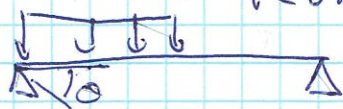


12.13

$$\Theta_1 = \frac{-3wL^3}{128EI}$$

$$V_{L/2}^1 = \frac{-5wL^4}{768EI}$$

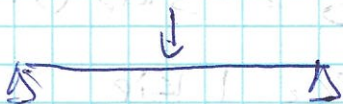
$$w = 2 \text{ kN/m}$$



$$P = 8 \text{ kN}$$

$$L = 8 \text{ m}$$

$$\Theta_2 = \frac{-PL^2}{16EI}$$

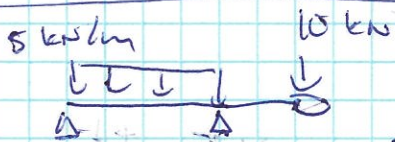


$$V_{L/2}^2 = \frac{-PL^3}{48EI}$$

$$\Theta_A = \Theta_1 + \Theta_2 = \frac{-3(2)(8)^3}{128EI} + \left(\frac{-8(8)^2}{16EI} \right)$$

$$V = V^1 + V^2 = \frac{-5(2)(8)^4}{768EI} + \left(\frac{-8(8)^3}{48EI} \right)$$

12.15

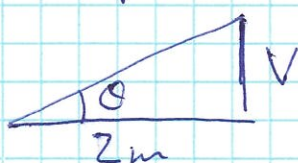


$$w = 5$$

$$V_1 = -20$$

$$V_2 = -20$$

$$V_3 = -20$$



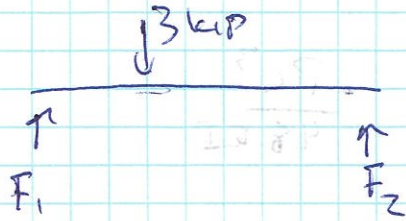
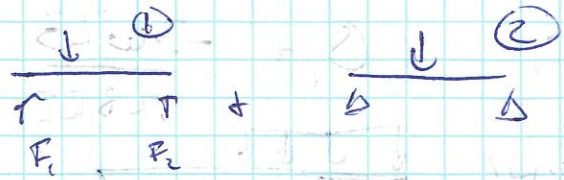
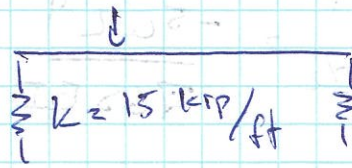
$$\tan \theta = \frac{V}{2} \Rightarrow V \approx 20$$

$$\Theta_1 = \frac{wL^3}{24EI} \Rightarrow V_1 = \frac{5(4)^3}{12EI}$$

$$\Theta_2 = -\frac{ML}{3EI} \Rightarrow V_2 = -\frac{20(4)(2)}{3EI}$$

$$V_3 = -\frac{10(2)^2}{3EI}$$

12.16



$$\sum F_y = 0 = F_1 + F_2 - 3 = 0$$

$$\Rightarrow F_1 = 2$$

$$\sum M_1 = 0 = -3 \text{ kip} (3 \text{ ft}) + 9 F_2$$

$$F_2 = 1 \text{ kip}$$



$$V_1 = \frac{1 \text{ kip}}{15 \text{ kip/ft}} = \frac{1}{15} \text{ ft}$$

$$\frac{V_2}{6} = \frac{1/15}{9} \Rightarrow V_2 = \frac{2}{45} \text{ ft}$$

$$V_3 = \frac{3(6)(3)}{6EI(9)} (9^2 - 6^2 - 3^2) = \frac{144 \text{ in}^2}{\text{ft}^2}$$

$$= \frac{3(6)(3)(81 - 36 - 9) 144}{6(29000)(12) 9} = 0.15 \text{ ft}$$

$$= 0.126 \text{ ft} = 1.5 \text{ in}$$