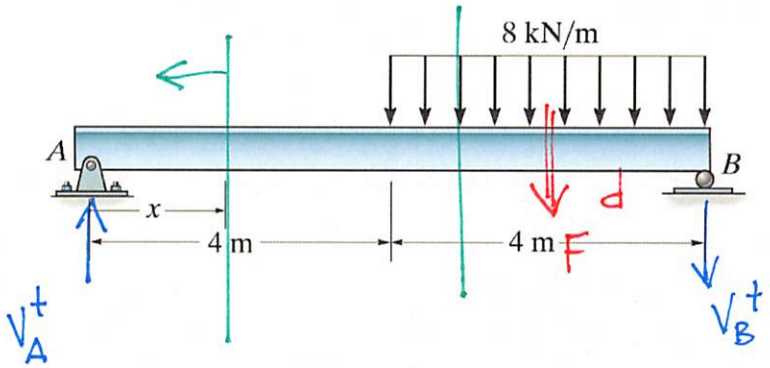
Example 4b-5 - Determine the internal shear and bending moment as a function of ***x***.

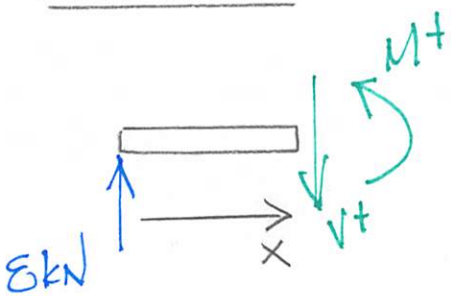


$F = 32\,kN \quad d = \frac{1}{2}(4m) = 2m$

$\circlearrowleft^+ \Sigma M_B = 0 = 32kN(2m) - V_A(8m)$ $\quad V_A = 8\,kN$

$+\uparrow \Sigma F_y = 0 = V_A - 32kN - V_B$ $\quad V_B = -24\,kN$

$0 \le x \le 4m$



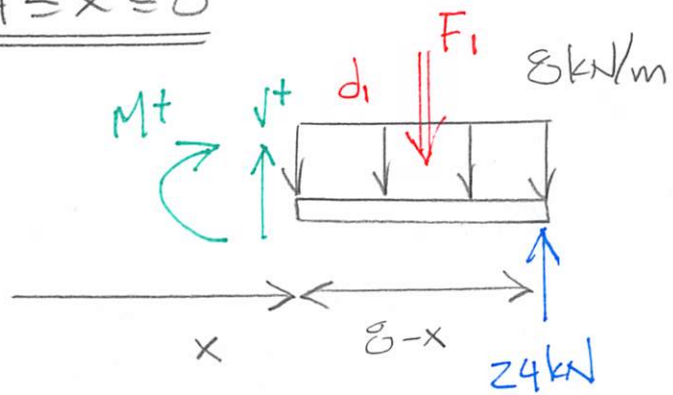
$\circlearrowleft^+ \Sigma M_{CUT} = 0 = M - 8kN(x)$

$M(x) = [8x]\,kN\,m$ $\quad M(x=0) = 0$ ✓

$+\uparrow \Sigma F_y = 0 = -V + 8kN$

$V(x) = 8\,kN$ $\quad V(x=0) = 8kN$ ✓

$4 \le x \le 8$



$\circlearrowleft^+ \Sigma M_{CUT} = 0 = -M - 8(8-x)\frac{1}{2}(8-x) + 24kN(8-x)$

$M(x) = \left[-4(8-x)^2 + 24(8-x)\right]kN\,m$ $\quad M(x=8) = 0$ ✓

$+\uparrow \Sigma F_y = 0 = V - 8(8-x) + 24kN$

$V(x) = [-8(8-x) - 24]\,kN$ $\quad V(x=8) = -24\,kN$ ✓

$F_1 = 8(8-x) \qquad d_1 = \frac{1}{2}(8-x)$