

## Problems for Chapter 3 p.28

prob 1

$$W1 := 13 \quad \text{N/m} \quad S1 := 300 \quad D1 := 8$$

$$T1 := \frac{W1 \cdot S1^2}{8 \cdot D1} \quad T1 = 1.828 \cdot 10^4 \quad \text{N}$$

$$T2 := T1$$

$$W2 := W1 \quad S2 := 250$$

$$D2 := \frac{W2 \cdot S2^2}{8 \cdot T2} \quad D2 = 5.556 \quad \text{N}$$

prob 2

$$\sqrt{W_v^2 + (W_w + W_i)^2} \quad \text{N}$$

prob 3

$$D1 := 1 \quad D2 := 0.8 \quad S := 1 \quad W := 1$$

$$T1 := \frac{W \cdot S^2}{8 \cdot D1} \quad T2 := \frac{W \cdot S^2}{8 \cdot D2} \quad \frac{T2}{T1} = 1.25$$

prob 4

$$D1 := 1 \quad D2 := 0.9 \quad S := 1 \quad W := 1$$

$$T1 := \frac{W \cdot S^2}{8 \cdot D1} \quad T2 := \frac{W \cdot S^2}{8 \cdot D2} \quad \frac{T2}{T1} = 1.111$$

prob 5

$$L = S + \frac{8 \cdot d^2}{3 \cdot S}$$

$$L = S + \frac{8 \cdot d^2}{3 \cdot S} = 2 \cdot \left[ \frac{S}{2} + \frac{8 \cdot x^2}{3 \cdot \left(\frac{S}{2}\right)} \right] = S + \frac{32 \cdot x^2}{3 \cdot S}$$

therefore

$$x = \frac{d}{2}$$

prob 6

$$L = S + \frac{8 \cdot d^2}{3 \cdot S}$$

$$S := 200 \quad d := 4.5$$

$$L := S + \frac{8 \cdot d^2}{3 \cdot S} \quad L = 200.27$$

therefore

$$x = \frac{d}{2}$$

$$L := 200.27 + 0.05$$

$$d := \sqrt{\frac{(L - S) \cdot 3 \cdot S}{8}} \quad d = 4.899$$

m