

Answer on Question 38958, Physics, Optics We will use formula for 2-lens system here. The effective focal length of such system is

$$\frac{1}{f_{eff}} = \frac{1}{f_1} + \frac{1}{f_2} - \frac{l}{f_1 f_2}$$

$$f_{eff} = \frac{1}{\frac{1}{f_1} + \frac{1}{f_2} - \frac{l}{f_1 f_2}}$$

where f_1, f_2 are focal lengths of the 1 and lens and l is distance between them. For concave lens f_2 should be negative.

We need f_{eff} to be infinity if we want to keep parallel beam parallel. Hence, equation for distance l is

$$\frac{1}{f_1} + \frac{1}{f_2} - \frac{l}{f_1 f_2} = 0$$

$$l = \left(\frac{1}{f_1} + \frac{1}{f_2} \right) f_1 f_2$$

$$l = - \left(\frac{1}{15} - \frac{1}{5} \right) \cdot 15 \cdot 5 = 10 \text{ cm}$$

Hence, answer is c) 10 cm.