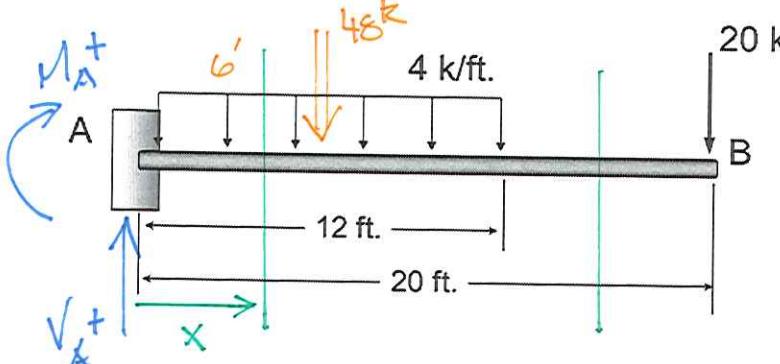


Example 4b-2 - Determine the internal shear and bending moment as a function of x .

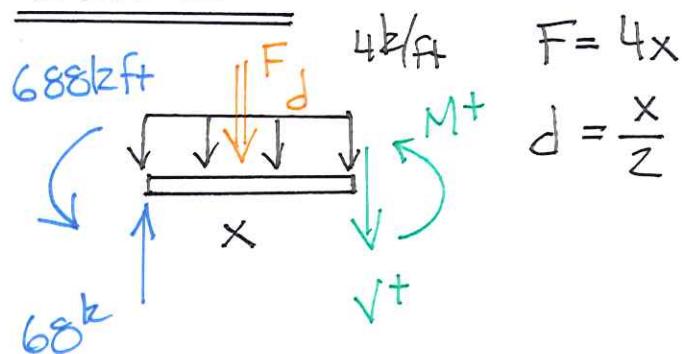


$$\text{Sum of moments at A: } \sum M_A = 0 = -M_A - 48k(6') - 20k(z_0)$$

$$M_A = -688 \text{ kft}$$

$$\text{Sum of vertical forces: } \sum F_y = 0 = V_A - 48k - 20k \quad V_A = 68k$$

$$\text{I} \quad 0 \leq x \leq 12$$



$$\text{Sum of moments at cut: } \sum M_{\text{cut}} = 0 = M + 4x\left(\frac{x}{z}\right) - 68x + 688 \text{ kft}$$

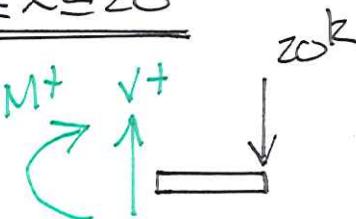
$$M(x)_I = \underline{\underline{[-2x^2 + 68x - 688] \text{ kft}}} \quad M(x=0) = -688$$

$$\text{Sum of vertical forces: } \sum F_y = 0 = -V - 4x + 68 \quad V(x=0) = 68k$$

$$V(x)_I = \underline{\underline{[-4x + 68] k}}$$

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

$$\text{II} \quad 12 \leq x \leq 20$$



$$\text{Sum of moments at cut: } \sum M_{\text{cut}} = 0 = -M - 20(z_0 - x)$$

$$M(x)_{\text{II}} = \underline{\underline{-20(z_0 - x) \text{ kft}}} \quad M(x=20) = 0$$

$$\text{Sum of vertical forces: } \sum F_y = 0 = V - 20$$

$$V(x)_{\text{II}} = \underline{\underline{20k}}$$

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

$$M_I(12) = M_{\text{II}}(12) \quad V_I(12) = V_{\text{II}}(12)$$