

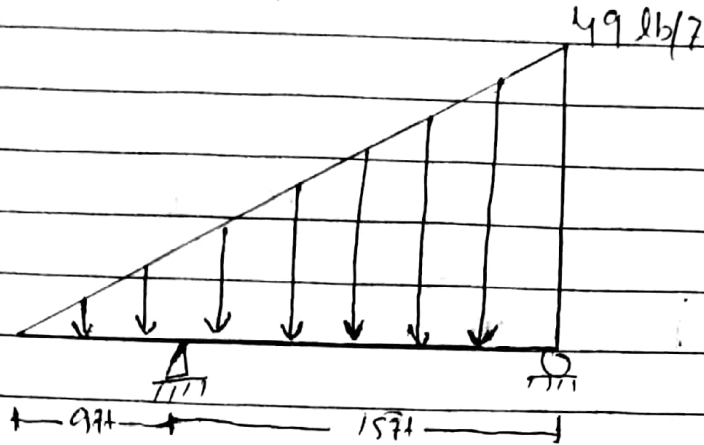
Q

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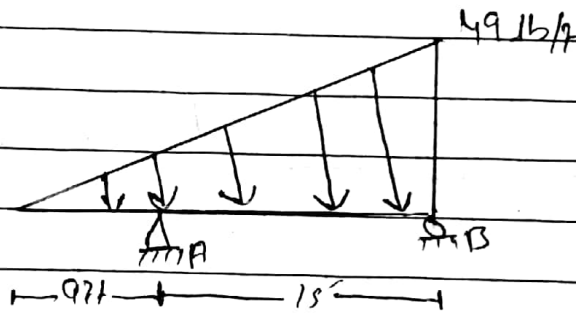
ID# 7549

Sec A

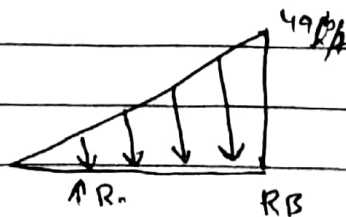
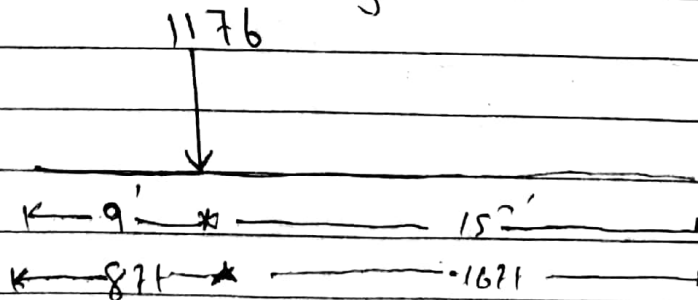
Q no 1



To find Shear Force & Bending moment Diagram



To find at point load at uniform vary load



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To find out the support reaction

$$\sum M_B = 0$$

$$-15R_A + 1176(16) = 0$$

$$R_A = \frac{(1176)(16)}{15}$$

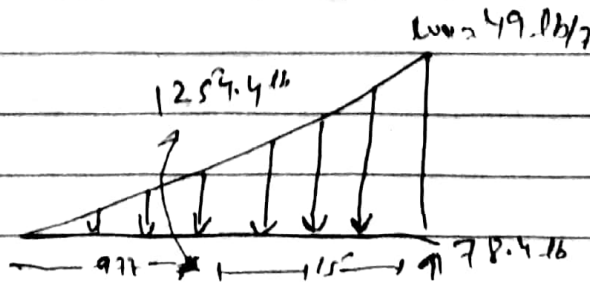
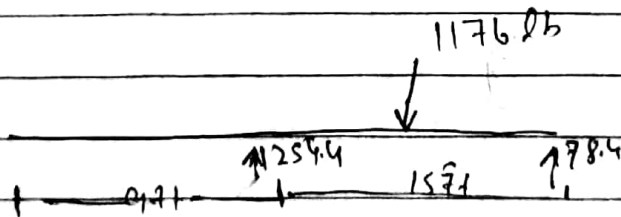
$$R_A = 1254.4 \text{ lb}$$

$$\sum F_y = 0$$

$$-1176 + R_A + R_B = 0$$

$$-1176 + 1254.4 + R_B = 0$$

$$R_B = +78.4 \text{ lb}$$



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Now Applicable load is be

$$\frac{w_0 l}{4} - \frac{1}{2} \left(\frac{w_0 n^2}{l} \right) (24) = 0$$

$$294 - \frac{1}{2} \frac{49 n^2}{l}$$

$$n = 16.97$$

↑ -ve ↑ve ↗ ΣM_0

$$M + \frac{1}{2} \left(\frac{w_0 n}{l} \right) n \left(\frac{n}{3} \right) - \frac{w_0 l}{4} \left(24 - \frac{n}{3} \right) = 0$$

$$M = -\frac{1}{2} \left(\frac{49 (16.97)}{24} (16.97) \right) \left(\frac{16.97}{3} \right) +$$

$$\frac{49 (24)}{4} \left(16.97 - \frac{1}{3} \right) = 0$$

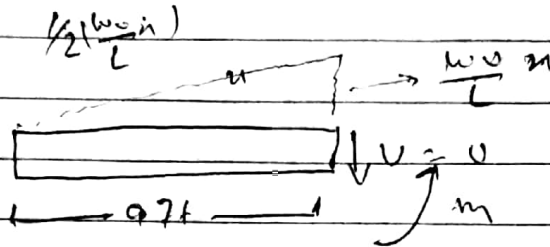
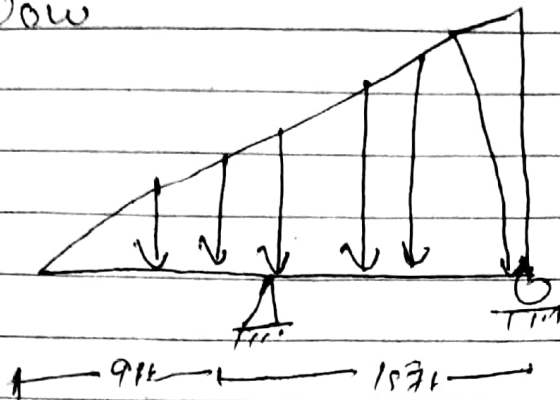
$$m = -1663 + 9637$$

$$m = 974.18 \text{ lb-ft}$$

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Now



$$\frac{1}{2} \left(\frac{49 (16.97)}{24} \right) (16.97)$$

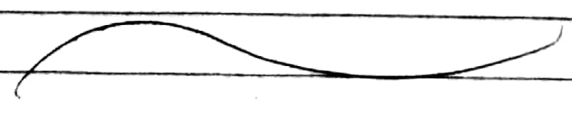
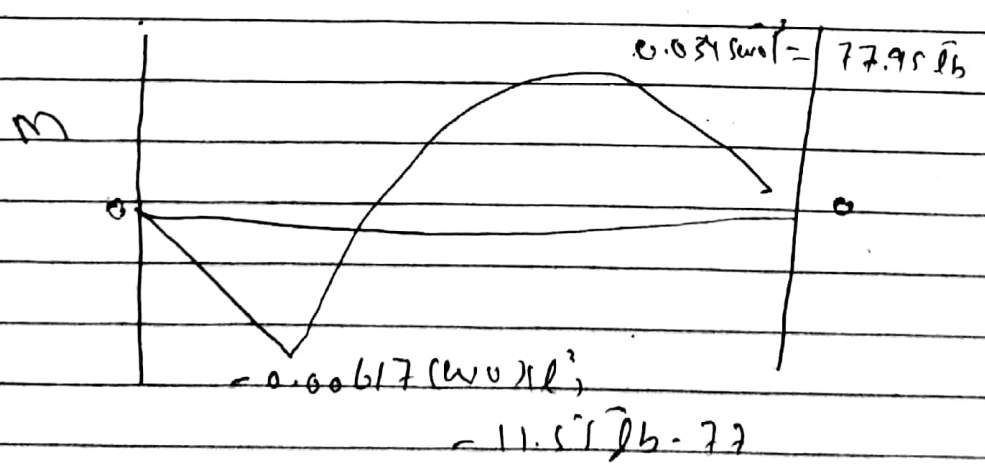
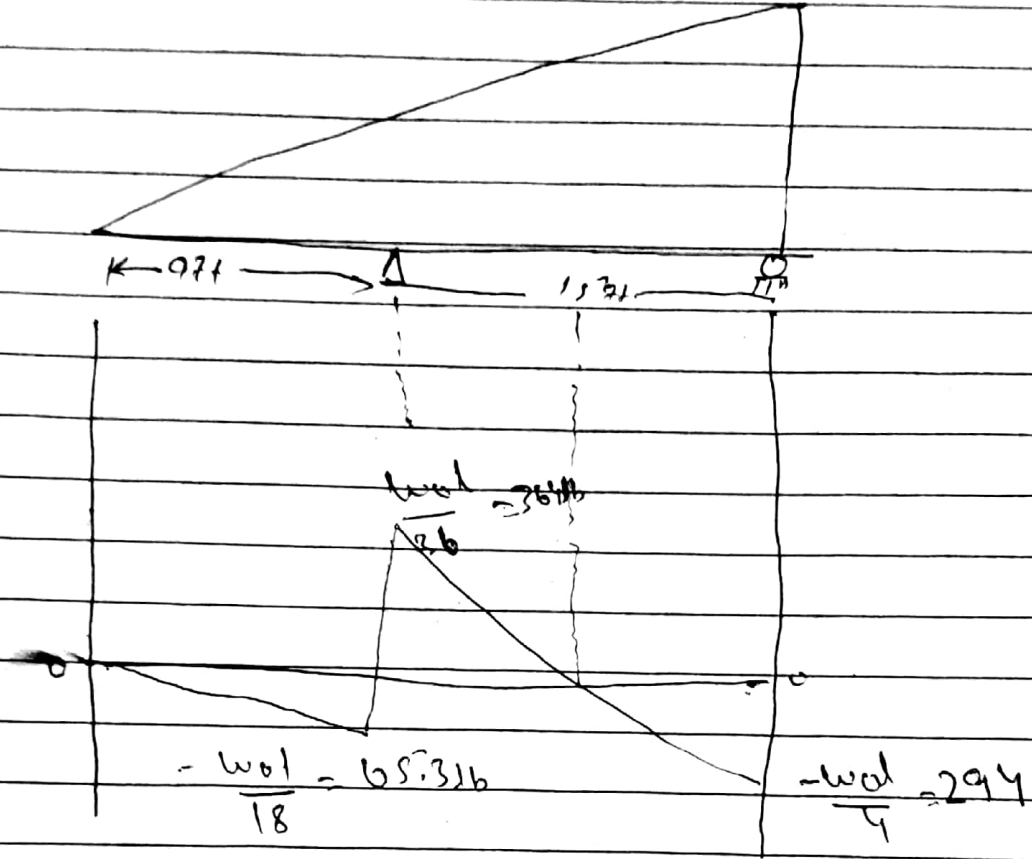
$$= 293.98 \text{ lb}$$

$$\frac{w_0}{l} u = \frac{49 (16.97)}{24}$$

$$= 34.6 \text{ lb/ft}$$

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Now Shear Force & bending moment



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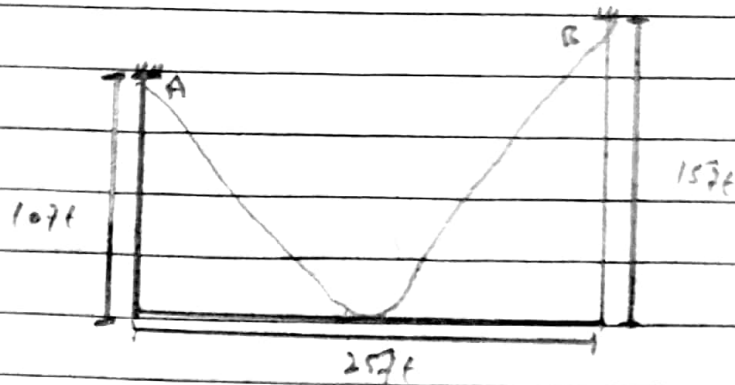
①

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Sec = A

Q no 2



→ Cable support uniform load 549 lb/ft

→ Determine the tension in cable at,

Support A = ?

Support B = ?

Sol:-
$$y = \frac{w x^2}{2FH}$$

By putting values

$$15 = \frac{549 x^2}{2FH} \rightarrow \text{①}$$

$$10 = \frac{549 (25-x)^2}{2FH} \rightarrow \text{②}$$

By solving both equation

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$$F_H = \frac{549}{2115} n^2, \quad F_H = \frac{549}{2116} (25-n)^2$$

Now $F_H = F_H$

$$\frac{549}{2115} n^2 = \frac{549}{2116} (25-n)^2$$

$$22.87 n^2 = 27.45 (625 - 50n + n^2)$$

$$n^2 = \frac{27.45}{22.87} (625 - 50n + n^2)$$

$$n^2 = 1.200 (625 - 50n + n^2) \rightarrow \textcircled{1}$$

Now choose root < 25

By solving eq $\textcircled{1}$

$$n = 13.077t$$

Now

$$25 - 13.07 = 11.937t$$

$$\text{As } F_H = \frac{549}{2115} n^2 = \frac{549}{30} (13.07)^2$$

$$F_H = 3126 \rightarrow \textcircled{A}$$

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$$F_H = \frac{549}{2(10)} (95-n)^2 = \frac{549}{20} (11.93)^2$$

$$F_H = 39061b \rightarrow B$$

Support B

$$y = \frac{W_0}{2F_H} x^2 = \frac{549}{2(3126)} x^2$$

$$\frac{dy}{dx} = \tan \theta_B = 0.0871x^2$$

$$= 0.087(13.07)$$

$$= 1.137$$

We have

$$\tan \theta_B = 1.137$$

$$\theta_B = \tan^{-1}(1.137)$$

$$\theta_B = 48.670^\circ$$

Tension B

$$T_B = \frac{F_H}{\cos \theta_B} = \frac{3126}{\cos(48.670)} = 4733.51b$$

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$$= 4.73 \text{ kips}$$

Support A

$$y = \frac{w_0}{2FH} x^2 = \frac{541^2}{2(3126)} \quad \text{---} (11.93)^2$$

$$y = 12.5'$$

$$\frac{dy}{dx} = \tan \theta_A = 12.5'$$

$$\theta_A = \tan^{-1}(12.5')$$

$$\theta_A = 85.49^\circ$$

Now

$$T_A = \frac{FH}{\cos \theta_A} = \frac{3126}{\cos(85.42^\circ)} = 39147.06$$

$$= 39.14 \text{ kips}$$



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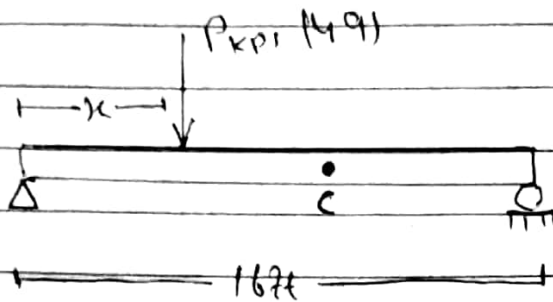
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Sec A

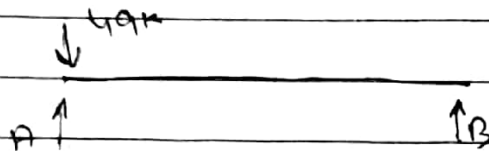
Q no 3



For

$$x = 0$$

$$R_A = ?$$



$$\sum M_B = 0$$

$$(49 \times 16) - R_A(16)$$

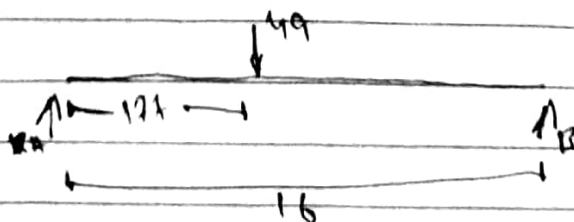
$$\frac{784}{16} = R_A$$

$$R_A = 49$$

For

$$x = 17t$$

$$R_A = ?$$



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$$\sum^+ \text{MB} = 0$$

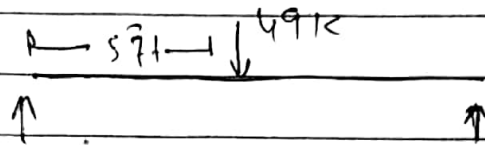
$$(49 \times 15) - R_A(16) = 0$$

$$= \frac{735}{16}$$

$$R_A = 45.93$$

For $n=5$

$R_A = ?$



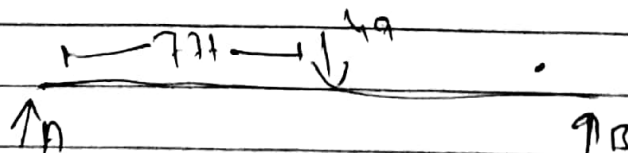
$$\sum^+ \text{MB} (49 \times 5) - R_A(16) = 0$$

$$= \frac{245}{16}$$

$$R_A = 15.31$$

For $n=7$

$R_A = ?$

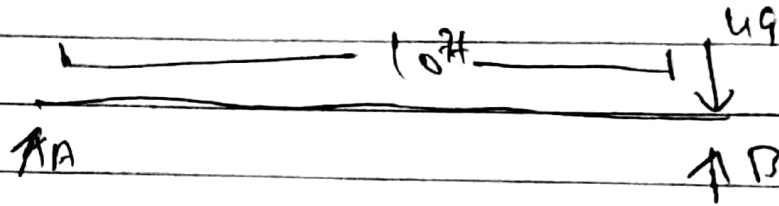


$$\frac{343}{16}$$

$$= R_A = 21.43$$

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$$-R_A 16 + 49(10)$$

$$R_A = 0$$

