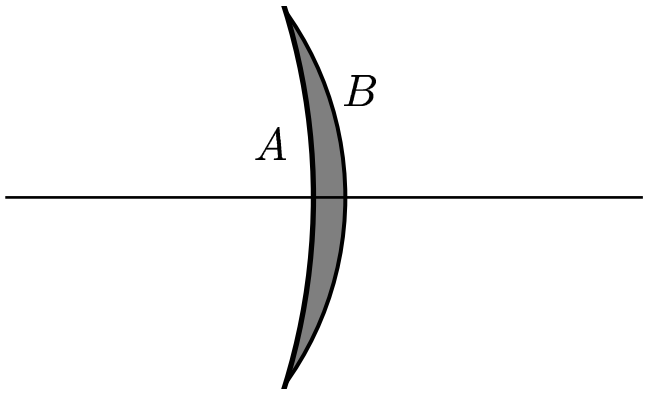
Find the focal length of the thin lens shown below, which has a crescent shape and it is facing to the left. Here $|R_A| = 2\,a$, $|R_B| = a$, $n_{lens} = 1.5$ and $n_{med} = 1$.



A) $f = -\dfrac{3\,a}{4}$

B) $f = -2\,a$

C) $f = 2\,a$

D) $f = -4\,a$

E) $f = 4\,a$

Using $n_{lens} = \frac{3}{2}$ and $n_{medium} = 1$, the lens maker's formula gives us

$$\begin{aligned}
\frac{1}{f} &= \left(\frac{n_{lens}}{n_{medium}} - 1\right)\left(\frac{1}{R_1} - \frac{1}{R_2}\right) \\
&= \left(\frac{3}{2} - 1\right)\left(\frac{-1}{|R_A|} + \frac{1}{|R_B|}\right) \\
&= \frac{1}{2}\left(\frac{-1}{2\,a} + \frac{1}{a}\right) = \frac{1}{4\,a} \\
f &= 4\,a\,.
\end{aligned}$$

Answer **E**.

36.04-02˙Lens˙Makers˙Formula 2005-11-29