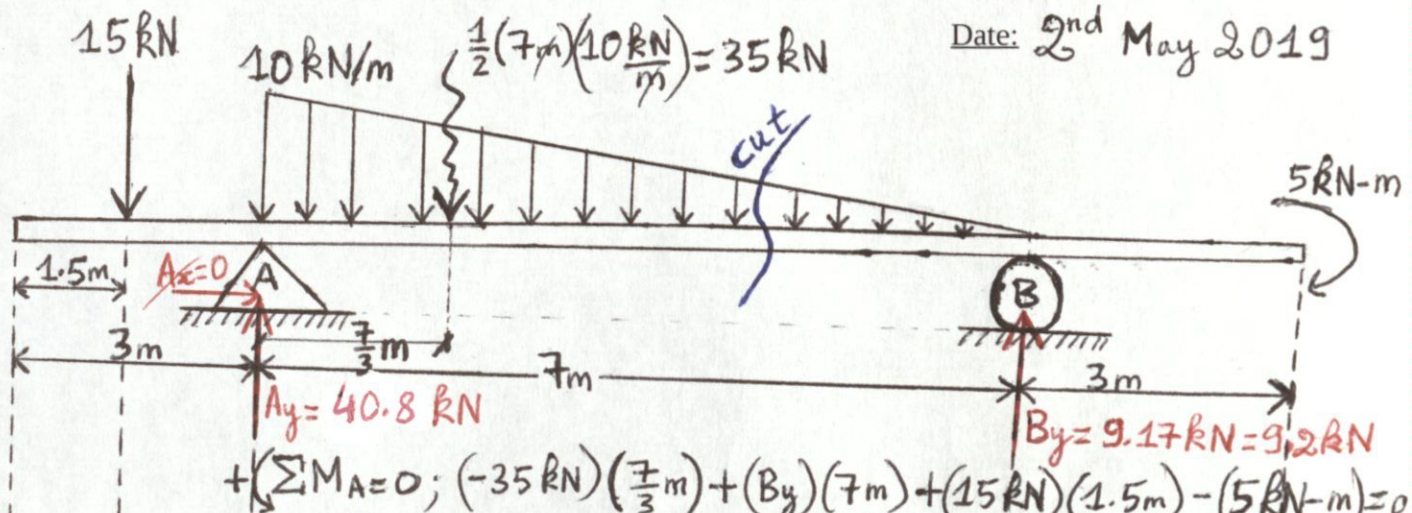
DTY Tutoring, inc.
Email: dtytutoring@gmail.com
Website:www.dtytutoring.com

Date: 2nd May 2019

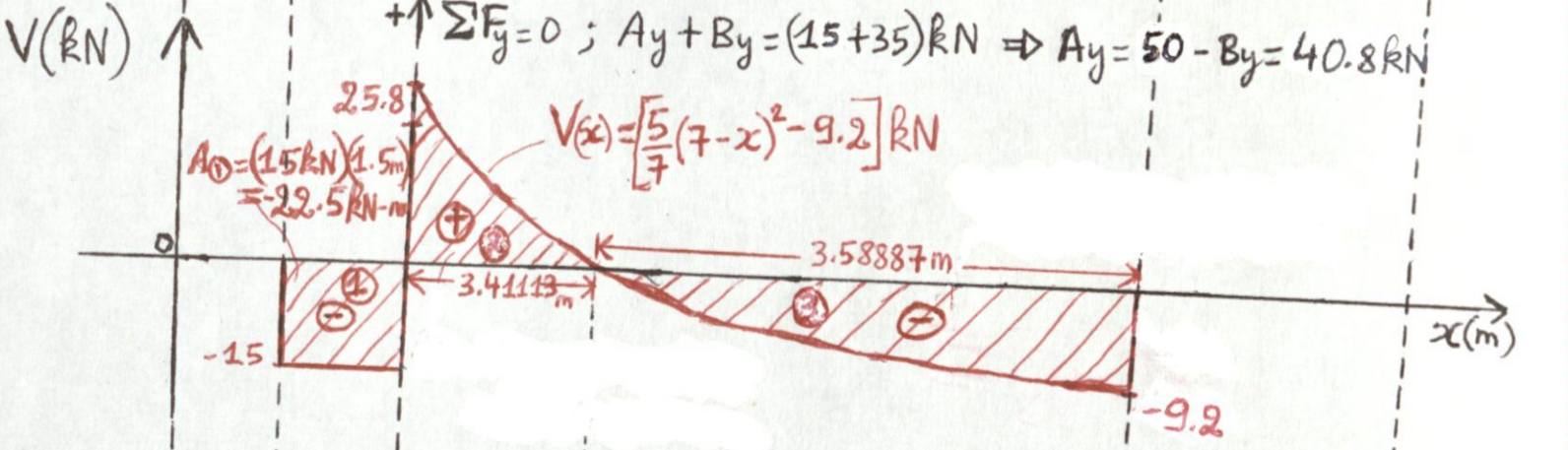


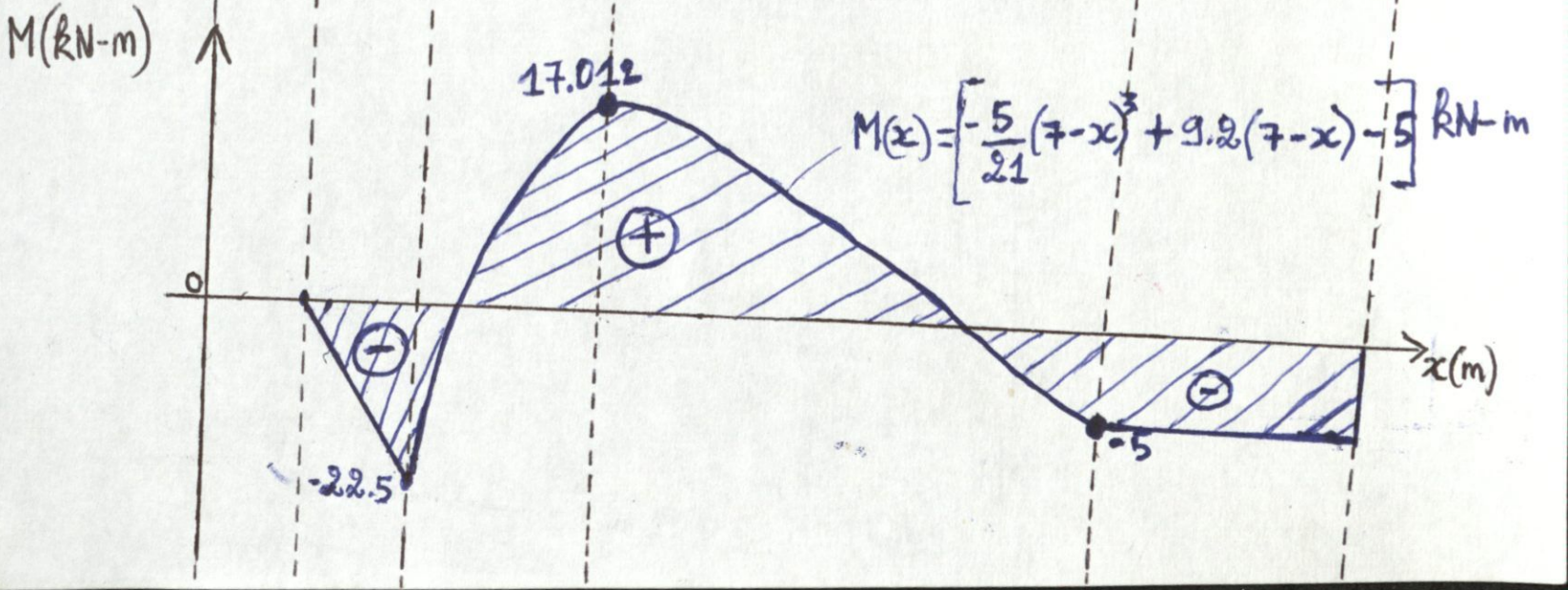
$+\circlearrowleft \sum M_A=0;\ (-35kN)(\frac{7}{3}m)+(B_y)(7m)+(15kN)(1.5m)-(5kN\text{-}m)=0$

$B_y=9.17kN=9.20kN$

$\pm\rightarrow \sum F_x=0;\ A_x=0$

$+\uparrow \sum F_y=0;\ A_y+B_y=(15+35)kN \Rightarrow A_y=50-B_y=40.8kN$





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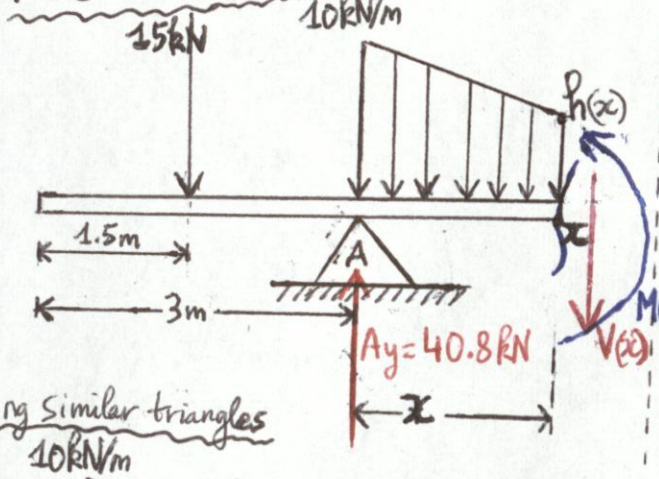
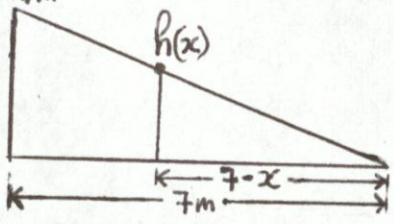
FBD Cut (LHS)



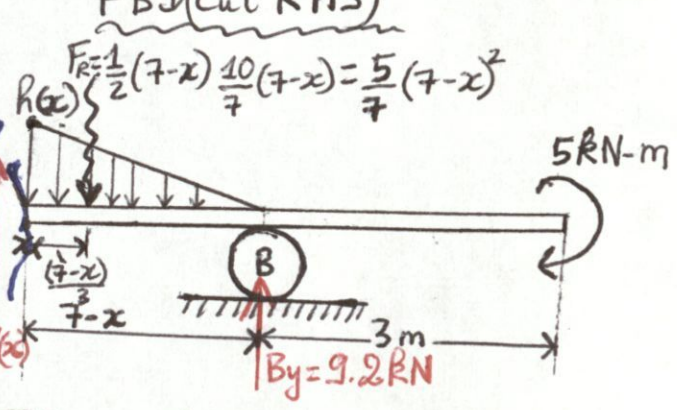
Using similar triangles



$$\frac{10\,kN/m}{7\,m} = \frac{h(x)}{7-x}$$

$$h(x) = \left[\frac{10}{7}(7-x)\right]\frac{kN}{m}$$

FBD (Cut RHS)



$+\uparrow \sum F_y = 0$; $V(x) + By = F_R$

$V(x) = F_R - By$

$$V(x) = \left[\frac{5}{7}(7-x)^2 - 9.2\right] kN$$

↳ valid for: $[3 \le x \le 10]$ m

$+\circlearrowleft \sum M_x = 0$;

$$(-F_R)\left(\frac{7-x}{3}\right) + (By)(7-x) - (5\,kN-m) = M(x)$$

$$-\frac{5}{7}(7-x)^2\left(\frac{7-x}{3}\right) + (9.2\,kN)(7-x) - (5\,kN-m) = M(x)$$

$$M(x) = \left[-\frac{5}{21}(7-x)^3 + 9.2(7-x) - 5\right] kN-m$$

↳ valid for: $[3 \le x \le 10]$ m

$V(x) = 0$

$$\frac{5}{7}(7-x)^2 - 9.2 = 0$$

$x_1 = 3.41113$ m

~~$x_2 = 10.5889$ m~~