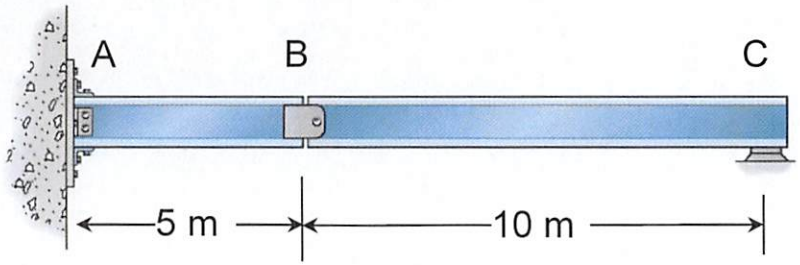
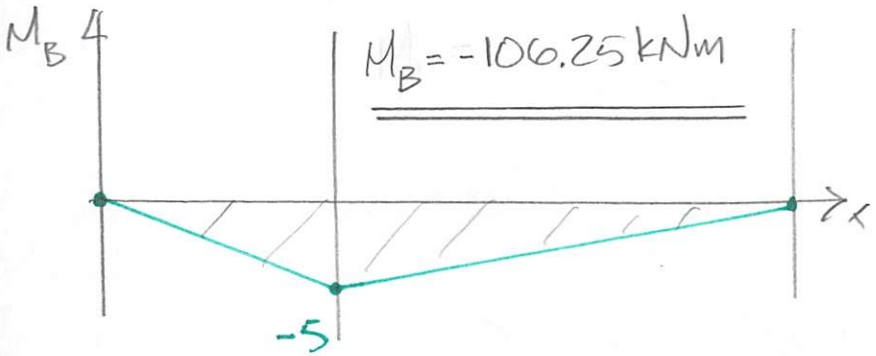
Example 6a-4: The beam below is subject to a dead load of 1.5 kN/m and a single live load of 10 kN. Determine the maximum ***negative*** moment these loads create at point A and the maximum ***positive*** shear at point B.





$M_B = -106.25\ kNm$

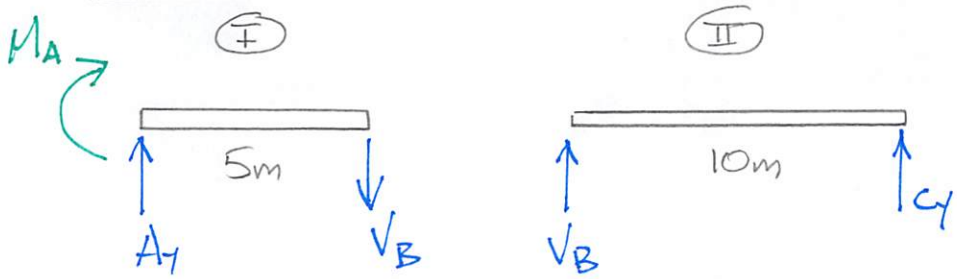
CONCENTRATED LOAD

$M_B = (-5m)10kN = -50kNm$

DEAD UNIFORM LOAD

$M_B = 1.5kN/m\left(\frac{1}{2}\right)(15m)(-5m) = -56.25kNm$

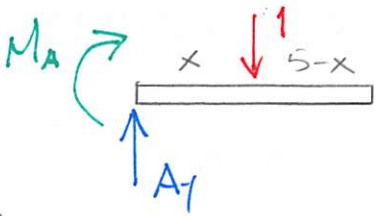
FBD AB



$0 \le x \le 5m$ – LOCATION ON UNIT LOAD

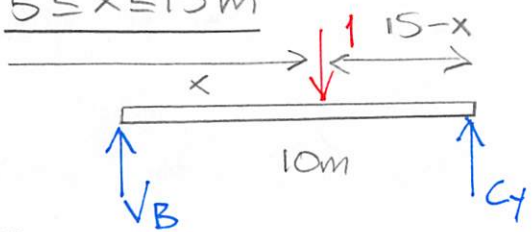
(II) $\circlearrowleft +\sum M_C = 0 = -V_B(10m)$ $\quad V_B = 0$

(I) $\circlearrowleft +\sum M_A = 0 = -M_A - 1(x)$



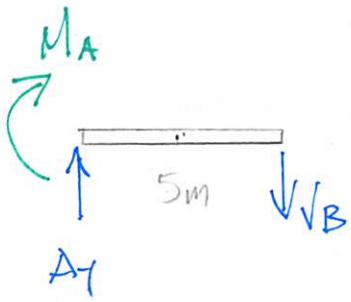
$M_A = -x$

$5 \le x \le 15m$



$\circlearrowleft +\sum M_C = 0 = 1(15-x) - V_B(10m)$

$V_B = \frac{15-x}{10}$



$\circlearrowleft +\sum M_A = 0$

$= -M_A - V_B(5m)$

$M_A = -\frac{15-x}{2}$