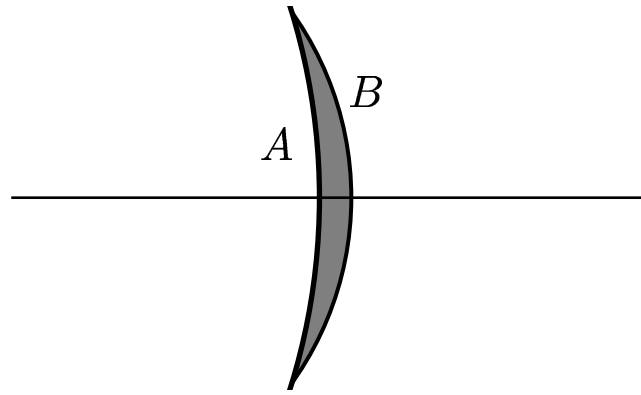


Find the focal length of the thin lens shown below, which has a crescent shape and it is facing to the left. Here $|R_A| = 2a$, $|R_B| = a$, $n_{lens} = 1.5$ and $n_{med} = 1$.



- A) $f = -\frac{3a}{4}$
- B) $f = -2a$
- C) $f = 2a$
- D) $f = -4a$
- E) $f = 4a$

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

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

Answer **E**.