

NAME

SHER A2

ID

7862

SEC

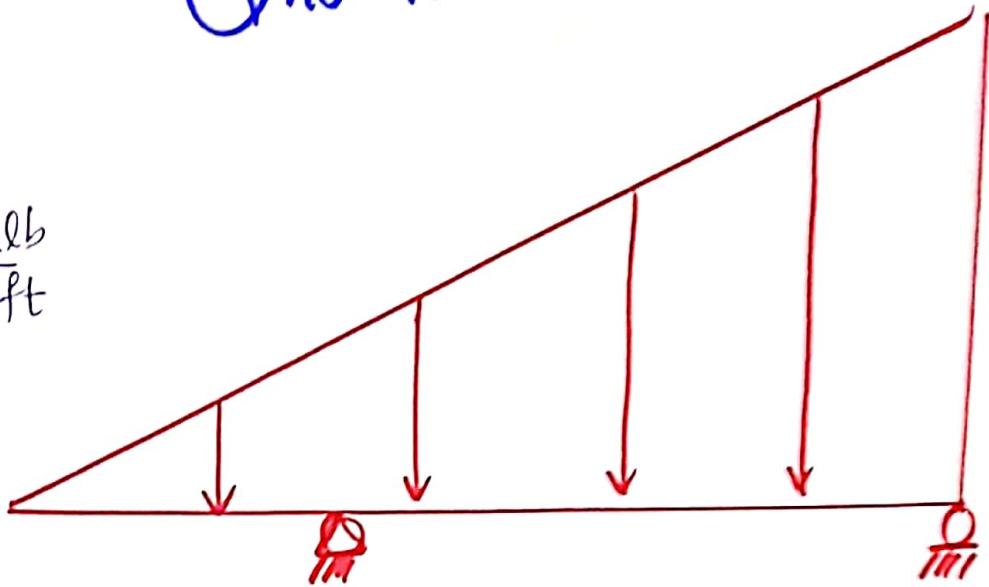
B

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Q no # 01

Pg # 1

$$\frac{Plb}{ft} = \frac{62lb}{ft}$$



$$\begin{aligned} \text{Total load} &= \frac{1}{2} (L \times w) \\ &= \frac{1}{2} (62 \times 24) \end{aligned}$$

$$\boxed{T.L = 744 \text{ k/ft}}$$

$$\sum F_y = 0 \quad \sum M_B = 0$$

$$\frac{1}{2} \times 62 \times 24 \times \frac{1}{3} (24) = R_A \times 15$$

$$\boxed{R_A = 396.8 \text{ lb}}$$

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Pg #2

$$\sum F_y = 0 \uparrow$$

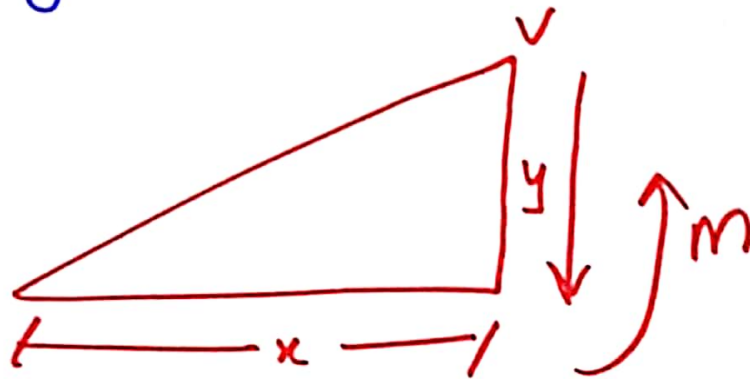
$$R_A + R_B = \frac{1}{2} \times 62 \times 24$$

$$396.8 + R_B = 744$$

$$R_B = 744 - 396.8$$

$$R_B = 347 \text{ lb}$$

Now taking section :-



for y

$$\frac{y}{x} = \frac{62}{24}$$

$$y = \left[ \frac{62}{24} \right] x$$

So  $\sum F_y = 0 \quad \uparrow +$

$$-\frac{1}{2} x x \left[ \frac{62}{24} \right] x - V_c = 0$$

$$V_c = -\frac{1}{2} x (2.58) x$$

$$V_c = -\frac{2.58 x^2}{2}$$

at  $x = 0$

$$V_c = 0$$

and at  $x = 9$

$$V_c = -163.68 \text{ lb}$$

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Pg #4

$$M = -\frac{1}{2} x x x \left(\frac{62}{24}\right) x x \frac{1}{3} x$$

$$M = -\frac{62 x^2}{144}$$

at  $x = 0$

$$M = 0$$

at  $x = 9$

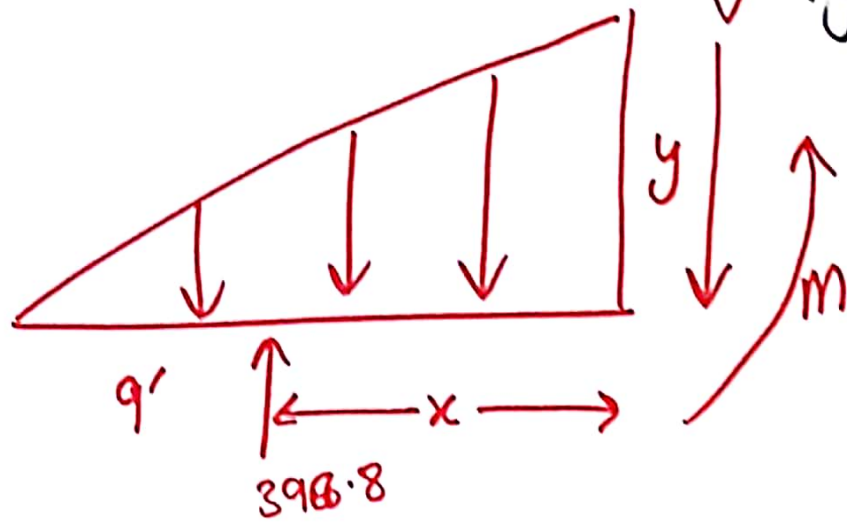
$$M = -\frac{62(9)^2}{144}$$

$$M = -34.875$$

Now for section (2)-

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Pg# 05

for  $y$ 

$$\frac{y}{(x+9)} = \frac{62}{24}$$

$$y = \frac{62(x+9)}{24}$$

~~$$y = 6x$$~~

$$\text{So } \sum F_y = 0 \uparrow$$

$$396.8 - \frac{1}{2}(x+9) \left( \frac{97}{24}(x+9) \right) - V_c = 0$$

$$V_c = -\frac{97(x+9)^2}{48} + 396.8$$

$$\text{at } x=0$$

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Pg # 6

$$V_c = 396.8$$

$$\text{at } x = 15$$

$$V_c = -44.3.11$$

$$\text{at } \cancel{x} =$$

$$M + \frac{1}{2} x (x+9) \left( \frac{62}{24} \right) (x+9) x \frac{1}{3} (x+9) - 396.8 = 0$$

$$M = 396.8 - \frac{62}{144} (x+9) (x+9)^2$$

$$\text{at } x = 0$$

$$M = -391.0625 \text{ lb}\cdot\text{ft}$$

$$\text{at } x = 15$$

$$M = 396.8 - \frac{62(x+9)^3}{144}$$

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Pg # 7

at  $x=0$

$$M = -991.062 \text{ lb}\cdot\text{ft}$$

at  $x=15$

$$M = 0$$

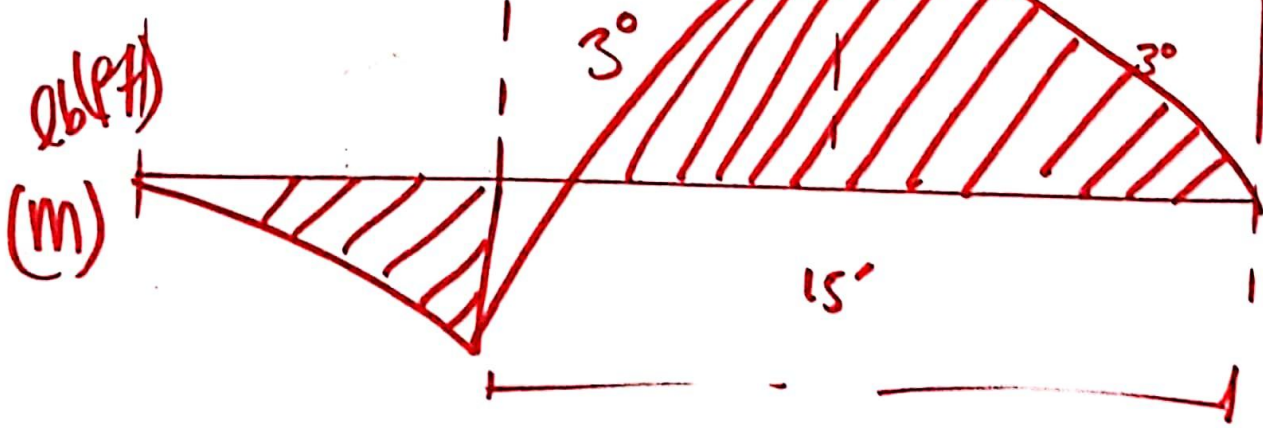
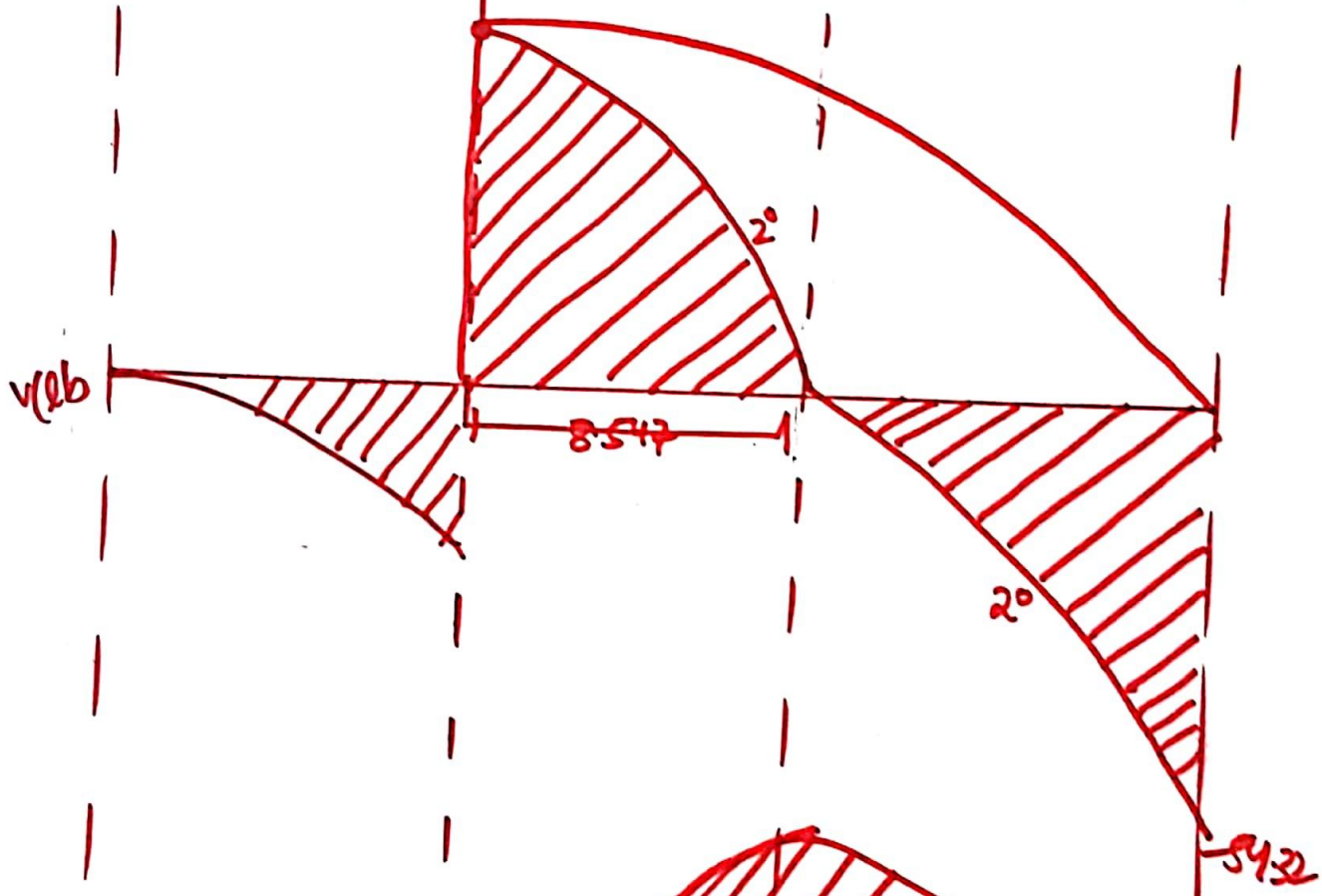
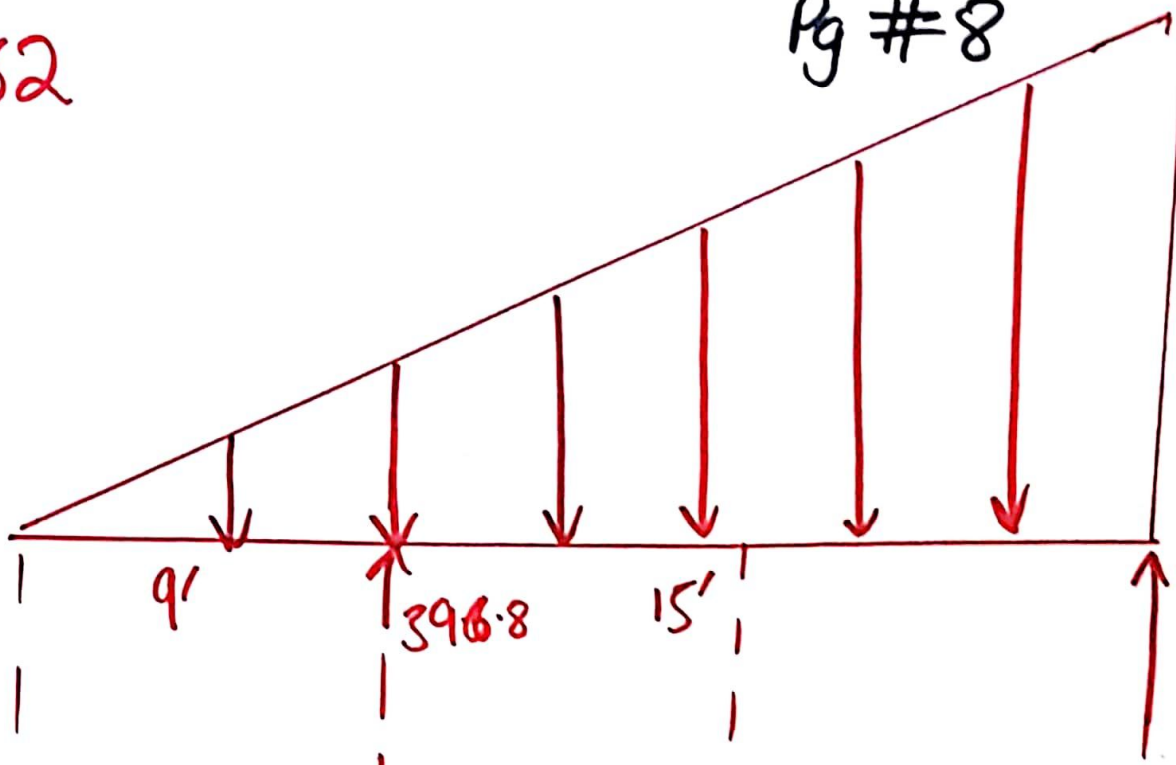
P-T-O



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Pg #8

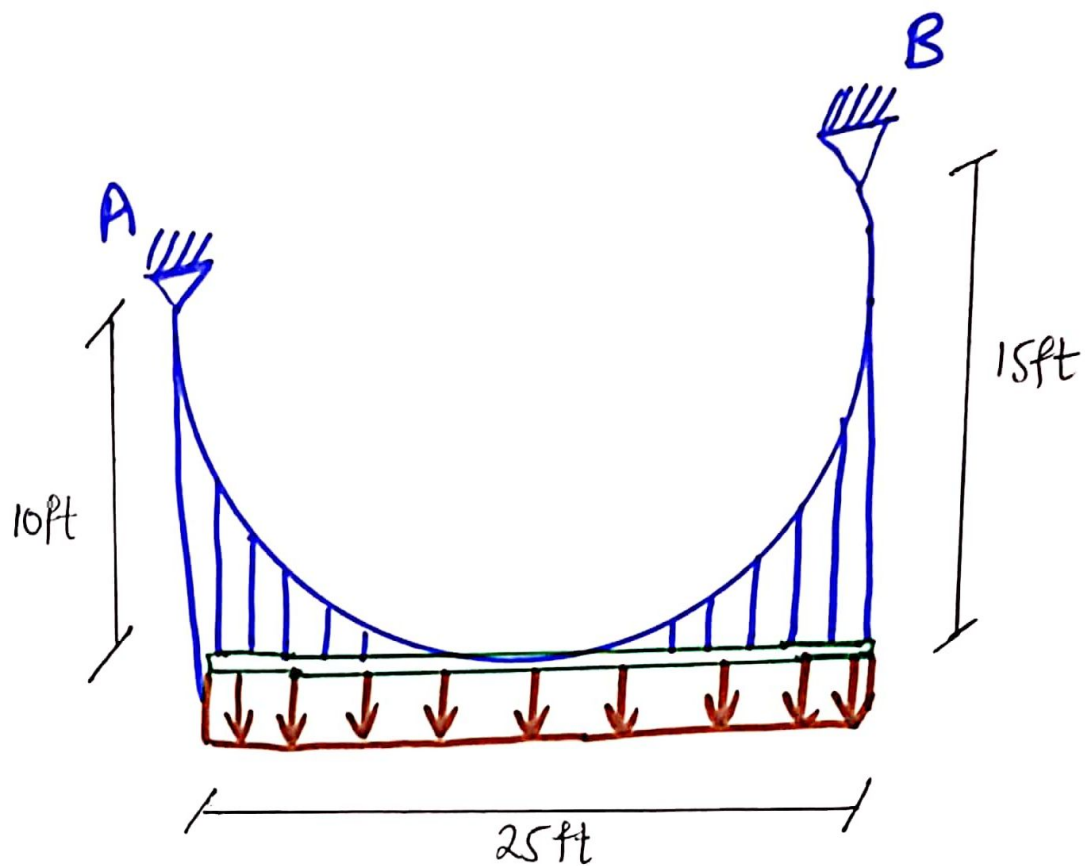
74416  
ft



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Qno # 2

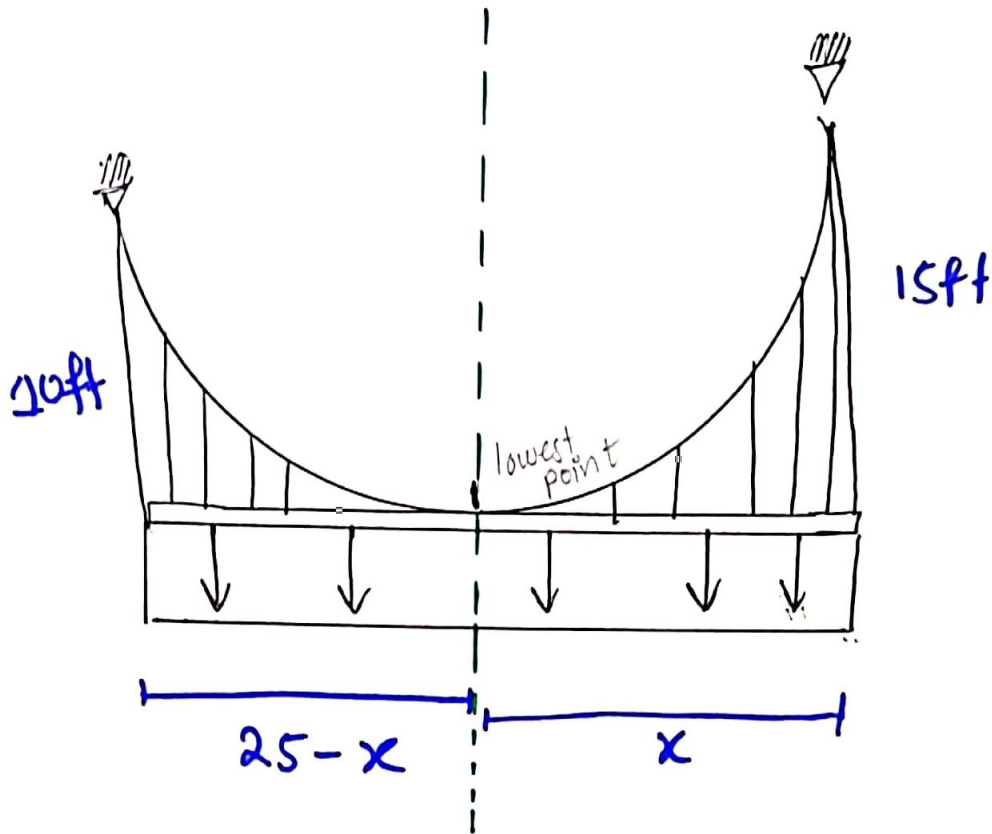
Pg # 9



$$\frac{Plb}{ft} = 862 \frac{lb}{ft}$$

Solution :-

As the given cable have different heights. We will divide into two for better illustration.



$$F_{H_1} = \frac{WL_1^2}{2h} \quad , \quad F_{H_2} = \frac{WL_2^2}{2h}$$

$$F_{H_1} = \frac{862(25-x)^2}{2(10)}$$

$$F_{H_2} = \frac{862(x)^2}{2(15)}$$

As we know  $F_{H_1} = F_{H_2}$

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Pg # 11

$$\frac{\frac{431}{862}(25-x)^2}{2 \times 10} = \frac{\frac{431}{862}(x)^2}{2 \times 15}$$

$$\sqrt{43.1(25-x)^2} = \sqrt{28.733(x)^2}$$

$$6.56(25-x) = 5.36(x)$$

$$164 - 6.56x = 5.36(x)$$

$$164 = 11.92x$$

$$x = L_1 = 13.758'$$

As  $x$  has been determined So,

$$\Rightarrow 25 - x = 25 - 13.758'$$

$$L_2 = 11.242$$

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Pg #12

So

$$F_H = \frac{862 (11.24)^2}{2 \times 10}$$

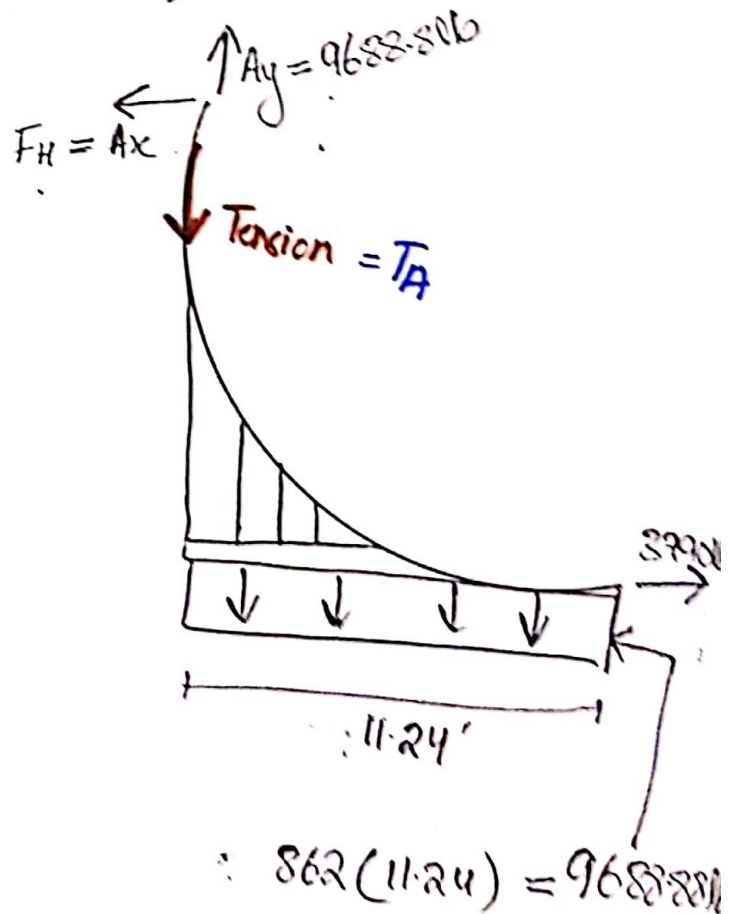
$$F_H = 3790 \text{ lb}$$

Now find  $T_{max}$   $[T_A]$

$$T_{max} = \sqrt{(F_H)^2 + (W_0 L)^2}$$

$$T_A = \sqrt{(3790)^2 + (9688.8 \text{ lb})^2}$$

$$T = 10403.77 \text{ lb}$$





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Pg #13

Now for  $[T_B]$

$$\sum F_y = 0$$

$$B_y + A_y - 862(25) = 0$$

$$B_y + 9688.88 - 21550 = 0$$

$$B_y - 11861.12 = 0$$

$$B_y = 11861.12$$

Now to find  $(T_B)$

$$T_B = \sqrt{B_x^2 + B_y^2}$$

$$T_B = \sqrt{(3790)^2 + (11861.12)^2}$$

$$T_B = 12451.91 \text{ lb}$$

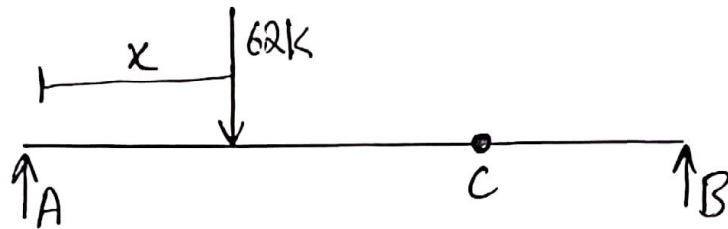
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Qno # 03

Pg # 14

Shear force influence line for beam

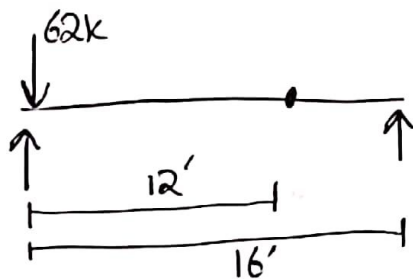
$$P = 62k$$



$$x = 0$$

$$V_c = ?$$

∴ Shear force changes with every different position

$$\Rightarrow$$


$$\sum M_B = 0$$

$$62 \times 16 - R_A(16) = 0$$

$$R_A = 62k$$



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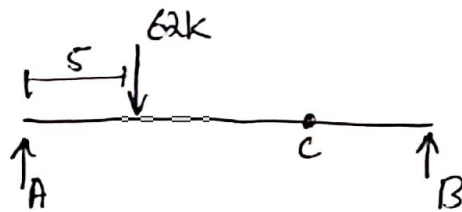
Pg # 15

$$R_A - 62 - V_c = 0$$

$$\cancel{62} - 62 - V_c = 0$$

$$V_c = 0$$

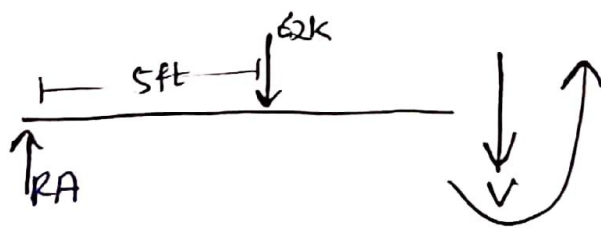
Taking  $x = 5$



$$\sum M_B = 0$$

$$-R_A(16) + 62(11) = 0$$

$$R_A = 42.625 \text{ k}$$



$$42.625 - 62 - V_c = 0$$

$$V_c = -19.375$$

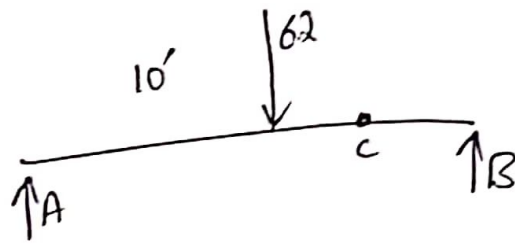


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Pg #16

Now

$$x = 10$$

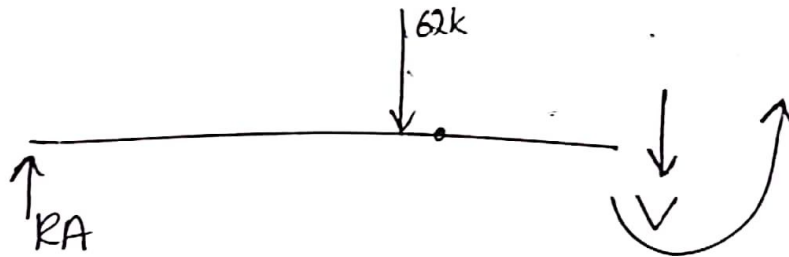


$$\left( \begin{array}{l} + \\ \curvearrowright \end{array} \right) \sum M_D = 0$$

$$V_c = ?$$

$$-R_A(16) + 62(6) = 0$$

$$R_A = 23.25 \text{ k}$$



$$23.25 - 62 - V_c = 0$$

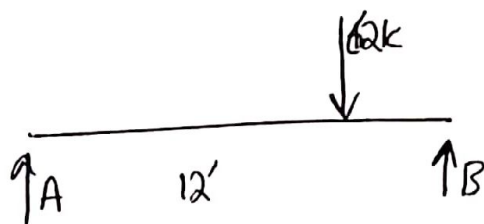
$$V_c = -38.75$$

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Now

$x = 12$

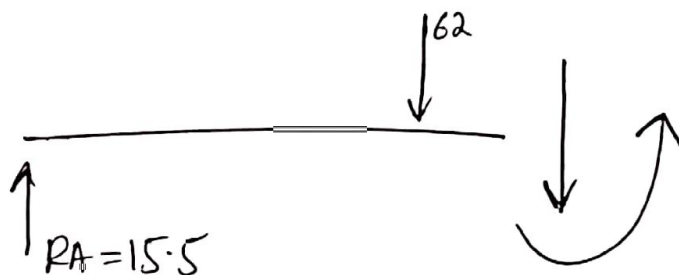
Pg #17



$$\sum M_B = 0$$

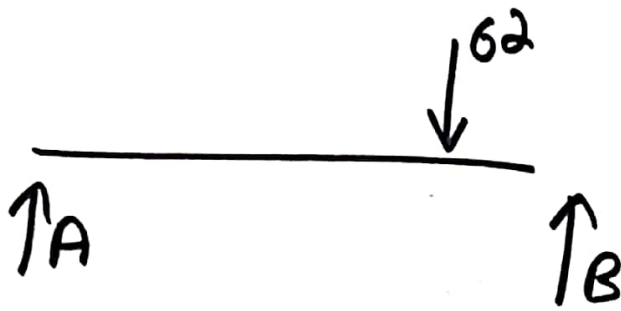
$$- R_A \times 16 + 62(4) = 0$$

$$R_A = 15.5$$



$$15.5 - 62 - V_c = 0$$

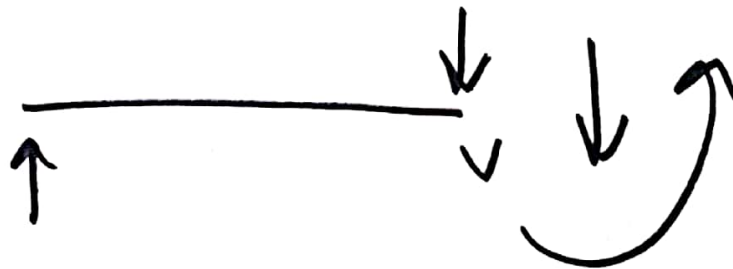
$$V_c = -46.5$$



$$\Sigma M_B = 0 \quad (+)$$

$$-R_A(16) + 62(4) = 0$$

$$R_A = 15.5$$

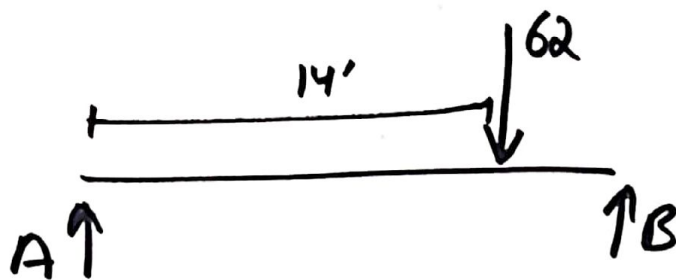


$$18.5 - V_c = 0$$

$$V_c = 18.5 \text{ k}$$

$$x = 14$$

Pg #19



$$\sum M_B = 0$$

$$-RA(16) + 62(2) = 0$$

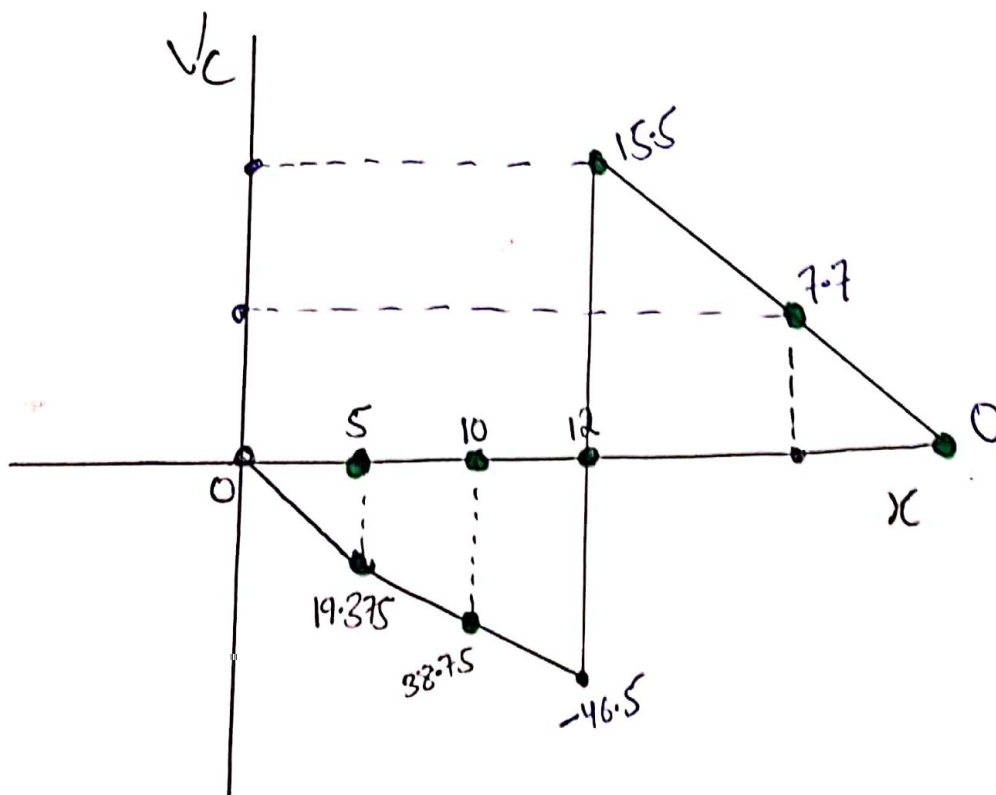
$$RA = 7.75$$



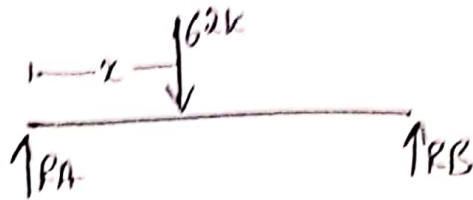
$$7.75 - V_c = 0$$

$$V_c = 7.75$$

$x$	$V_c$
0	0
5	-19.375
10	-38.75
12 <sup>-</sup>	-46.5
12 <sup>+</sup>	15.5
14	7.75
16	0



Now to find influence line  
for reaction A



$$\Rightarrow \underline{x=0}$$

$$R_A = ?$$



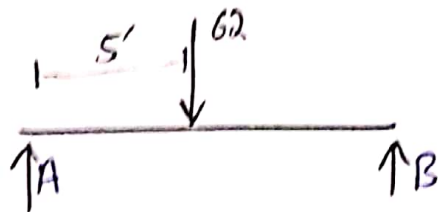
$$\sum M_B = 0$$

$$-R_A(16) + 62(16) = 0$$

$$\boxed{R_A = 62}$$

$$\Rightarrow \underline{x=5}$$

$$R_A = ?$$

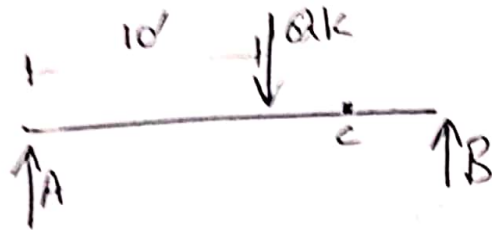


$$\sum M_B = 0$$

$$-R_A(16) + 62(11) = 0$$

$$\boxed{R_A = 42.625}$$

$x = 10$

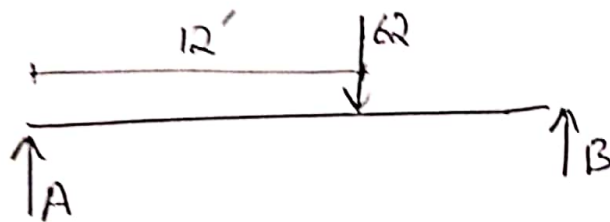


$$\left( \sum M_B = 0 \right)$$

$$-R_A(16) + 62(6) = 0$$

$$R_A = 23.25 \text{ k}$$

$x = 12$

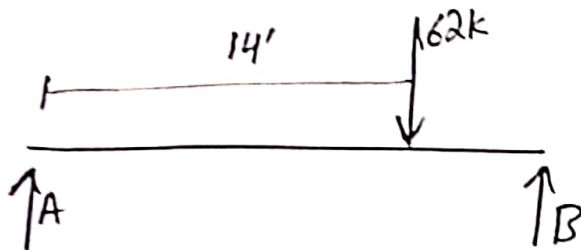


$$\left( \sum M_B = 0 \right)$$

$$-R_A(16) + 62(4) = 0$$

$$R_A = 15.5 \text{ k}$$

$x = 14$

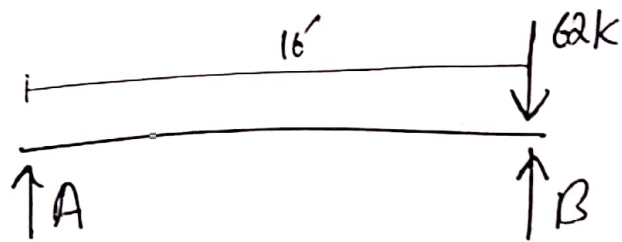


$$\left( \sum M_B = 0 \right)$$

$$-R_A(16) + 62(2) = 0$$

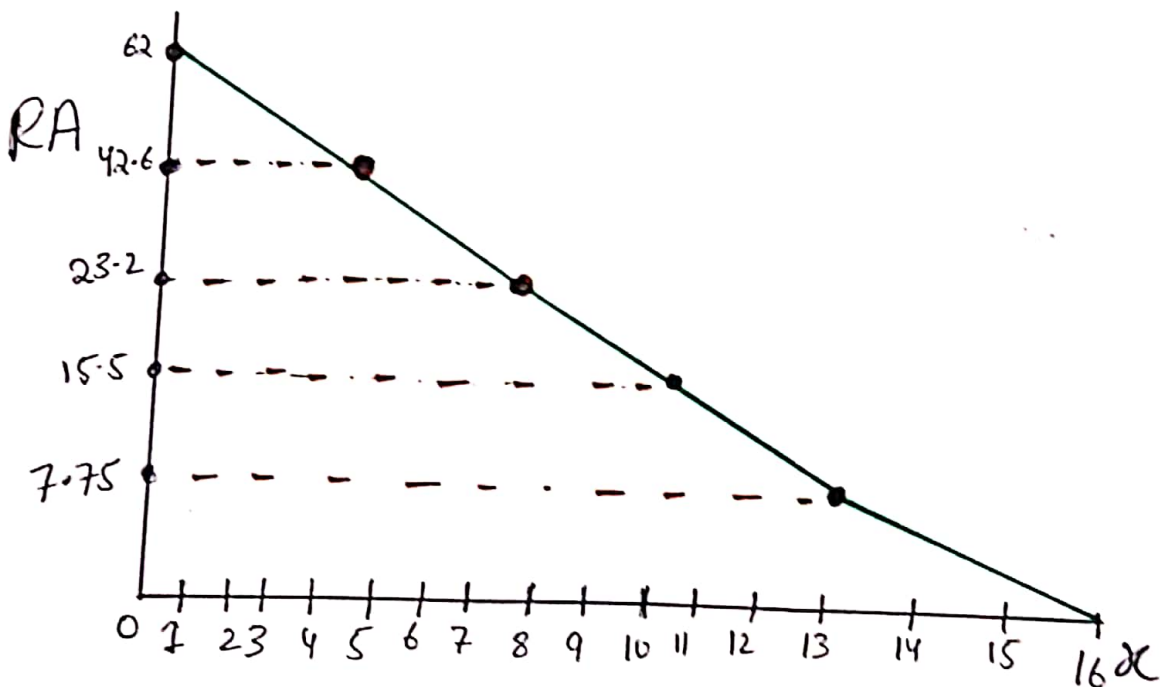
$$R_A = 7.75$$

$$x = 16$$



$$-RA(16) + 62(0) = 0$$

$$RA = 0$$



Influence line of RA