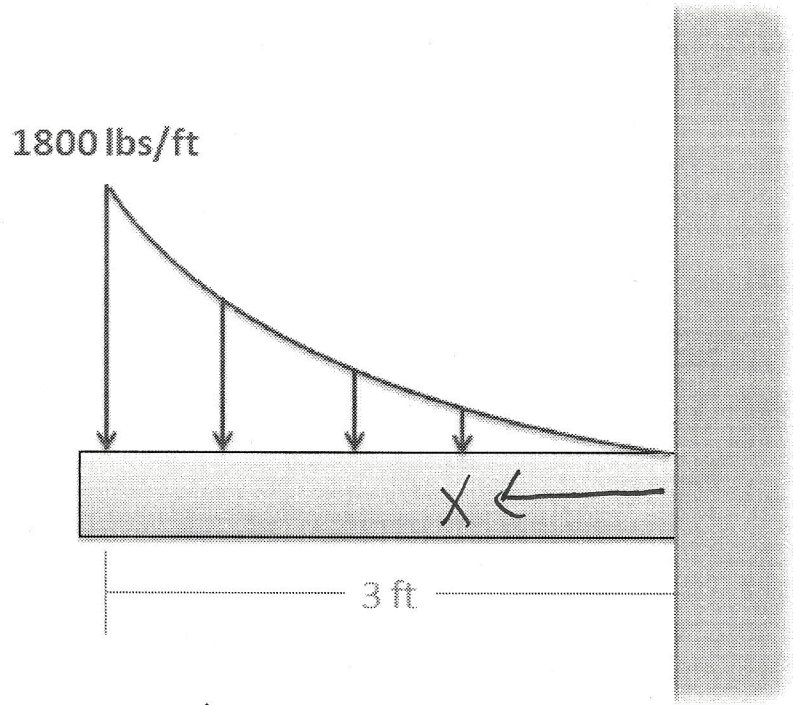
Question 2:

Determine the magnitude and the point of application for the equivalent point load of the distributed force shown below.



$1800 = a(3)^2$

$a = 200$

Calculations

$$F(x) = 200x^2$$

$$F_{eq} = \int_0^3 (200x^2)\,dx$$

$$F_{eq} = \left|_0^3 \frac{200}{3}x^3\right.$$

$$F_{eq} = \frac{200}{3}(3)^3 - 0$$

$$F_{eq} = 1800 \text{ lbs}$$

$$X_{eq} = \frac{\int_0^3 (200x^2)(x)\,dx}{F_{eq}}$$

$$\int_0^3 200x^3\,dx$$

$$\downarrow$$

$$\Big|_0^3 50x^4$$

$$50(3)^4 - 0 = 4050$$

$$X_{eq} = \frac{4050}{1800}$$

$$X_{eq} = 2.25\ ft$$

Solution