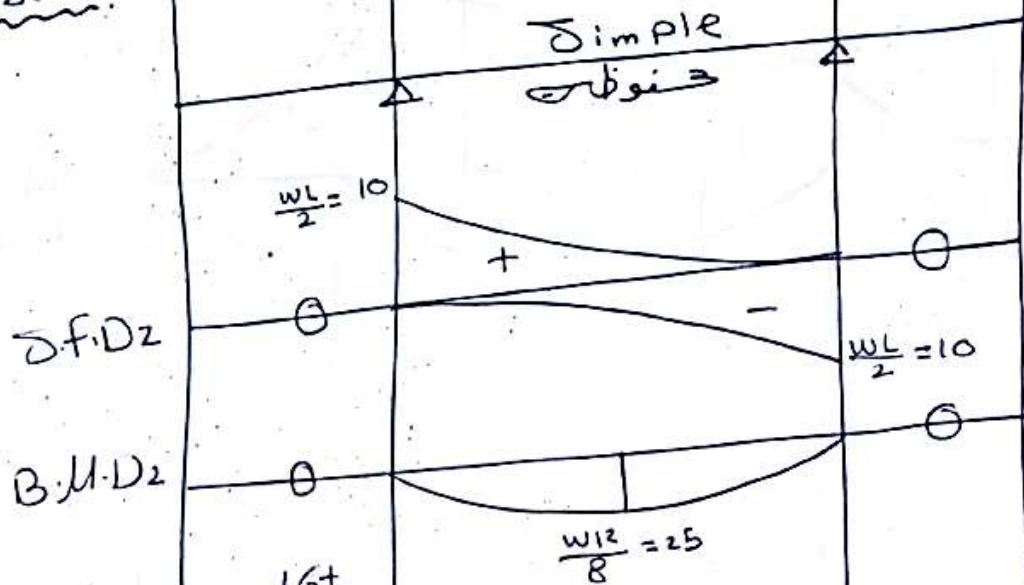
$$l.l = 2+1m'$$

$$2+1m'$$

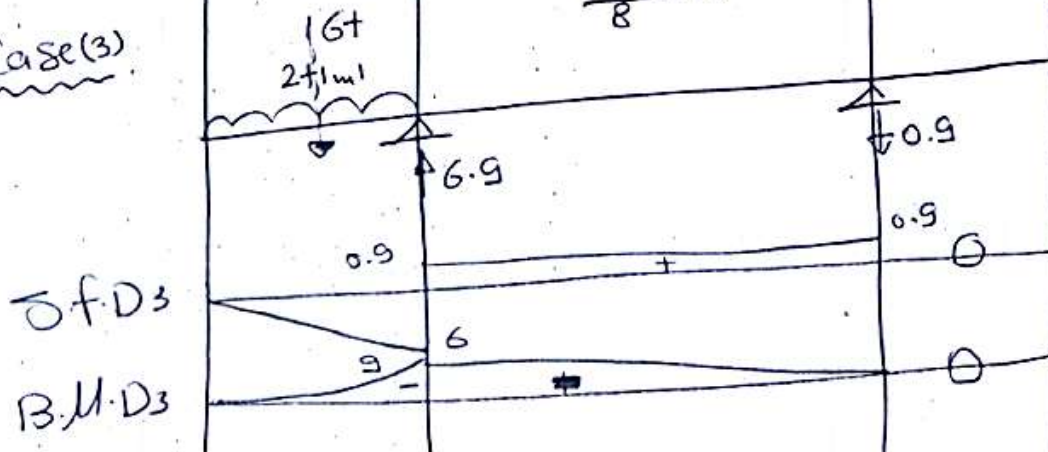
Case (1)



Case (2)

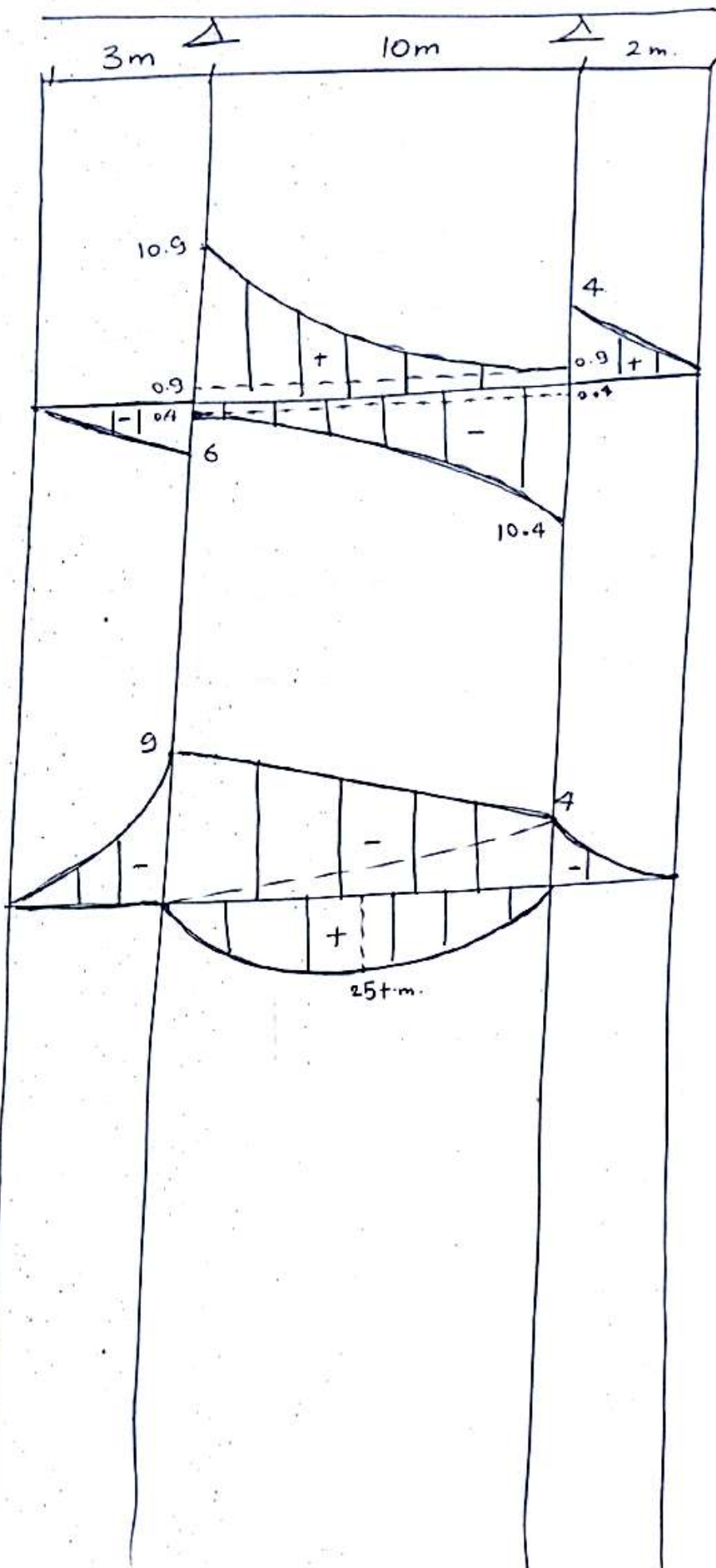


Case (3)



Max & Min  
S.F.D

Max & Min  
B.M.D





\* ملاحظات :

(١) تم رسم الـ B.M.D & S.F.D نتيجة كل حالة فصل على حدة

(٢) عند تجميع الكالات يكون التجميع تراكمي وذلك لأن الحمل الكلي سيكون أن يوزع في مكانين في نفس الوقت

(٣) يراعى عند التجميع أن يتم التجميع لكل باركة على حدة مع الجانب الموجب مع الجانب مع الجانب

Ex:2

Draw Max & Min Curves due to  $10 \text{ kN} = 411 \text{ N}$

Case (1)

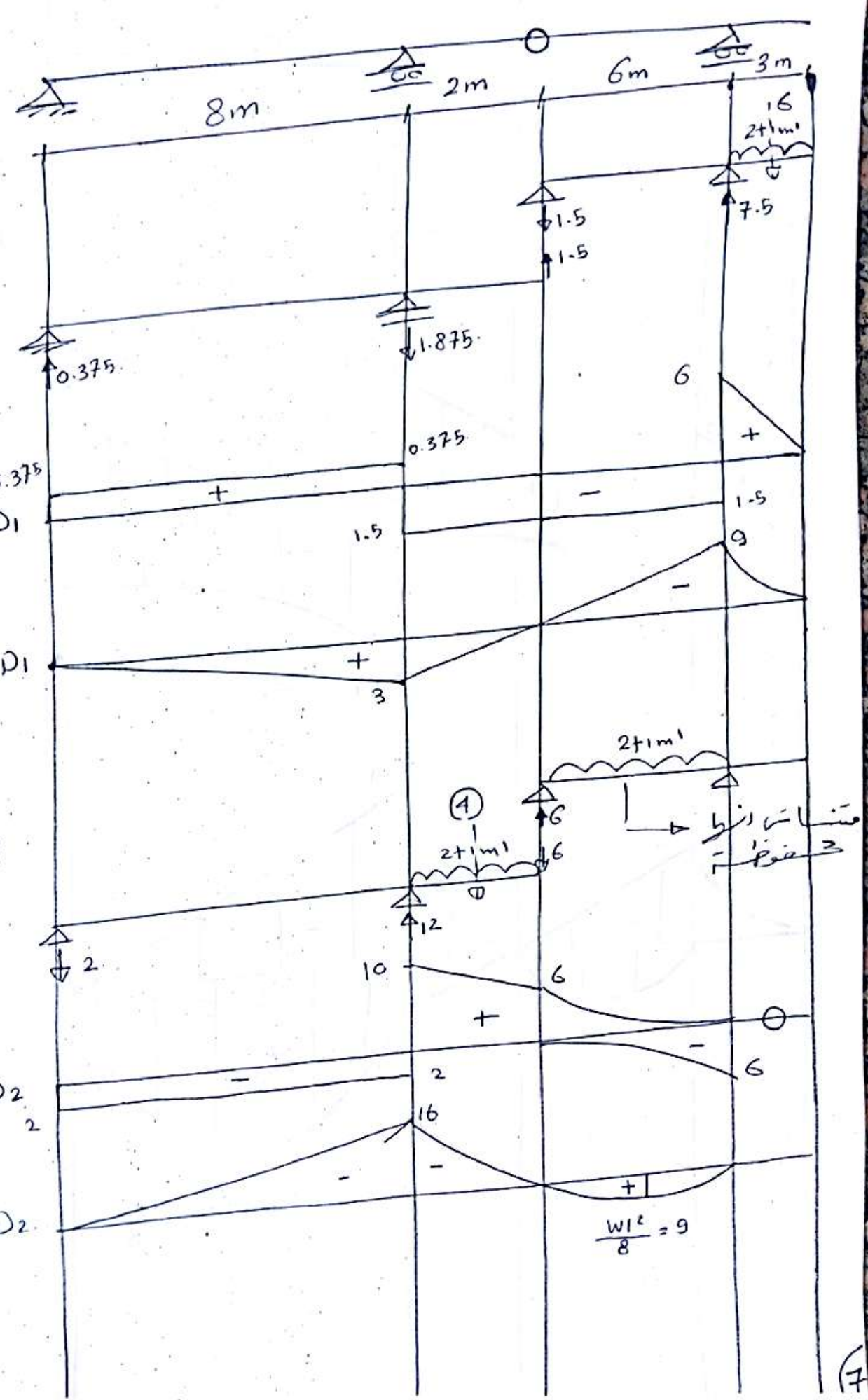
S.F.D<sub>1</sub>

B.M.D<sub>1</sub>

Case (2)

S.F.D<sub>2</sub>

B.M.D<sub>2</sub>



$$\frac{w l^2}{8} = 9$$



Case (3)

S.F.Ds

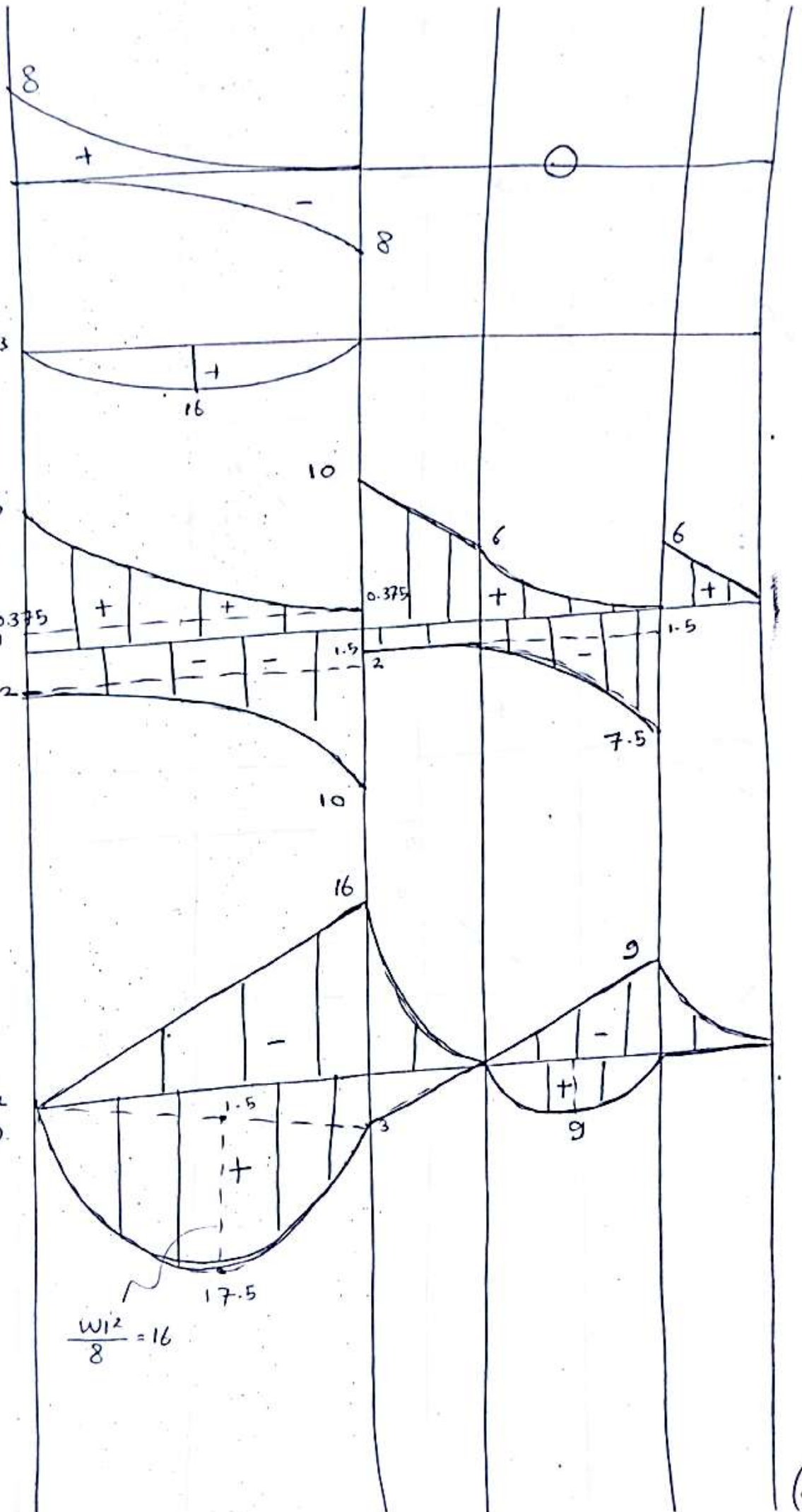
B.M.Ds

8.375

Max & Min  
Q

Max & Min  
B.M.D.

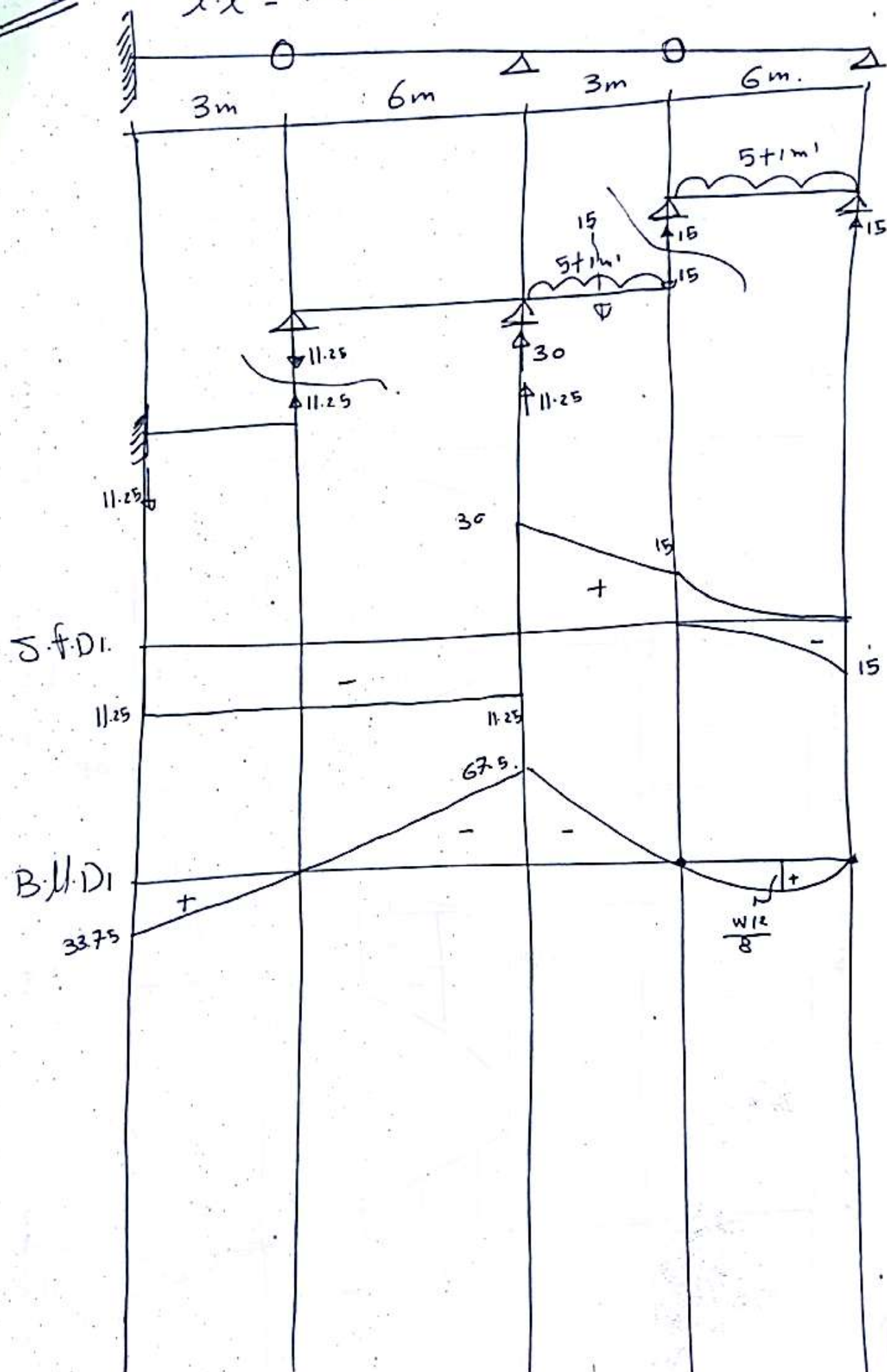
$$\frac{w l^2}{8} = 16$$

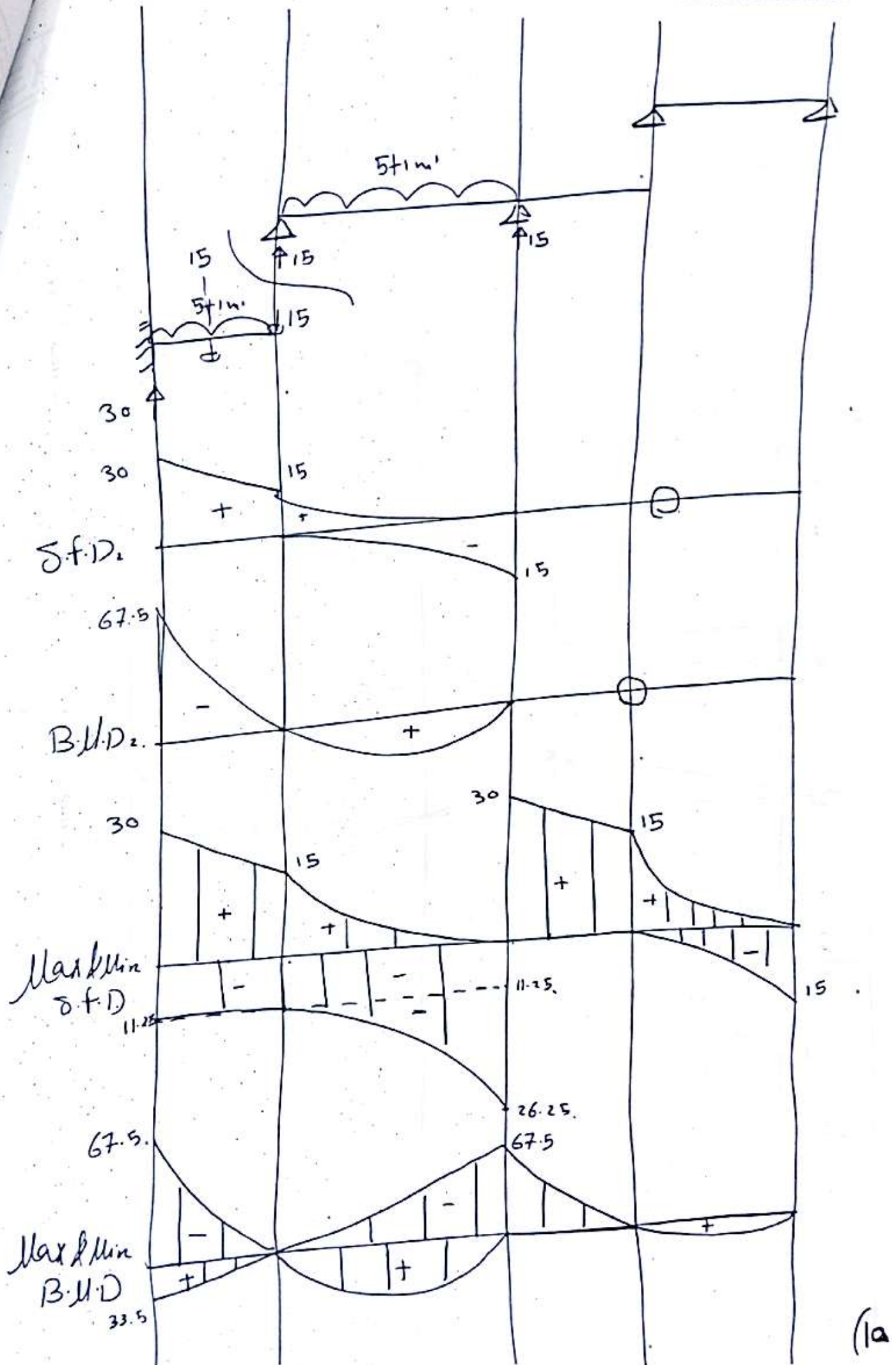




**EX:1**

Draw Max & Min S.F.D & B.M.D due to c.  
 $l.l = 5 + 1m'$







EX:

Draw Max & Min S.F.D & B.M.D due to  
 $l.l = 4 \text{ t/m}$

