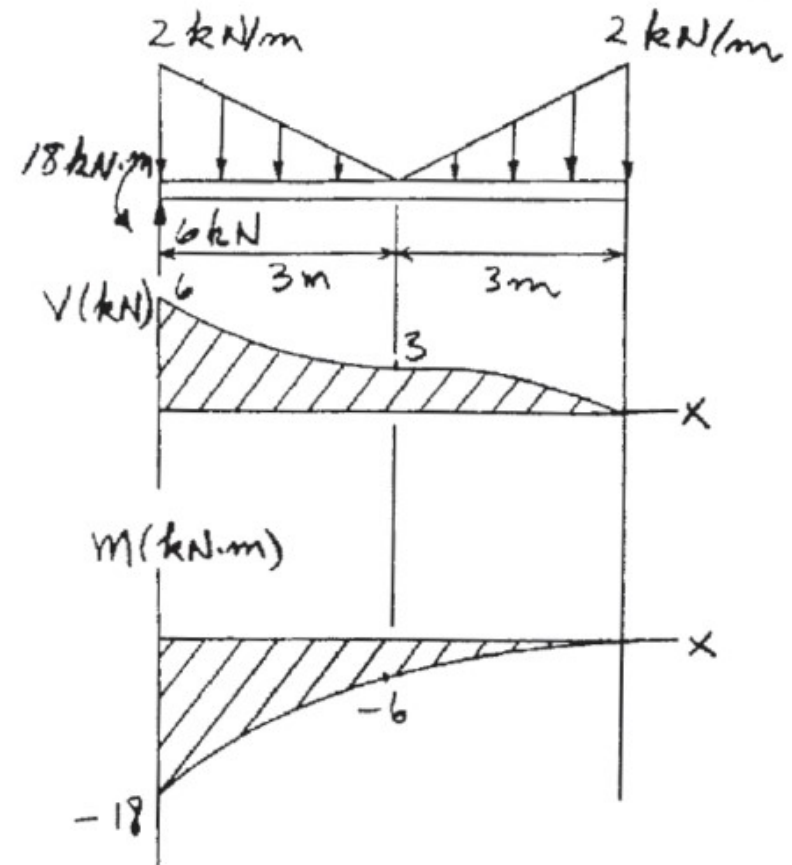
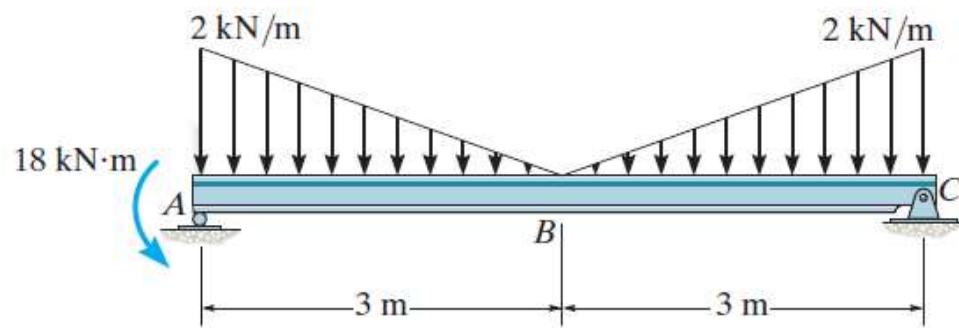
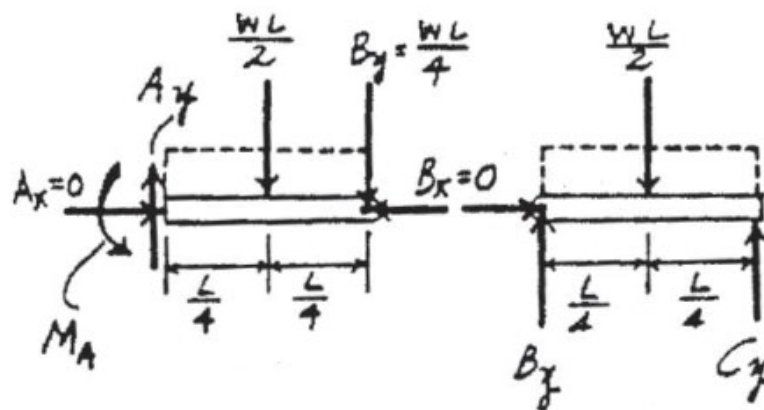
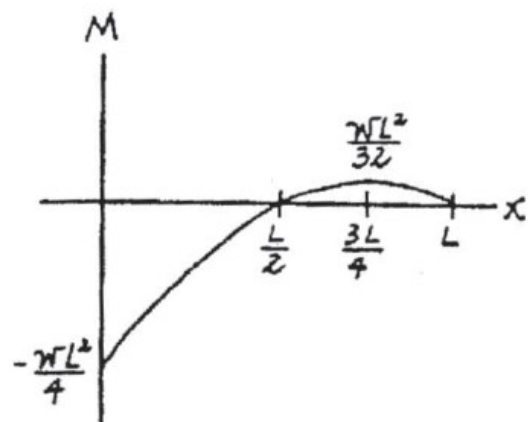
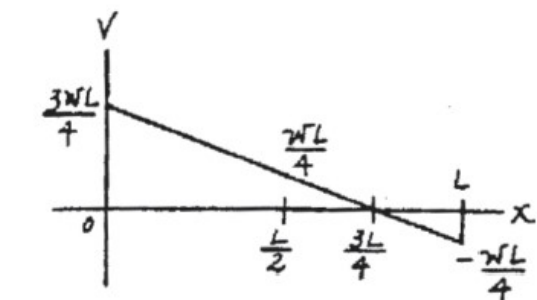
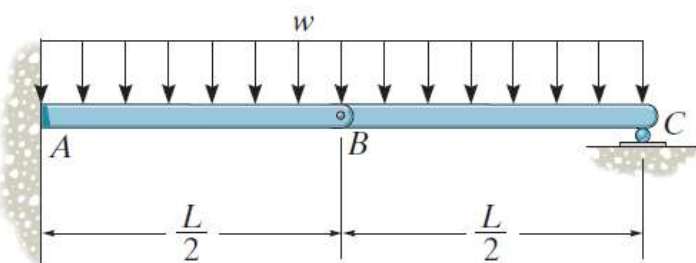


Draw the shear and moment diagrams for the beam.



Draw the shear and bending-moment diagrams for beam *ABC*. Note that there is a pin at *B*.

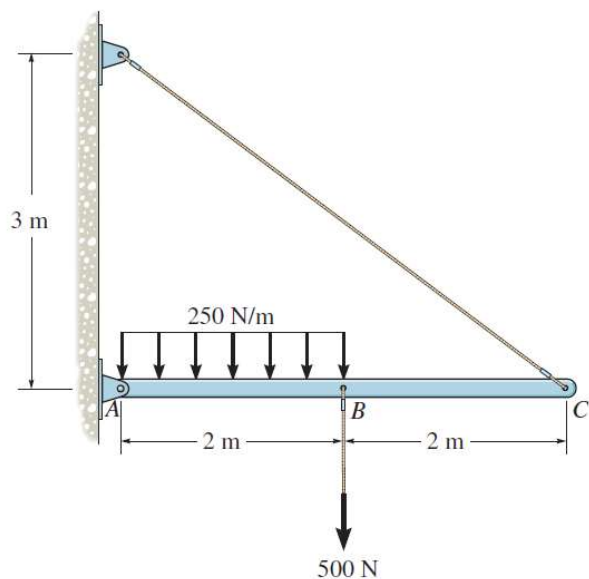


$$\zeta + \sum M_C = 0; \quad \frac{wL}{2} \left(\frac{L}{4} \right) - B_y \left(\frac{L}{2} \right) = 0 \quad B_y = \frac{wL}{4}$$

$$+ \uparrow \sum F_y = 0; \quad A_y - \frac{wL}{2} - \frac{wL}{4} = 0 \quad A_y = \frac{3wL}{4}$$

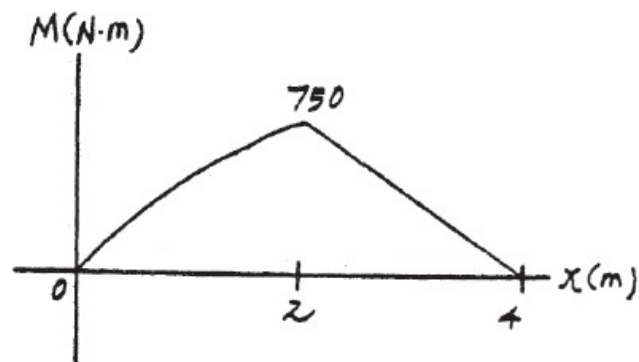
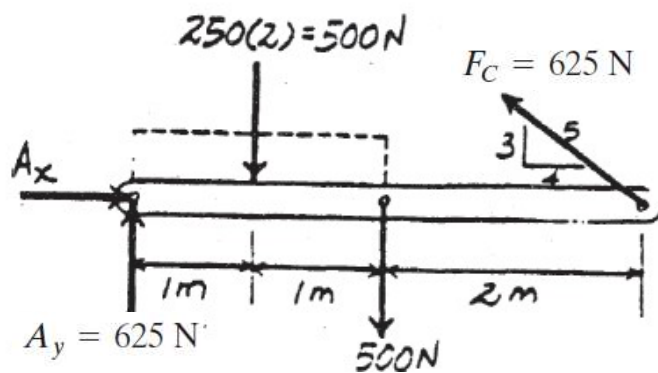
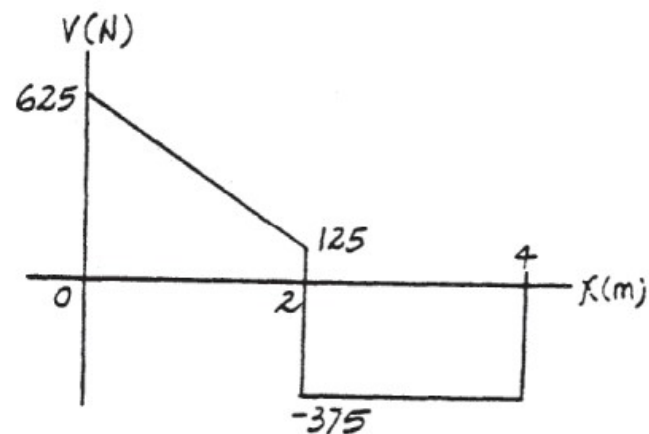
$$\zeta + \sum M_A = 0; \quad M_A - \frac{wL}{2} \left(\frac{L}{4} \right) - \frac{wL}{4} \left(\frac{L}{2} \right) = 0 \quad M_A = \frac{wL^2}{4}$$

Draw the shear and moment diagrams for the beam.

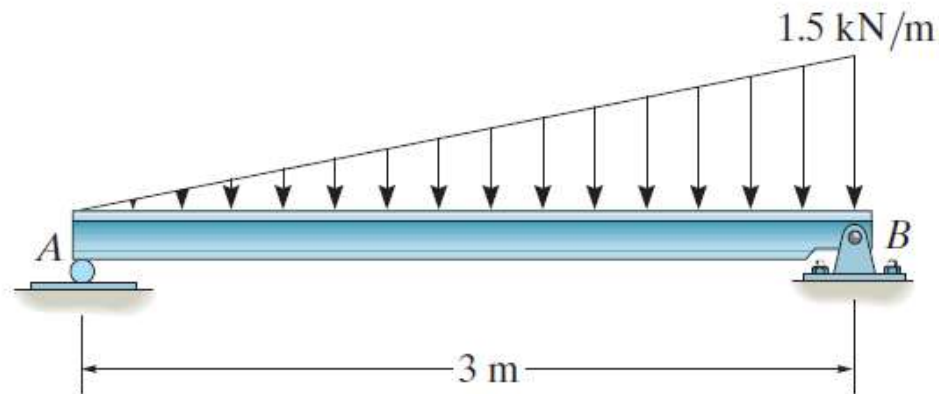


$$\zeta + \Sigma M_A = 0; \quad F_C \left(\frac{3}{5} \right) (4) - 500(2) - 500(1) = 0 \quad F_C = 625 \text{ N}$$

$$+\uparrow \Sigma F_y = 0; \quad A_y + 625 \left(\frac{3}{5} \right) - 500 - 500 = 0 \quad A_y = 625 \text{ N}$$



Draw the shear and moment diagrams for the beam.



$$+\uparrow \Sigma F_y = 0; \quad 0.75 - \frac{1}{2}x(0.5x) - V = 0$$

$$V = 0.75 - 0.25x^2$$

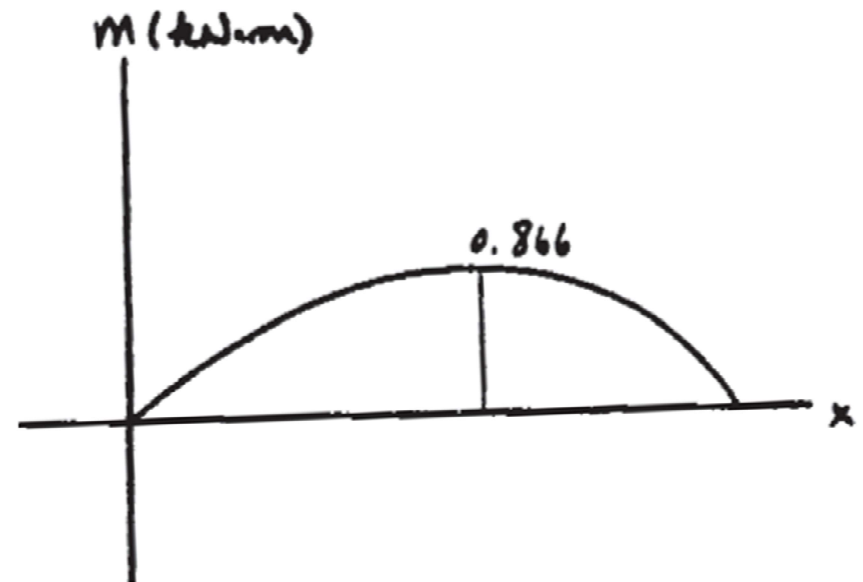
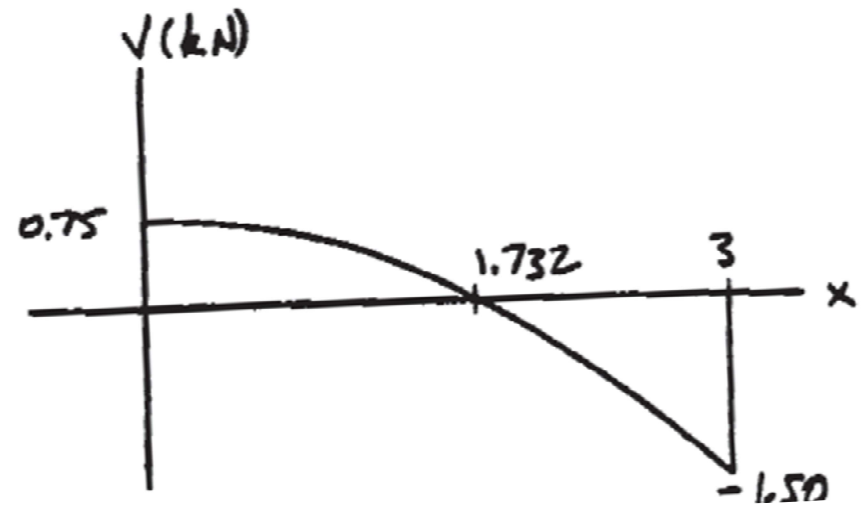
$$V = 0 = 0.75 - 0.25x^2$$

$$x = 1.732 \text{ m}$$

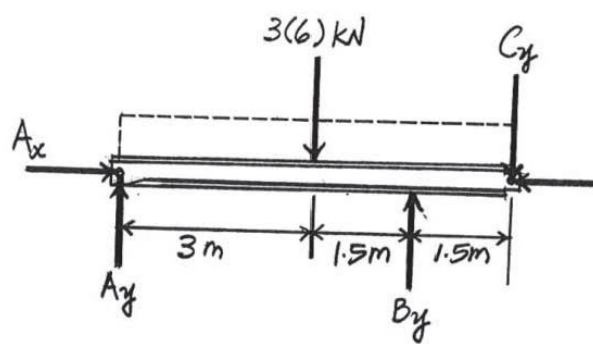
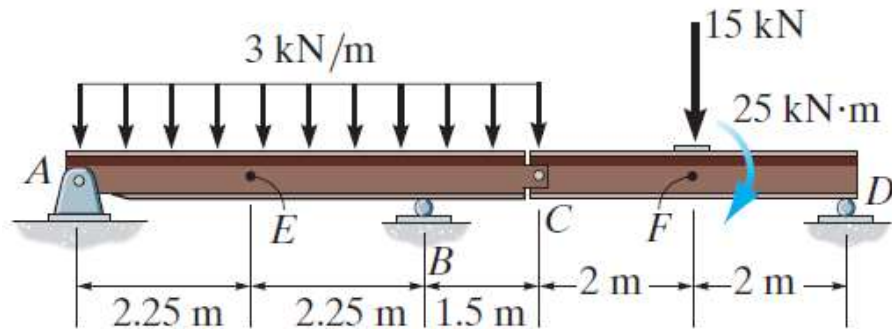
$$\zeta + \Sigma M = 0; \quad M + \left(\frac{1}{2}\right)(0.5x)(x)\left(\frac{1}{3}x\right) - 0.75x = 0$$

$$M = 0.75x - 0.08333x^3$$

$$M_{max} = 0.75(1.732) - 0.08333(1.732)^3 = 0.866$$



Determine the internal normal force, shear force, and moment at points E and F in the compound beam. Point F is located just to the left of the 15-kN force and 25-kN·m couple moment.



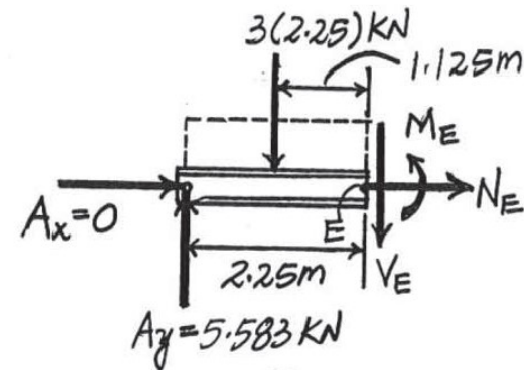
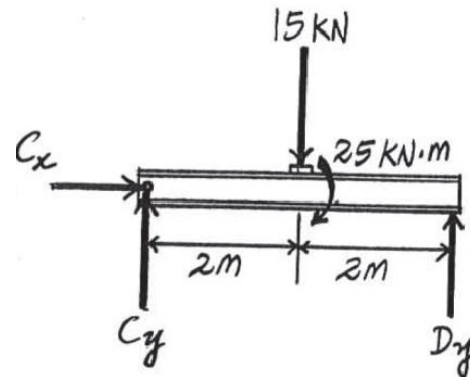
$$\pm \sum F_x = 0; \quad C_x = 0$$

$$\zeta + \sum M_C = 0; \quad D_y(4) - 15(2) - 25 = 0 \quad D_y = 13.75 \text{ kN}$$

$$\zeta + \sum M_D = 0; \quad 15(2) - 25 - C_y(4) = 0 \quad C_y = 1.25 \text{ kN}$$

$$\pm \sum F_x = 0; \quad A_x = 0$$

$$\zeta + \sum M_B = 0; \quad 3(6)(1.5) - 1.25(1.5) - A_y(4.5) = 0 \quad A_y = 5.583 \text{ kN}$$

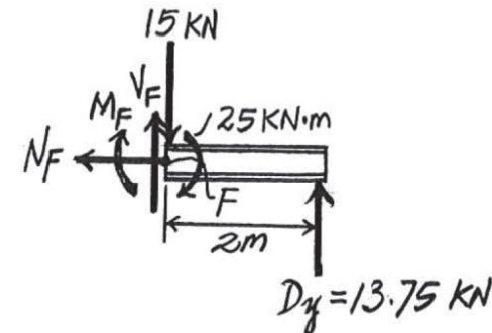


$$\pm \sum F_x = 0; \quad N_E = 0$$

$$+\uparrow \sum F_y = 0; \quad 5.583 - 3(2.25) - V_E = 0 \quad V_E = -1.17 \text{ kN}$$

$$\zeta + \sum M_E = 0; \quad M_E + 3(2.25) - 3(2.25)(8.125) = 0$$

$$M_E = 4.97 \text{ kN} \cdot \text{m}$$



$$\pm \sum F_x = 0; \quad N_F = 0$$

$$+\uparrow \sum F_y = 0; \quad V_F - 15 + 13.75 = 0 \quad V_F = 1.25 \text{ kN}$$

$$\zeta + \sum M_F = 0; \quad 13.75(2) - 25 - M_F = 0 \quad M_F = 2.5 \text{ kN} \cdot \text{m}$$

