

Answer on Question #39548, Physics, Other

Question:

An equiconvex lens of radius of curvature is cut in two equal parts by vertical plane so it becomes plano convex. if "f" is the focal length of equi convex lens then what will be the focal length of plano convex lens?

Answer:

Focal length equals:

$$\frac{1}{f} = (n - 1) \left(\frac{1}{R_1} - \frac{1}{R_2} \right)$$

where n is the refractive index of the lens medium, R_1 and R_2 are radii of curvature

Equiconvex lens have the same radius of curvature, or $R_1 = -R_2$ ("-" because both surfaces are convex), therefore:

$$\frac{1}{f} = \frac{2(n - 1)}{R}$$

For plano convex lens focal length equals:

$$\frac{1}{f'} = (n - 1) \frac{1}{R}$$

Therefore:

$$f' = 2f$$

Answer: $2f$