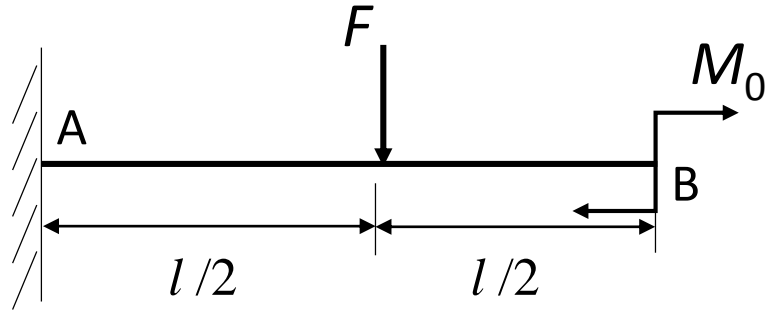# 4.1(c)

$\sum F_y = 0$ $Q' = 1N$

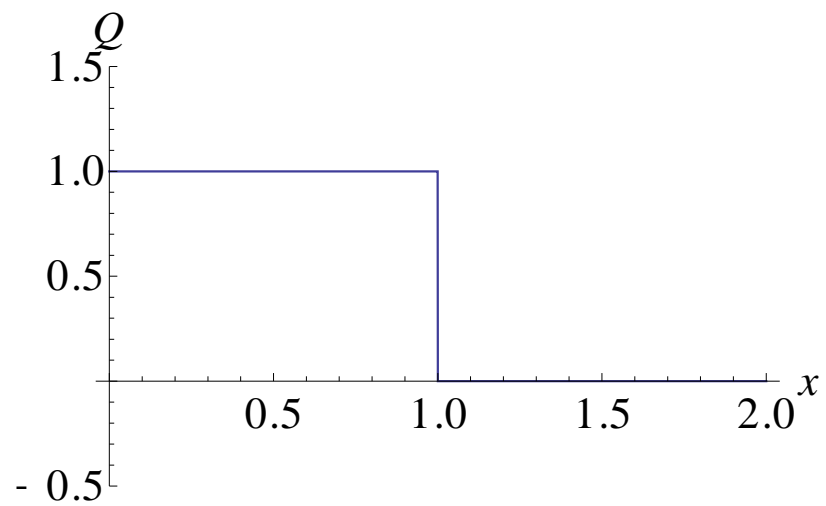$\sum M_A = 0$ $M' = -2\,N \cdot m$

$0 < x < \dfrac{l}{2}$

$Q = 1$

$M = x - 2$

$\dfrac{l}{2} < x < l$
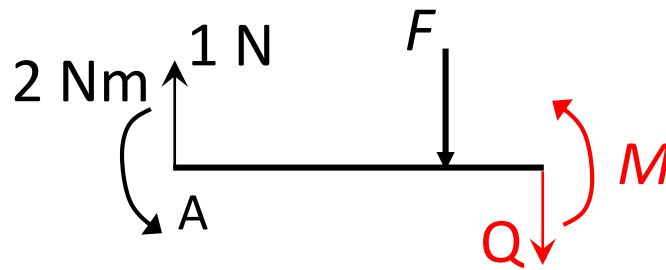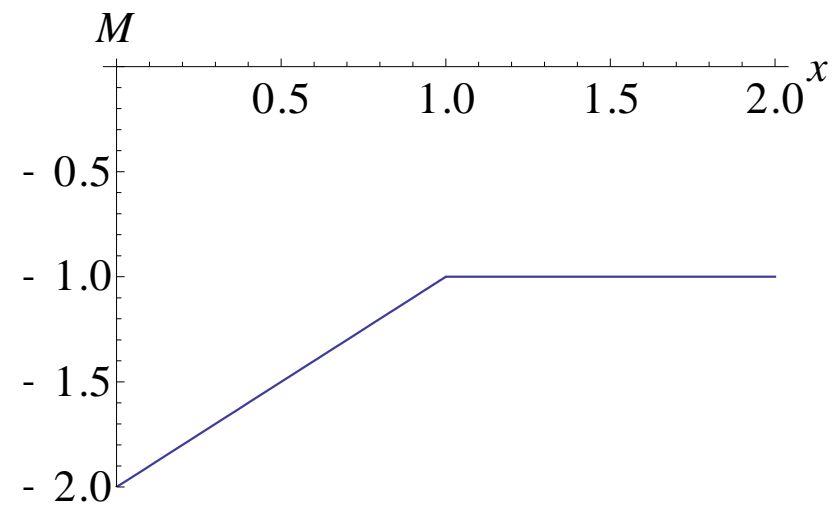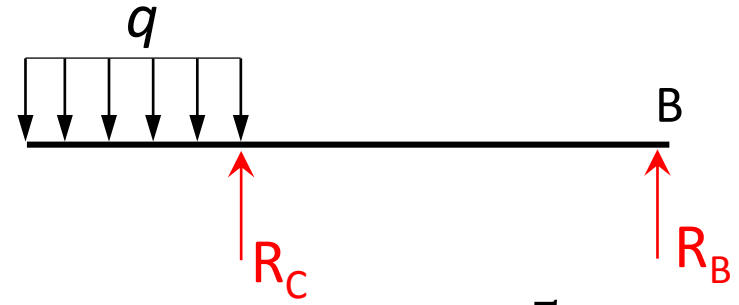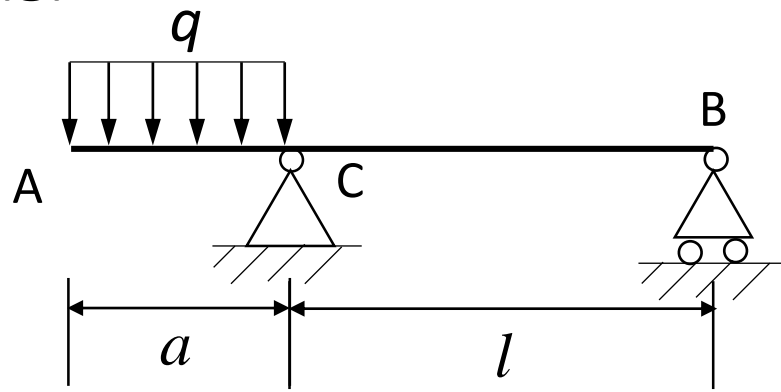
$Q = 0$

$M = -1$

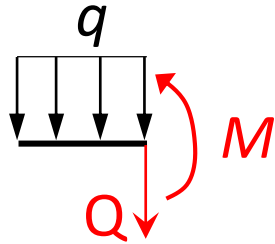$|Q|_{max} = 1 \text{N}$

$|M|_{max} = 2 \text{ Nm}$

4.1(g)

$\Sigma F_y = 0$
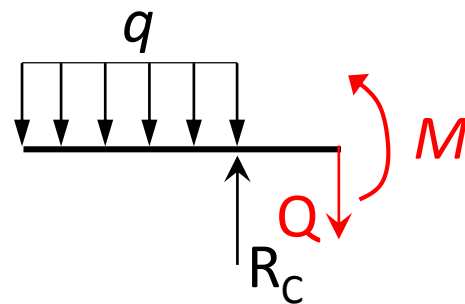$\Sigma M_B = 0$

$R_C = \frac{5}{4} N$

$R_B = -\frac{1}{4} N$

$0 < x < a$

$Q = -x$

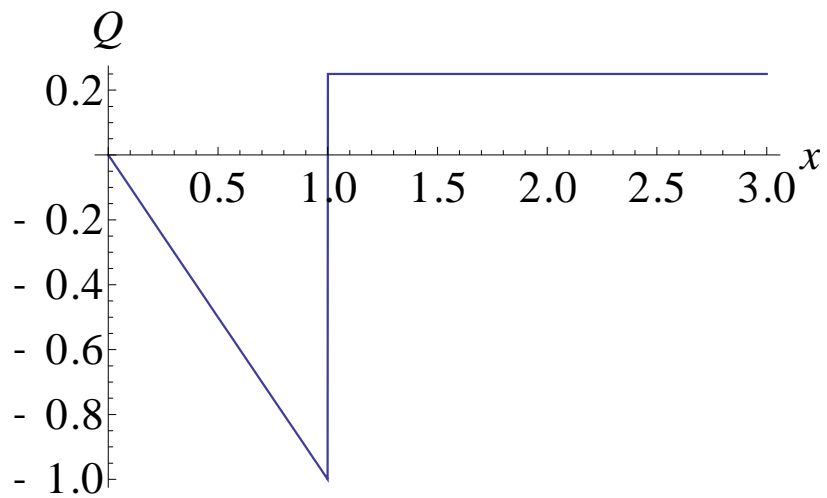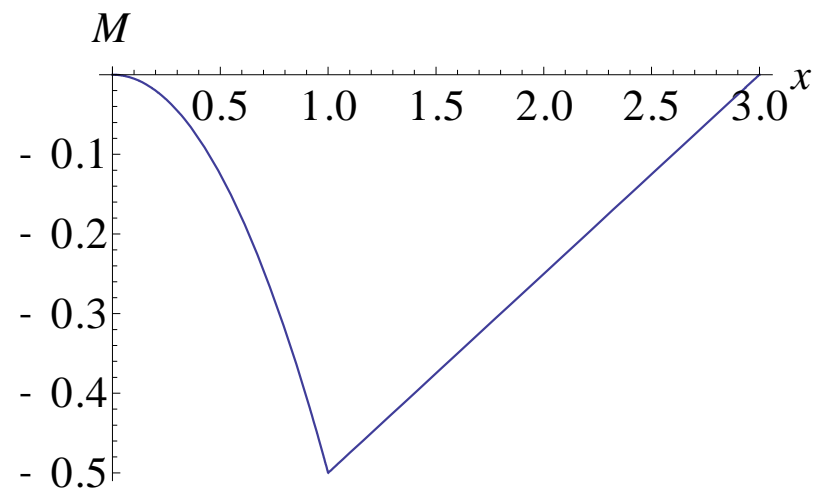$M = -\frac{x^2}{2}$

$a < x < a + l$

$Q = \frac{1}{4}$

$M = \frac{1}{4}x - \frac{3}{4}$
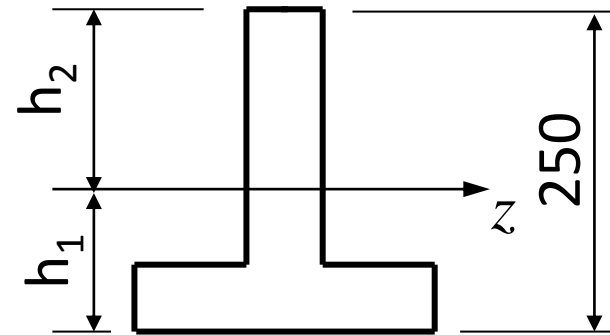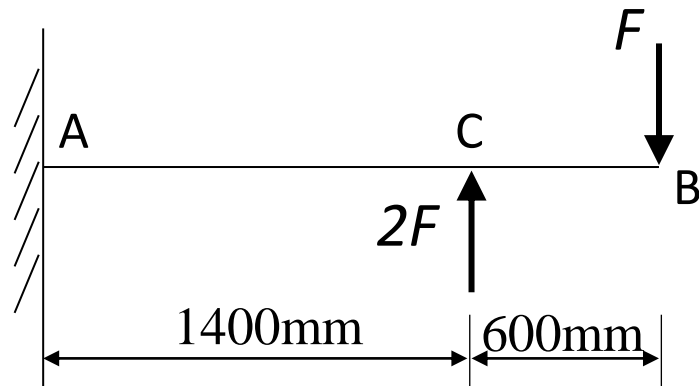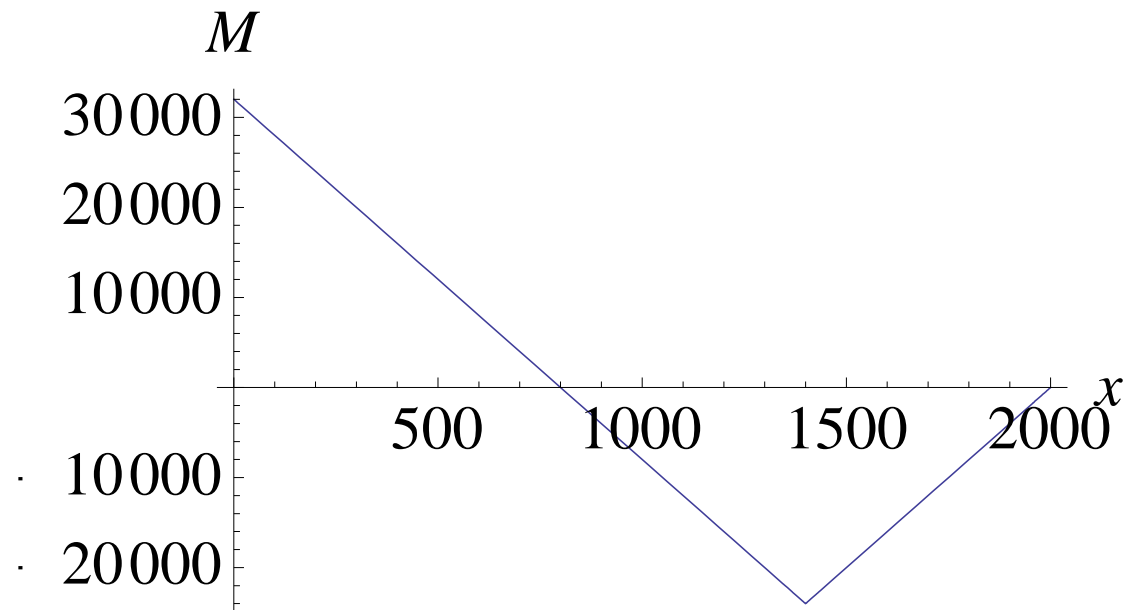
$|Q|_{max} = 1\text{N}$

$|M|_{max} = 0.5\ \text{Nm}$

4-5 T字形截面铸铁悬臂梁的尺寸及载荷如图所示。已知F=40 KN，$[\sigma_{拉}]$=40 MPa，$[\sigma_{压}]$=80 MPa，I_z=10180 cm^4，h_1=96.4 mm。试校核梁的强度

$$M = 32000 - 40x \text{ KN·mm} \qquad 0 \le x \le 1400$$

$$M = 40x - 80000 \text{ KN·mm} \qquad 1400 \le x \le 2000$$

M=32000 KNmm时

$$\sigma_{压} = \frac{Mh_2}{I_z} = \frac{32000 \times (250 - 96.4)}{10180} = 48.28MPa < [\sigma_{压}]$$

$$\sigma_{拉} = \frac{Mh_1}{I_z} = \frac{32000 \times 96.4}{10180} = 30.3MPa < [\sigma_{拉}]$$

M=-24000 KNmm时

$$\sigma_{压} = \frac{Mh_1}{I_z} = \frac{24000 \times 96.4}{10180} = 22.73MPa < [\sigma_{压}]$$

$$\sigma_{拉} = \frac{Mh_2}{I_z} = \frac{24000 \times (250 - 96.4)}{10180} = 36.21\ MPa < [\sigma_{拉}]$$