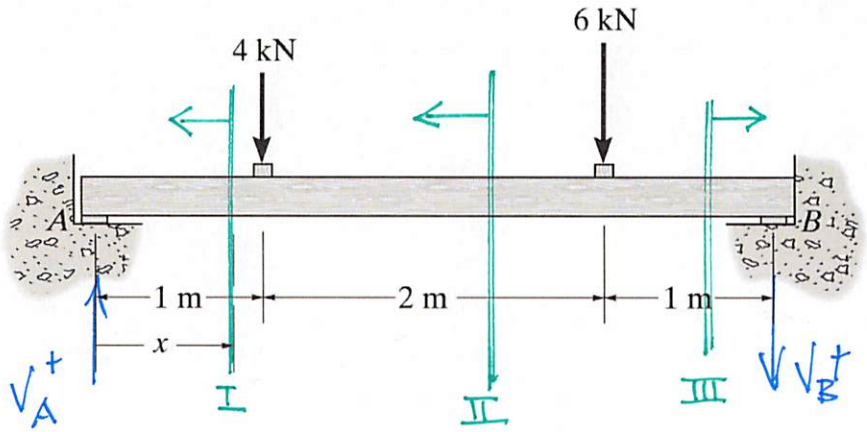
Example 4b-8 - Determine the internal shear and bending moment as a function of ***x***.

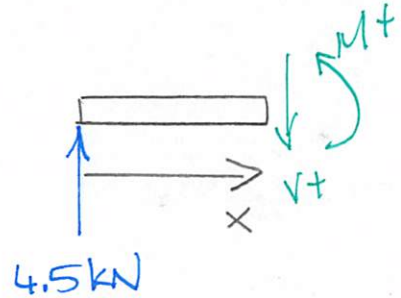


$$\circlearrowleft^+ \sum M_B = 0 = 6\,kN(1m) + 4\,kN(3m) - V_A(4m)$$

$$\underline{V_A = 4.5\,kN}$$

$$+\uparrow \sum F_y = 0 = V_A - V_B - 4kN - 6kN \qquad \underline{V_B = -5.5\,kN}$$

(I) $0 \le x \le 1m$



$$\circlearrowleft^+ \sum M_{CUT} = 0 = M - 4.5\,kN\,x$$

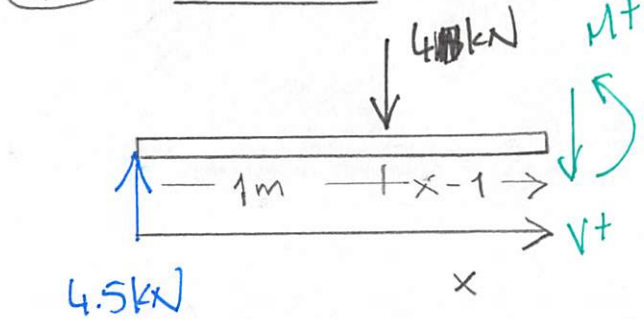
$$\underline{\underline{M(x) = [4.5x]\,kN\,m}} \qquad M(x=0) = 0 \checkmark$$

$$+\uparrow \sum F_y = 0 = -V + 4.5\,kN$$

$$\underline{\underline{V(x) = 4.5\,kN}} \qquad V(x=0) = 4.5\,kN \checkmark$$

$$\frac{dM}{dx} = V \checkmark$$

(II) $1 \le x \le 3m$



$$\circlearrowleft^+ \sum M_{CUT} = 0 = M + 4(x-1) - 4.5(x)$$

$$\underline{\underline{M(x) = [-4(x-1) + 4.5x]\,kN\,m}}$$

$$M_I(x=1) = M_{II}(x=1) \checkmark$$

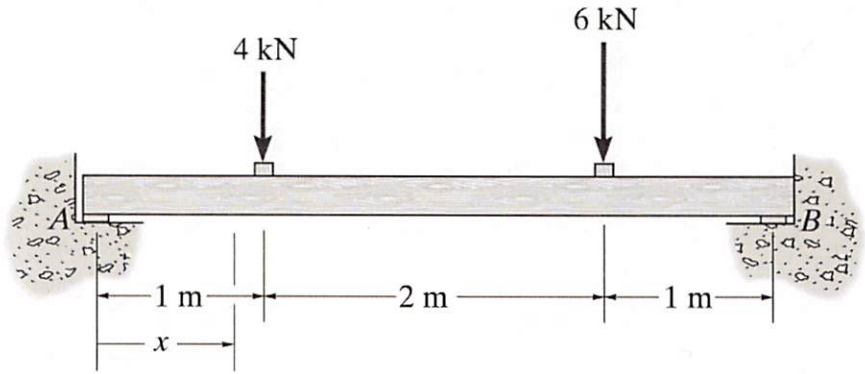
$$+\uparrow \sum F_y = 0 = -V - 4kN + 4.5kN$$

$$\underline{\underline{V(x) = [0.5]\,kN}}$$

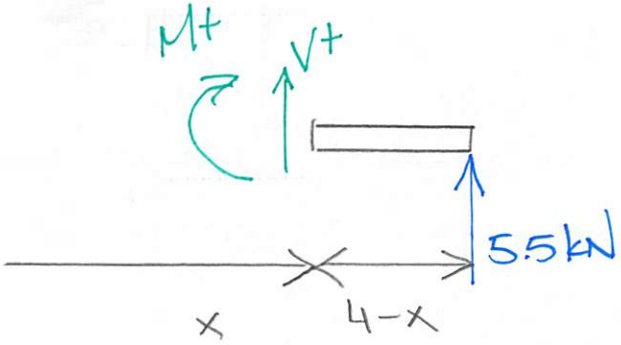
$$\frac{dM}{dx} = V \checkmark$$

$$V_{II}(x=1) - V_I(x=1) = -4kN \checkmark$$

Example 4b-8 - Determine the internal shear and bending moment as a function of ***x***.



(III) $3 \le x \le 4\,m$



$$\circlearrowleft + \sum M_{cut} = 0 = -M + 5.5(4-x)$$

$$M(x) = [5.5(4-x)]\ kN\,m$$

$$M(x=4) = 0 \checkmark$$

$$M_{II}(x=3) = M_{III}(x=3) \checkmark$$

$$+\uparrow \sum F_y = 0 = V + 5.5kN$$

$$V(x) = -5.5kN$$

$$V(x=4) = -5.5kN \checkmark$$

$$V_{III}(x=3) - V_{II}(x=3) = -6kN \checkmark$$