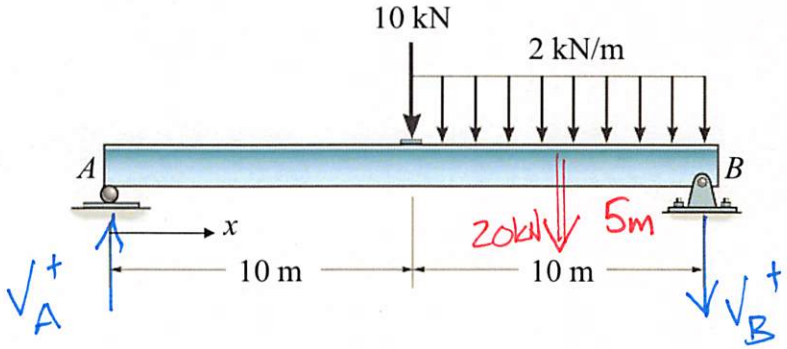
CIVL 3121 Quiz #4 S25 Name: _____

Determine the internal shear force and bending moment as a function of *x* throughout the beam.



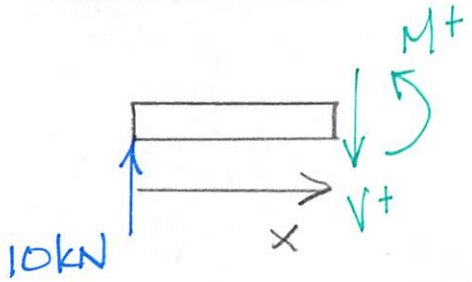
$$\circlearrowleft^+ \sum M_B = 0 = 20kN(5m) - 10kN(10m) - V_A(20m)$$

$$V_A = 10kN$$

$$+\uparrow \sum F_y = 0 = V_A - V_B - 20kN - 10kN$$

$$V_B = -20kN$$

$0 \le x \le 10m$



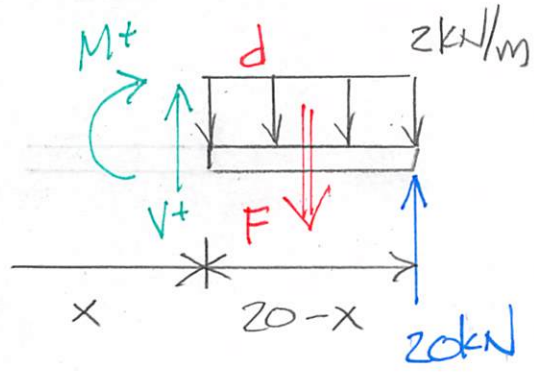
$$\circlearrowleft^+ \sum M_{CUT} = 0 = M - 10kN\,x$$

$$M(x) = [10x]\,kNm$$

$$+\uparrow \sum F_y = 0 = -V + 10kN$$

$$V(x) = 10kN$$

$10 \le x \le 20m$



$$\circlearrowleft^+ \sum M_{CUT} = 0 = -M - Fd + 20(20-x)$$

$$M(x) = \left[-(20-x)^2 + 20(20-x)\right] kNm$$

$$+\uparrow \sum F_y = 0 = V - F + 20kN$$

$$V(x) = \left[2(20-x) - 20\right] kN$$

$F = 2(20-x)$

$d = \frac{1}{2}(20-x)$