

### Answer on Question # 42002 – Math – Calculus

The intensity  $I$  of light varies inversely as the square of the distance  $D$  from the source. If the intensity of illumination on a screen 5 ft from a light is 4 foot candles, find the intensity on a screen 20 ft from the light.

**Solution:**

Intensity varies inversely as the square of the distance  $D$  from the source ( $k$  – coefficient):

$$I = \frac{k}{D^2}$$

In first case ( $D_1 = 5\text{ft}$ ,  $I_1 = 4\text{ fc}$ ):

$$I_1 = \frac{k}{D_1^2} \quad (1)$$

In second case ( $D_2 = 20\text{ft}$ ):

$$I_2 = \frac{k}{D_2^2} \quad (2)$$

(2)  $\div$  (1):

$$\frac{I_2}{I_1} = \frac{k}{D_2^2} \cdot \frac{D_1^2}{k} = \frac{D_1^2}{D_2^2}$$

$$I_2 = I_1 \frac{D_1^2}{D_2^2} = 4\text{fc} \cdot \frac{(5\text{ ft})^2}{(20\text{ ft})^2} = 0.25\text{fc}$$

**Answer:** intensity is equal to 0.25 foot candles.