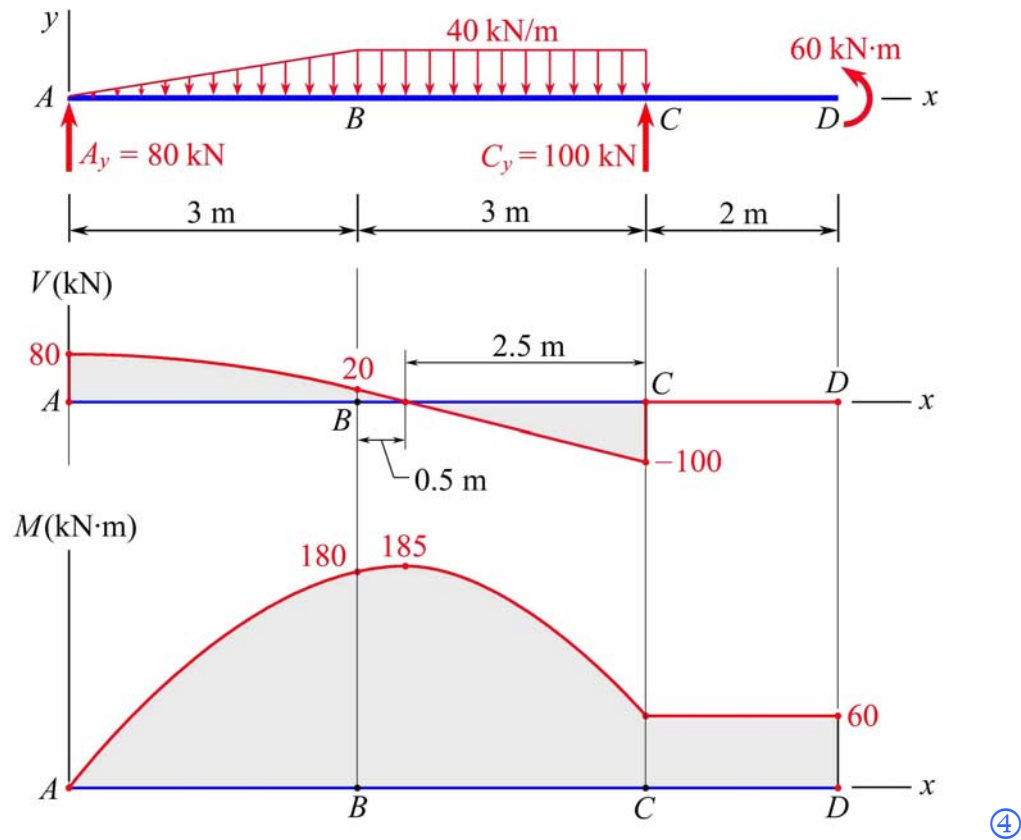


Answers to MEEG 3013 Test IIb

1. (a) Free-body diagram, shear diagram (V - x), and bending-moment diagram (M - x):



$$(b) \quad q = 80 \langle x \rangle^{-1} - \frac{40}{3}x + \frac{40}{3} \langle x-3 \rangle^1 + 40 \langle x-6 \rangle^0 + 100 \langle x-6 \rangle^{-1} \quad (1)$$

$$V = 80 - \frac{20}{3}x^2 + \frac{20}{3} \langle x-3 \rangle^2 + 40 \langle x-6 \rangle^1 + 100 \langle x-6 \rangle^0 \quad (1)$$

$$M = 80x - \frac{20}{9}x^3 + \frac{20}{9} \langle x-3 \rangle^3 + 20 \langle x-6 \rangle^2 + 100 \langle x-6 \rangle^1 \quad (1)$$

$$(c) \quad V_{\text{at } x=3.5 \text{ m}} = 0 \quad M_{\text{at } x=3.5 \text{ m}} = 185 \text{ kN}\cdot\text{m} \quad M_{\text{max}} = 185 \text{ kN}\cdot\text{m} \quad (3)$$

2. Mohr's circle with $X(0, -40)$, $Y(60, 40)$, angles, and dimensions: (4)

$$-45.0^\circ \leq \theta \leq -8.13^\circ \quad (3) \quad 45.0^\circ \leq \theta \leq 81.9^\circ \quad (3)$$

3. A. (b)
B. (f)
C. (a)

4. (See text.)