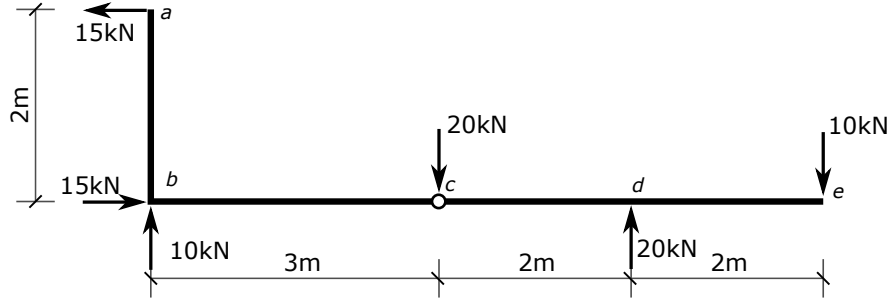
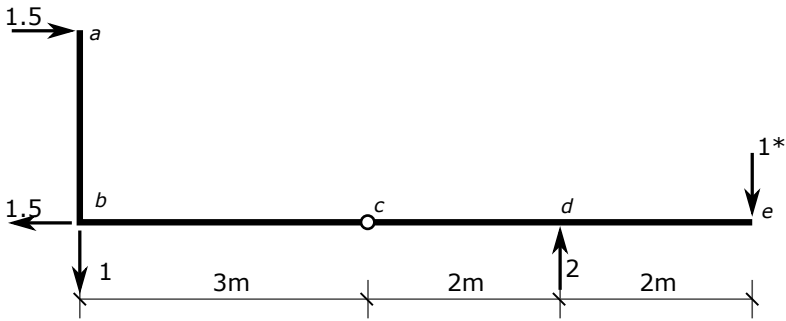
For vertical displacement at pt. e

Real



Virtual



due to spring elongation:

$$\Delta_e = \sum udL$$

Corrected Dec 14, 2012

$$\Delta_e = 1.5 \times \frac{-15kN}{10000kN/m} = -0.00225m = -2.25mm \qquad (\therefore\uparrow)$$

from previous problem, due to flexure: $\Delta_e = -1.074mm$

total displacement: $\Delta_e = -1.074mm - 2.25mm = -3.32mm \qquad (\therefore\uparrow)$