

Remarks: See §2.7, pages 45 t/m 51

Answers 2.48-1:

a. $q_x = (1 \text{ kN/m}^2)x + (3 \text{ kN/m})$

b. $N = -(0,5 \text{ kN/m}^2)x^2 - (3 \text{ kN/m})x + (15 \text{ kN})$

$$u = -\frac{x^3}{54 \times 10^3 \text{ m}^2} - \frac{x^2}{6 \times 10^3 \text{ m}} + \frac{5x}{3 \times 10^3}$$

c. $N(x=0) = +15 \text{ kN}$; $N(x=6 \text{ m}) = -21 \text{ kN}$

$$u(x=0) = +6 \text{ mm} ; u(x=6 \text{ m}) = 0$$

d. $N_A = +15 \text{ kN} \Rightarrow A_h = 15 \text{ kN} \leftarrow$

$$N_B = -21 \text{ kN} \Rightarrow B_h = 21 \text{ kN} \leftarrow$$

Explanation:

Units of measurement used: kN and m

$$q_x = x + 3$$

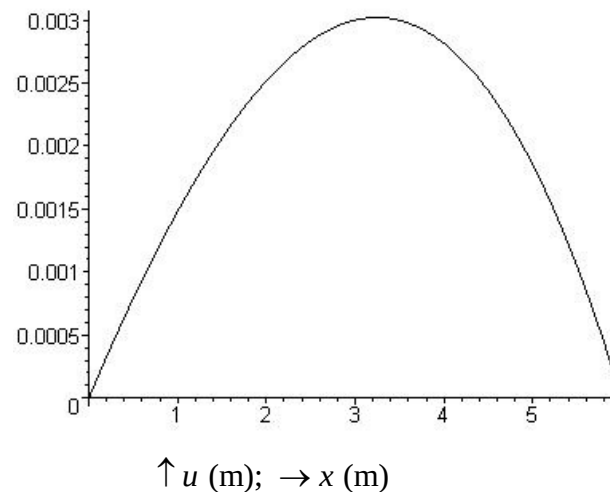
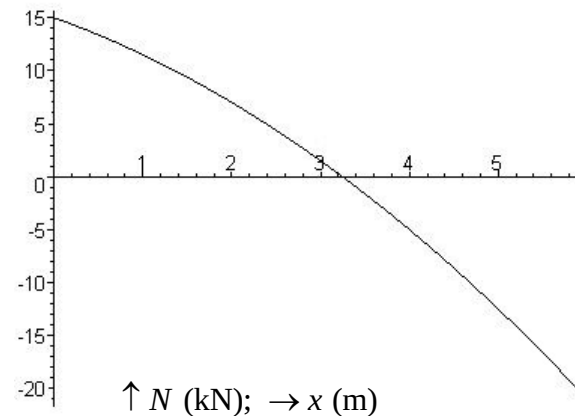
$$EAu'' = -q_x = -x - 3$$

$$N = EAu' = -\frac{1}{2}x^2 - 3x + C_1$$

$$EAu = -\frac{1}{6}x^3 - \frac{3}{2}x^2 + C_1x + C_2$$

$$x = 0; u = 0 \Rightarrow C_2 = 0$$

$$x = 6 \text{ m}; u = 0 \Rightarrow C_1 = 15 \text{ kN}$$



Remarks: See §2.7, pages 45 t/m 51

Answers 2.48-2:

a. $q_x = -(1 \text{ kN/m}^2)x + (9 \text{ kN/m})$

b. $N = +(0,5 \text{ kN/m}^2)x^2 - (9 \text{ kN/m})x + (21 \text{ kN})$

$$u = +\frac{x^3}{54 \times 10^3 \text{ m}^2} - \frac{x^2}{2 \times 10^3 \text{ m}} + \frac{7x}{3 \times 10^3}$$

c. $N(x=0) = +21 \text{ kN}$; $N(x=6 \text{ m}) = -15 \text{ kN}$

$$u(x=0) = 0; u(x=6 \text{ m}) = 0$$

d. $N_A = +21 \text{ kN} \Rightarrow A_h = 21 \text{ kN} \leftarrow$

$$N_B = -15 \text{ kN} \Rightarrow B_h = 15 \text{ kN} \leftarrow$$

Explanation:

Units of measurement used: kN and m

$$q_x = x - 9$$

$$EAu'' = -q_x = -x + 9$$

$$N = EAu' = -\frac{1}{2}x^2 - 9x + C_1$$

$$EAu = -\frac{1}{6}x^3 - \frac{9}{2}x^2 + C_1x + C_2$$

$$x=0; u=0 \Rightarrow C_2 = 0$$

$$x=6 \text{ m}; u=0 \Rightarrow C_1 = 21 \text{ kN}$$

