

NAME:

Quiz 05: Chapter 04

- A) Replace the distributed load with two equivalent discrete forces, F_1 and F_2 .
- B) Calculate the moment M_O of F_1 and F_2 about point O .
- C) Replace F_1 , F_2 , and M_O with a single equivalent resultant force R . Determine where (measured from point O) this load should be applied.

$$F_1 = \frac{bh}{2} = \frac{(3\text{m})(3\text{kN/m})}{2} = 4.5\text{kN}$$

$$x_1 = \frac{2b}{3} = \frac{2(3\text{m})}{3} = 2\text{m}$$

$$F_2 = \frac{bh}{2} = \frac{(1.5\text{m})(3\text{kN/m})}{2} = 2.25\text{kN}$$

$$x_2 = 3\text{m} + \frac{b}{3} = 3 + \frac{(1.5\text{m})}{3} = 3.5\text{m}$$

$$\curvearrowright M_O = F_1 x_1 + F_2 x_2 = (4.5\text{kN})(2\text{m}) + (2.25\text{kN})(3.5\text{m}) = 16.9\text{N}\cdot\text{m}$$

$$\downarrow R = F_1 + F_2 = 6.75\text{kN}$$

$$M_O = Rx \Rightarrow 16.9\text{N}\cdot\text{m} = (6.75\text{kN})x \Rightarrow x = 2.5\text{m}$$

