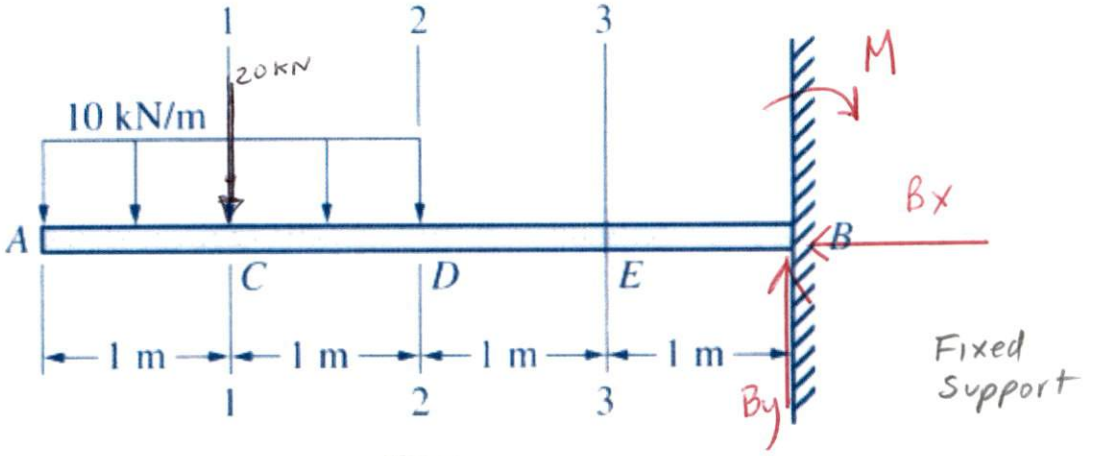
13-7

Refer to Figs. P13-7 to P13-12. Use the rules for finding shear forces and bending moments to determine the shear forces and bending moments in each figure at sections 1-1, 2-2, and 3-3.



Solution.

FBD

Equilibrium Equations

ccw +M ↻
cw −M ↺

$[\Sigma F_x = 0]$ $B_x = 0$

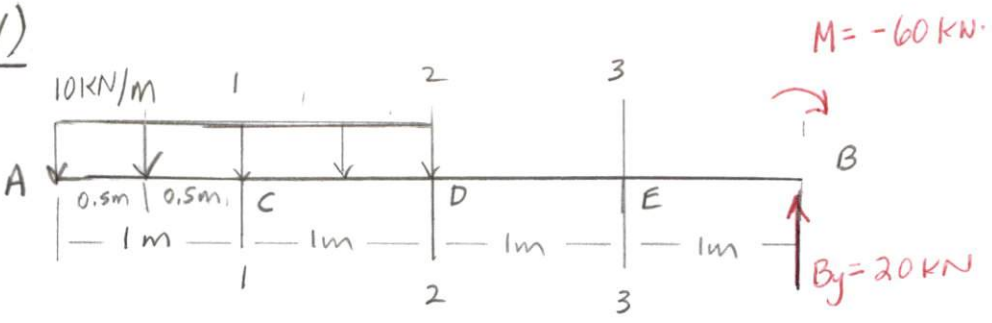
$[\Sigma F_y = 0]$ $-20\ kN + B_y = 0$

$B_y = 20\ kN \uparrow$

$[\Sigma M_B = 0]$ $20\ kN\,(3m) - M = 0$

$M = 60\ kN\cdot m$ ↺ and $M = -60\ kN\cdot m$ ↺

Shear Force (V)



$V_{1-1} = -\left(10\frac{kN}{m}\right)(1m) = -10kN$

$V_{2-2} = -\ 10\frac{kN}{m}(2m) = -\ 20\ kN$

$V_{3-3} = -\ 10\frac{kN}{m}(2m) = -\ 20\ kN$

Bending Moment (M)

$$M_{1-1} = -\frac{10\,kN}{m}(1m)(0.5m) = -5\,kN\cdot m$$

$$M_{2-2} = -\frac{10\,kN}{m}(2m)(1m) = -20\,kN\cdot m$$

$$M_{3-3} = -\frac{10\,kN}{m}(2m)(2m) = -40\,kN\cdot m$$