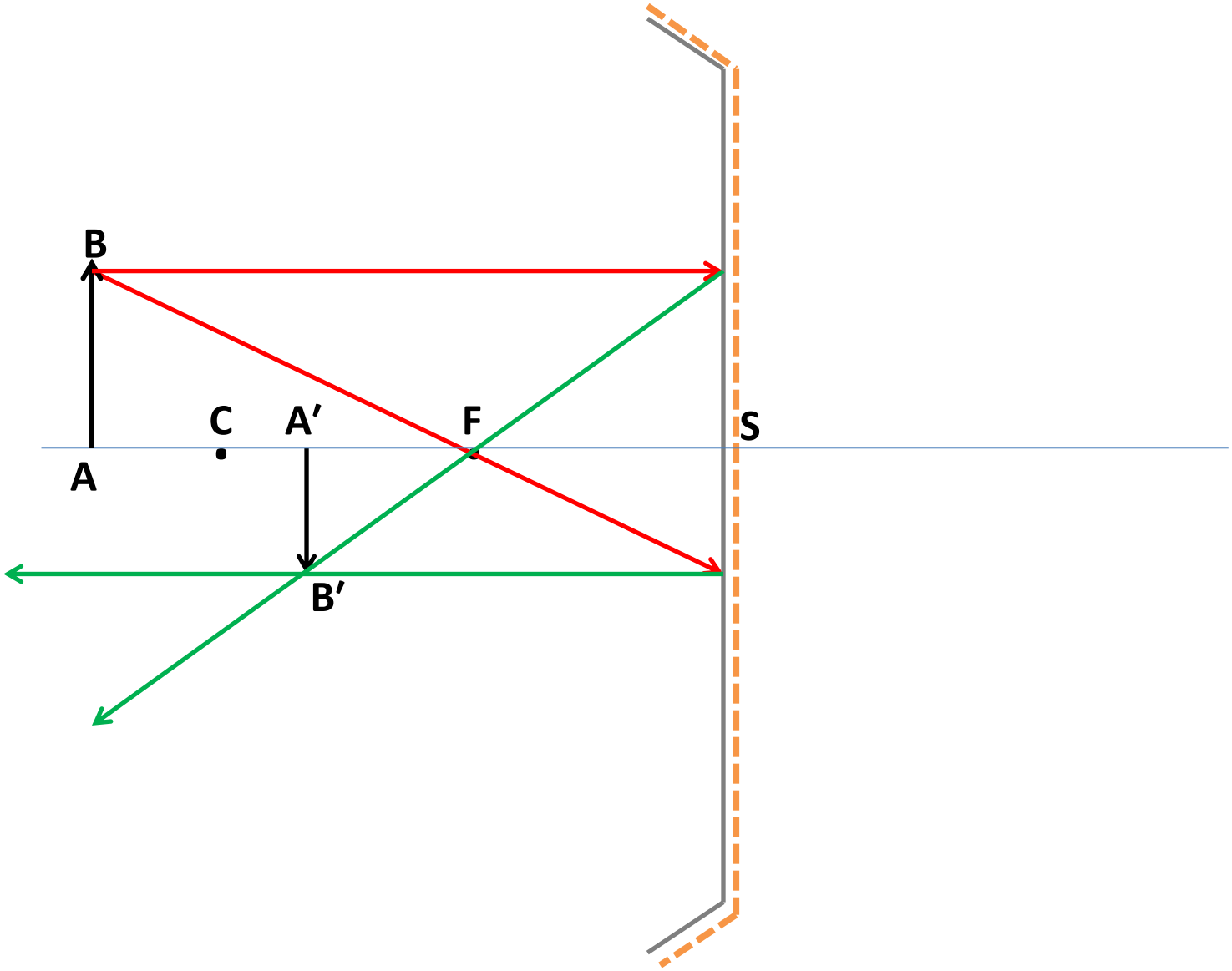
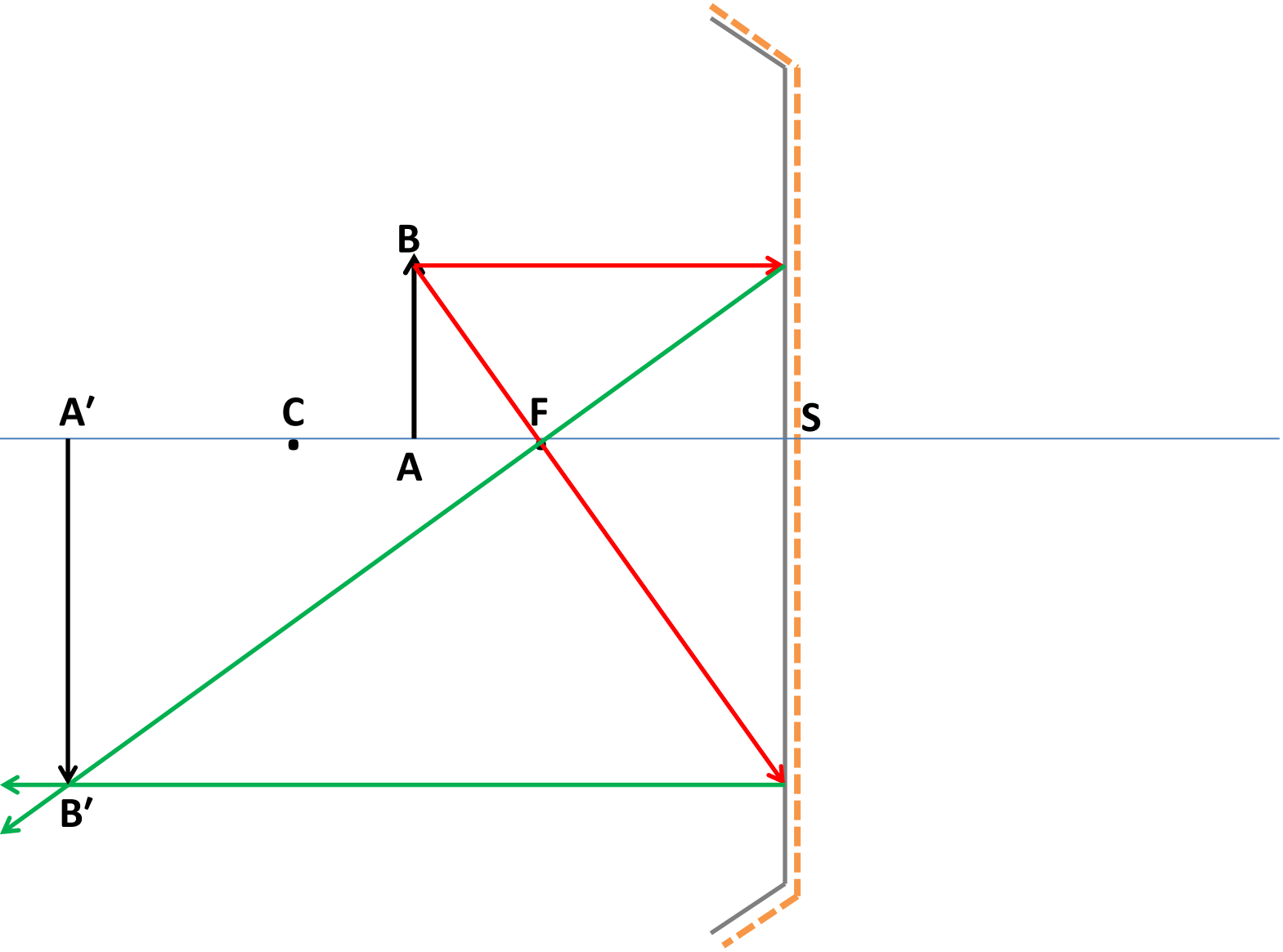
Solution du TD1

Miroirs sphériques


B
C
A′
F
S
A
B′


B
A'
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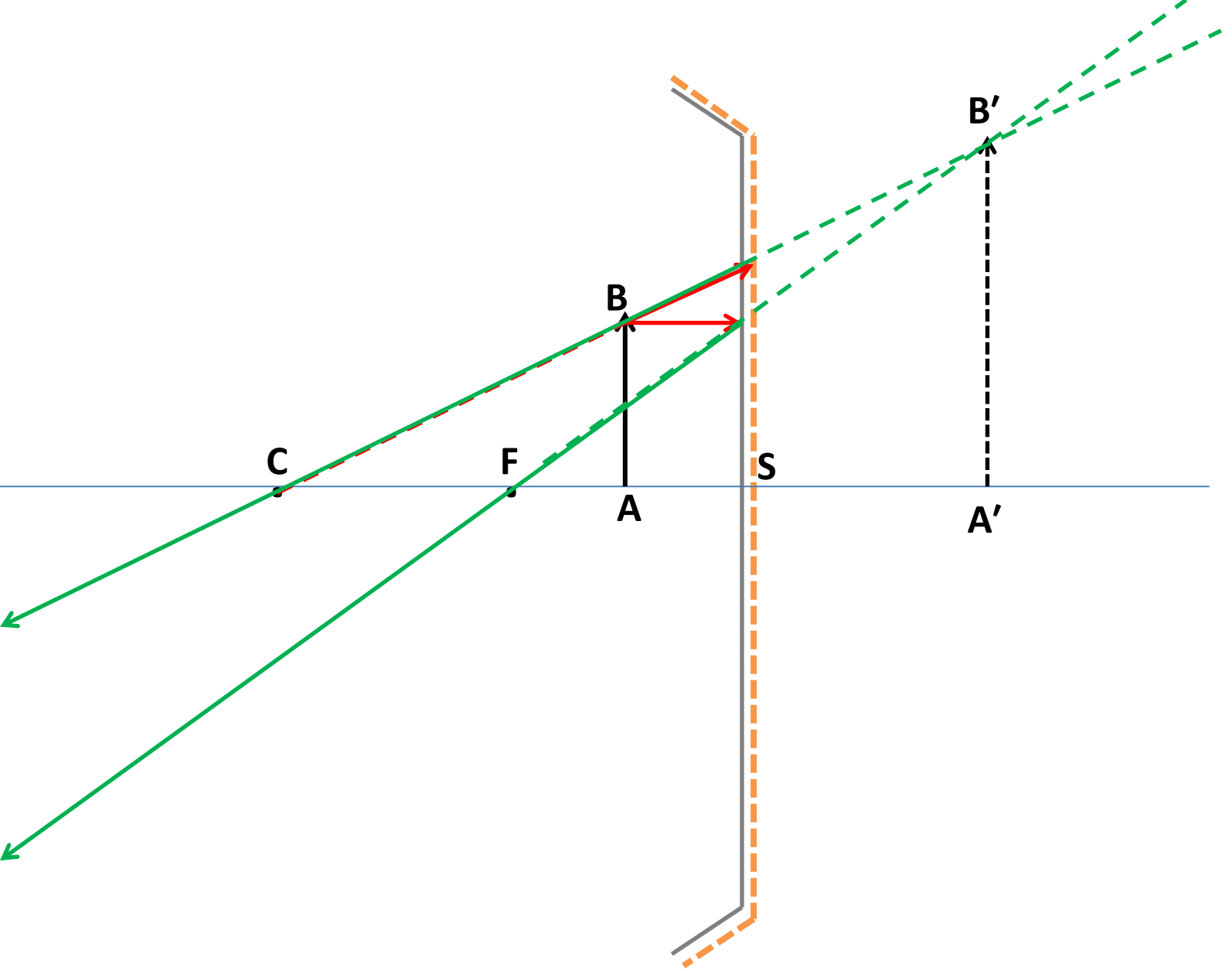
B′
B
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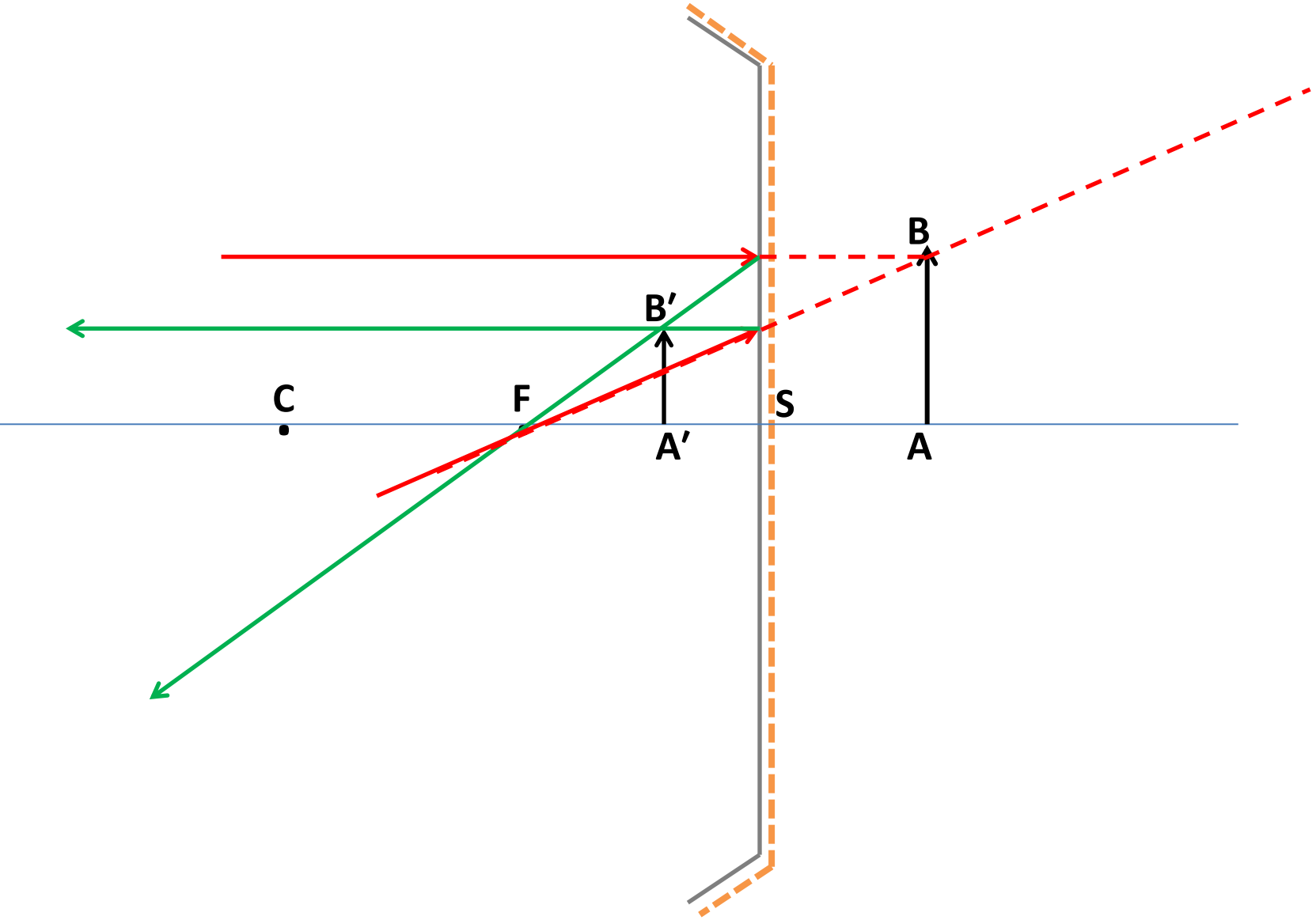
B
B′
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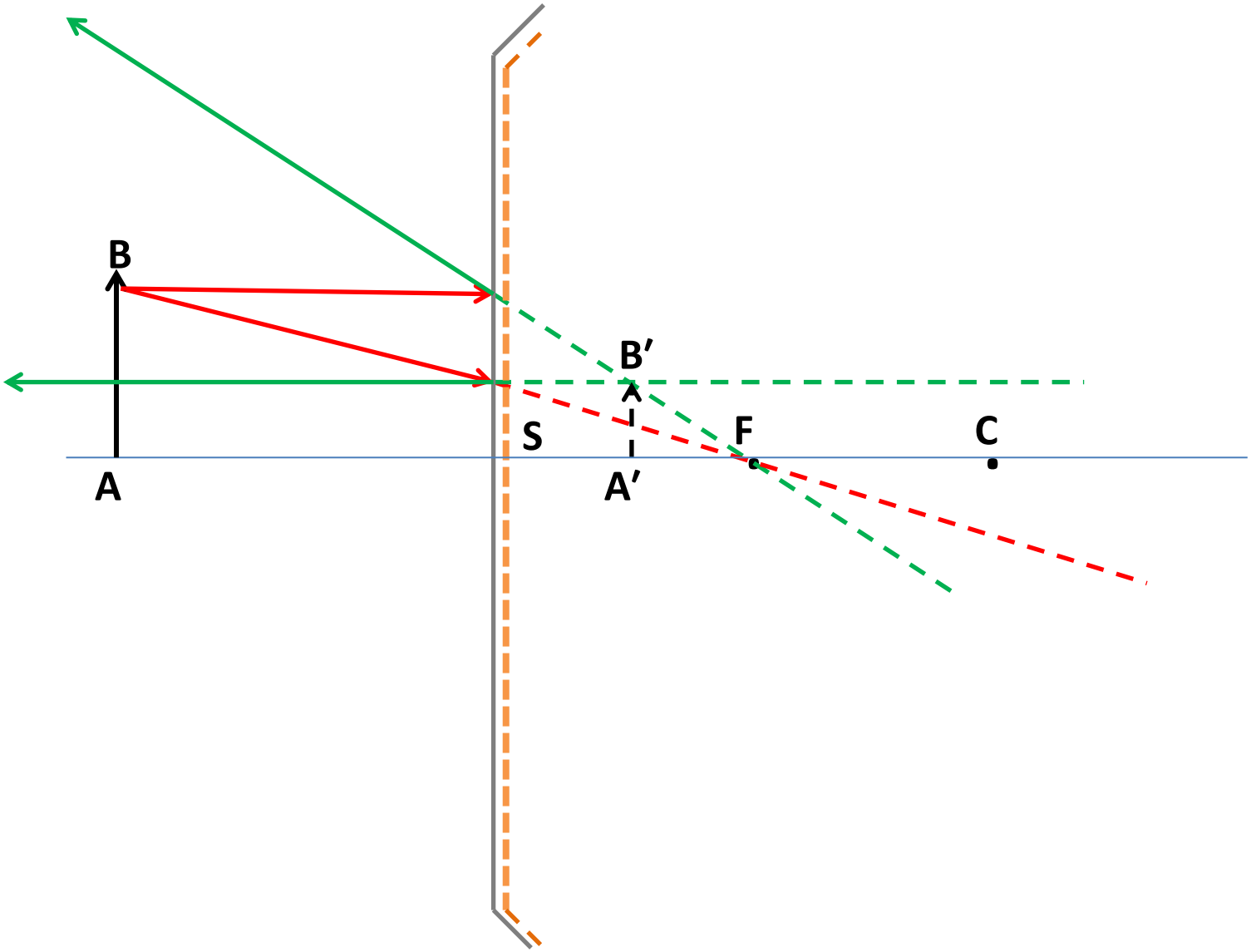
A′
A


B
B′
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A
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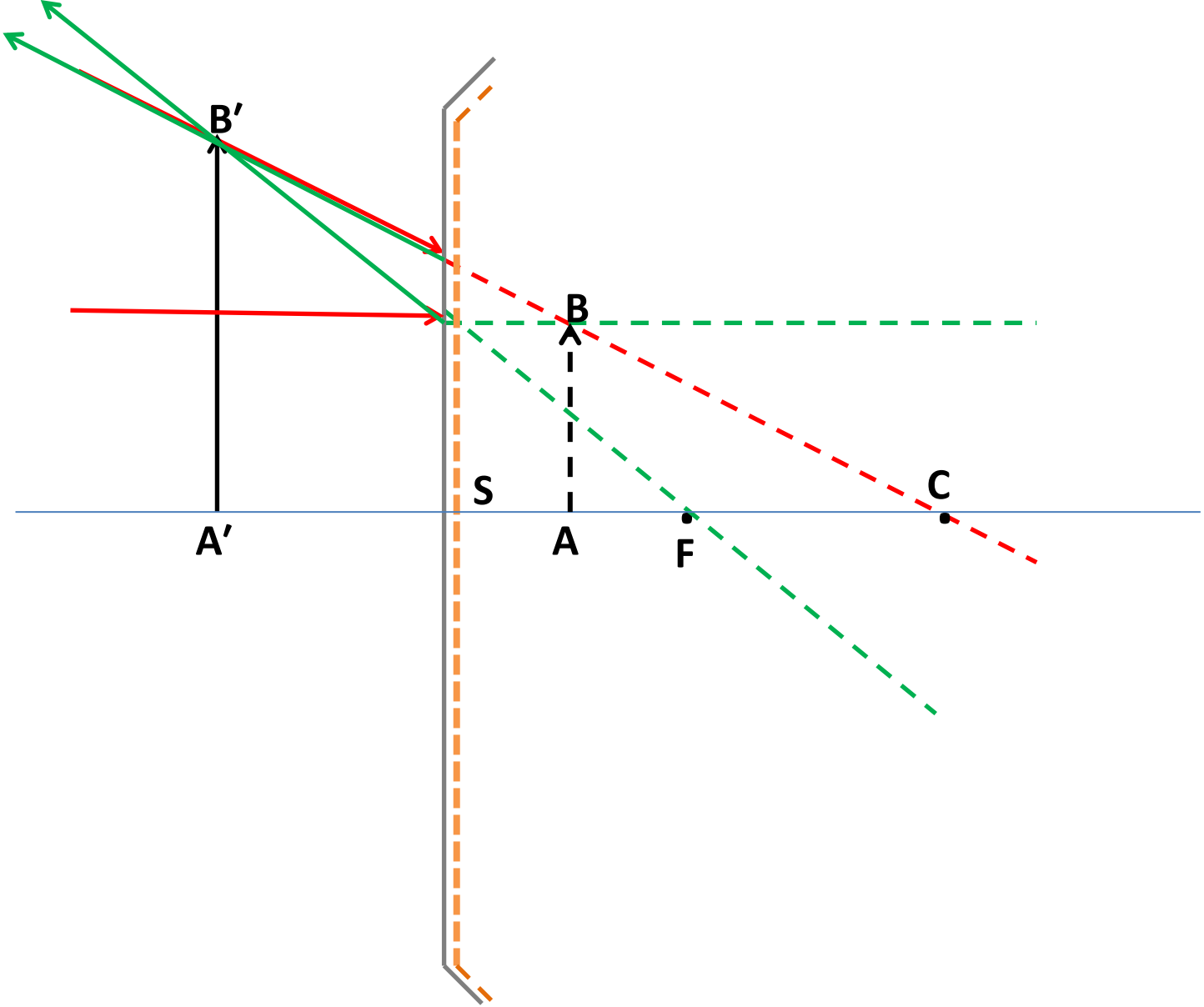
B′
B
S
C
A′
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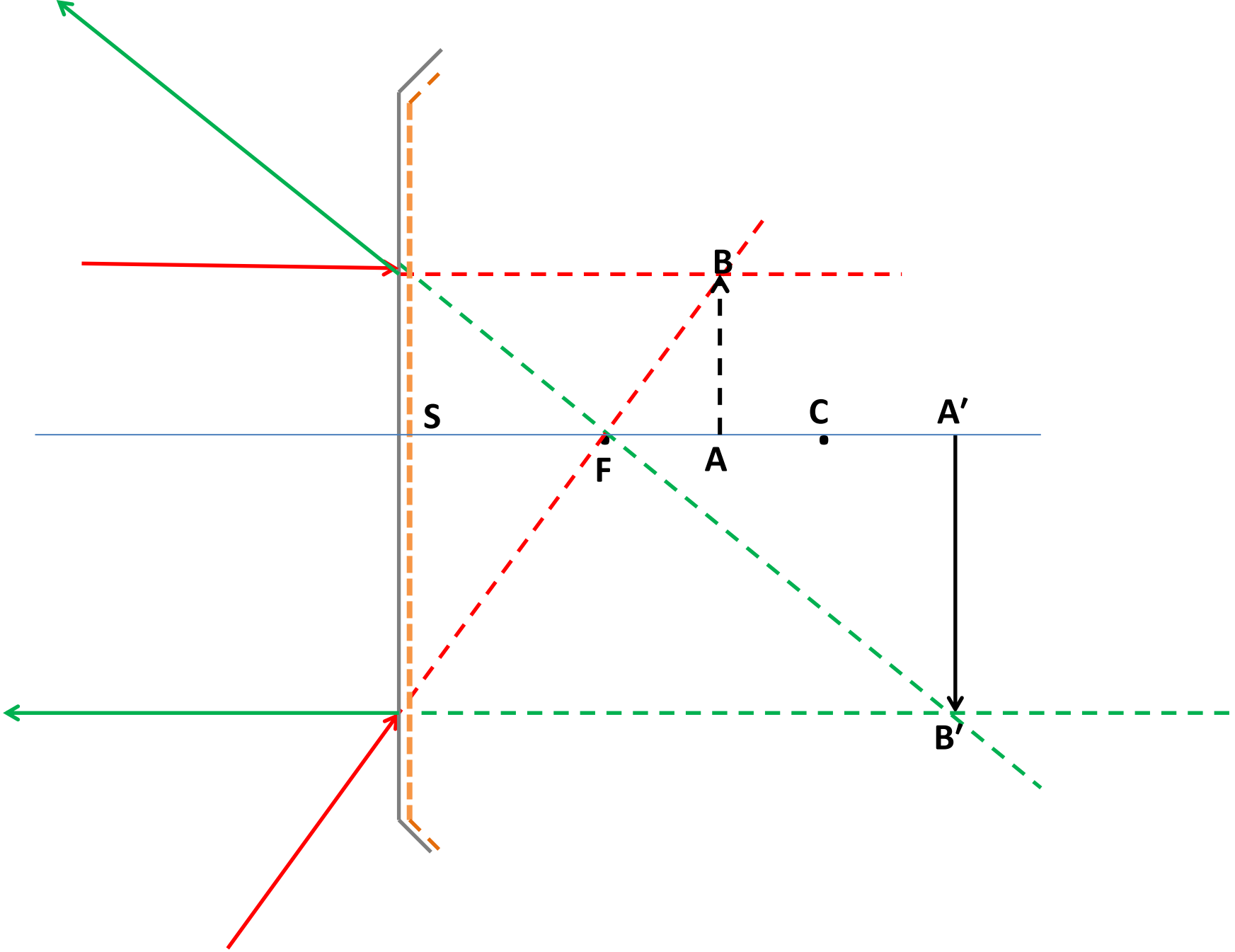
B
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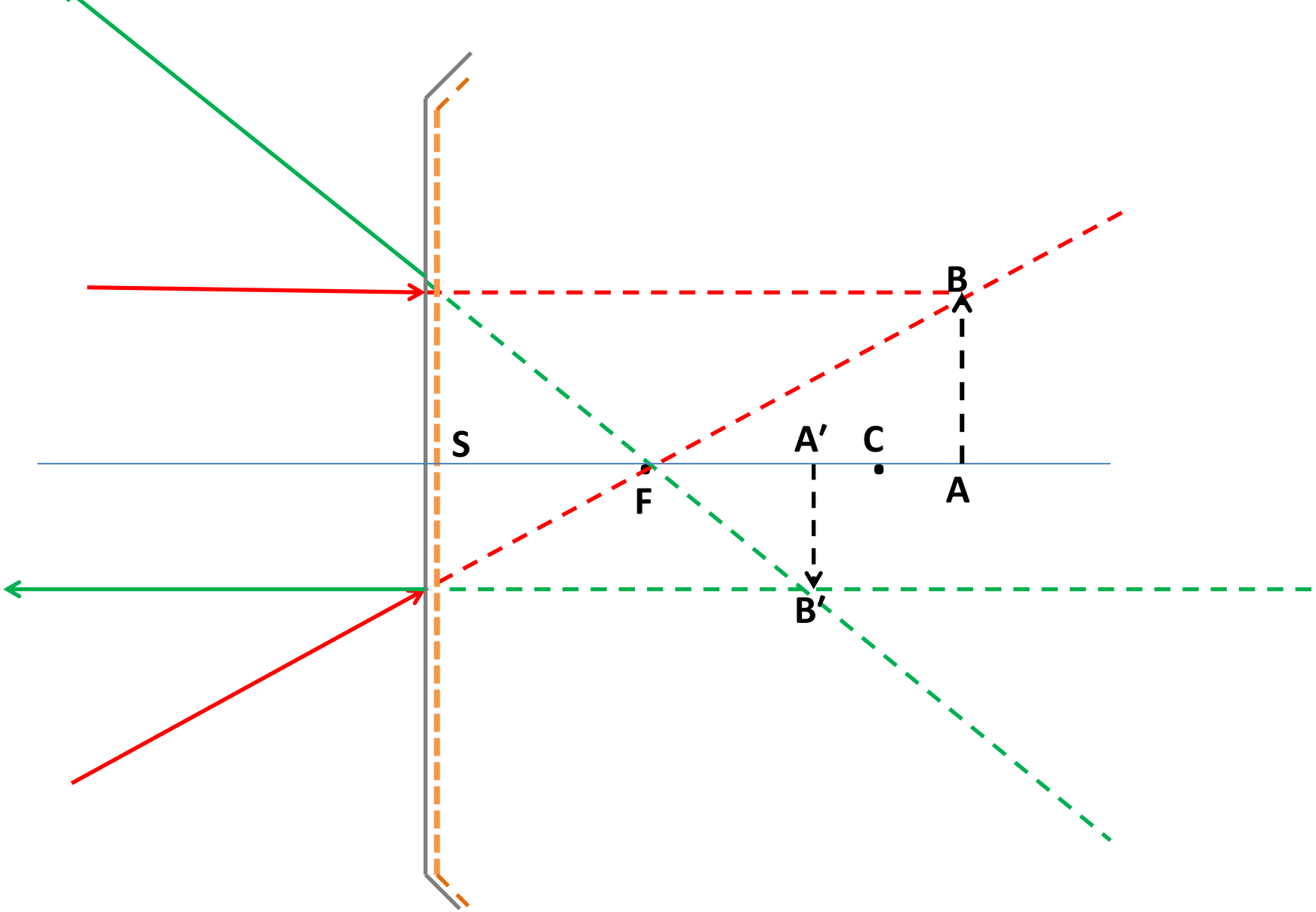
B'


B
S
A'
C
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F
B'

Exercice 2

R = -30cm, AB = 1cm

La position et la nature de l'image pour p = -60cm

Laposition du foyer $f = \frac{R}{2} = \frac{-30cm}{2} = \mathbf{-15cm}$

La position, la nature et le sens de l'image pour $\overline{SA} = p = -60cm$

Ona :

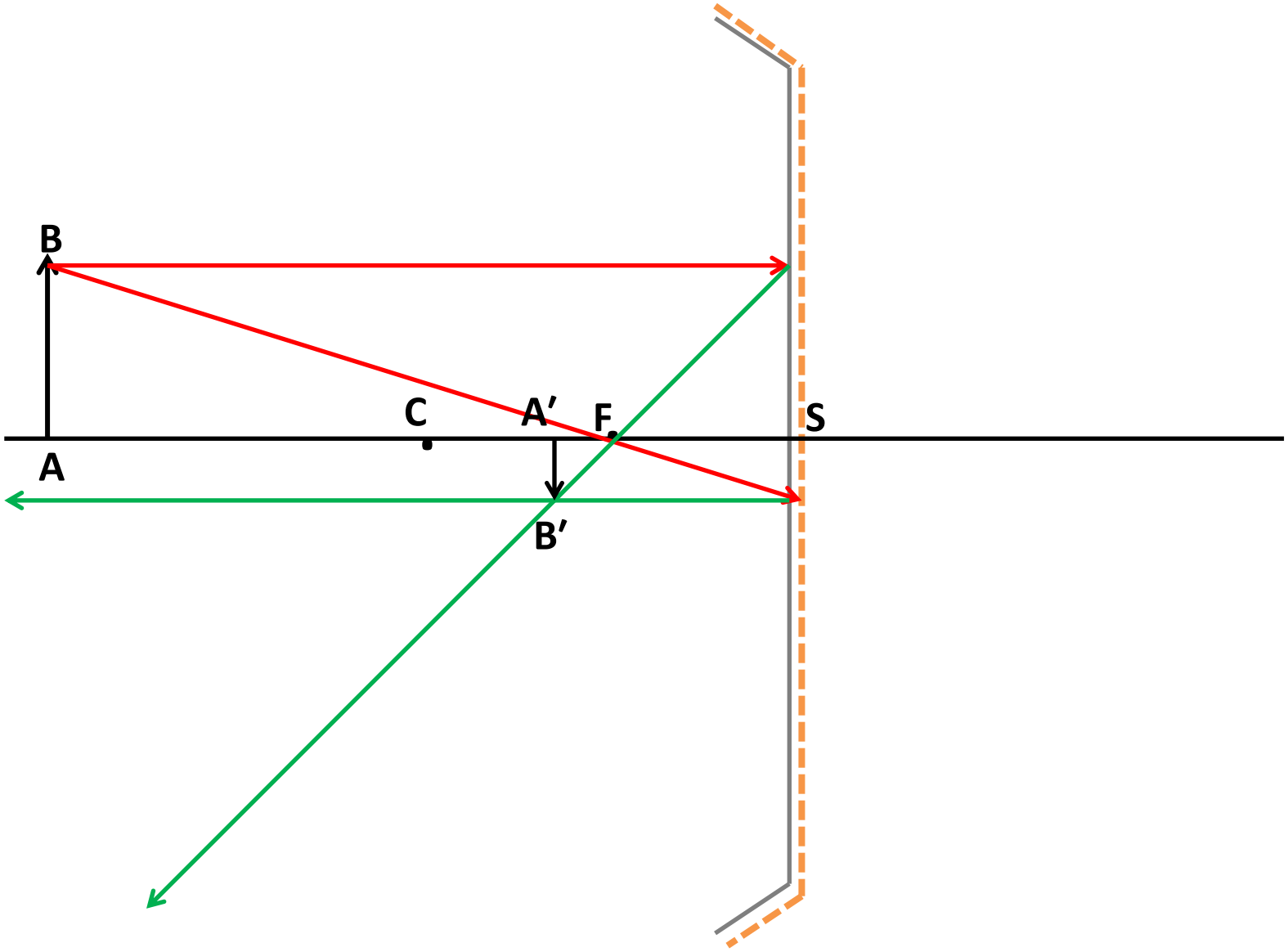
$$\frac{1}{p'} + \frac{1}{p} = \frac{2}{R} \quad \Rightarrow \quad p' = \frac{pR}{2p-R} = \mathbf{-20cm}$$

$\boldsymbol{p'} < \mathbf{0} \Rightarrow$ l'image est réelle.

$$\gamma = \frac{\overline{A'B'}}{\overline{AB}} = -\frac{p'}{p} = -\frac{-20}{-60} = -\frac{\mathbf{1}}{\mathbf{3}}$$

$\boldsymbol{\gamma} < \mathbf{0} \Rightarrow$ image renvrsée

$|\boldsymbol{\gamma}| < \mathbf{1} \Rightarrow$ image 3 fois plus petite que l'objet


B
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B'

2ème cas p = -20cm

Laposition du foyer $f = \frac{R}{2} = \frac{-30cm}{2} = \mathbf{-15cm}$

La position, la nature et le sens de l'image pour $\overline{SA} = p = -20cm$

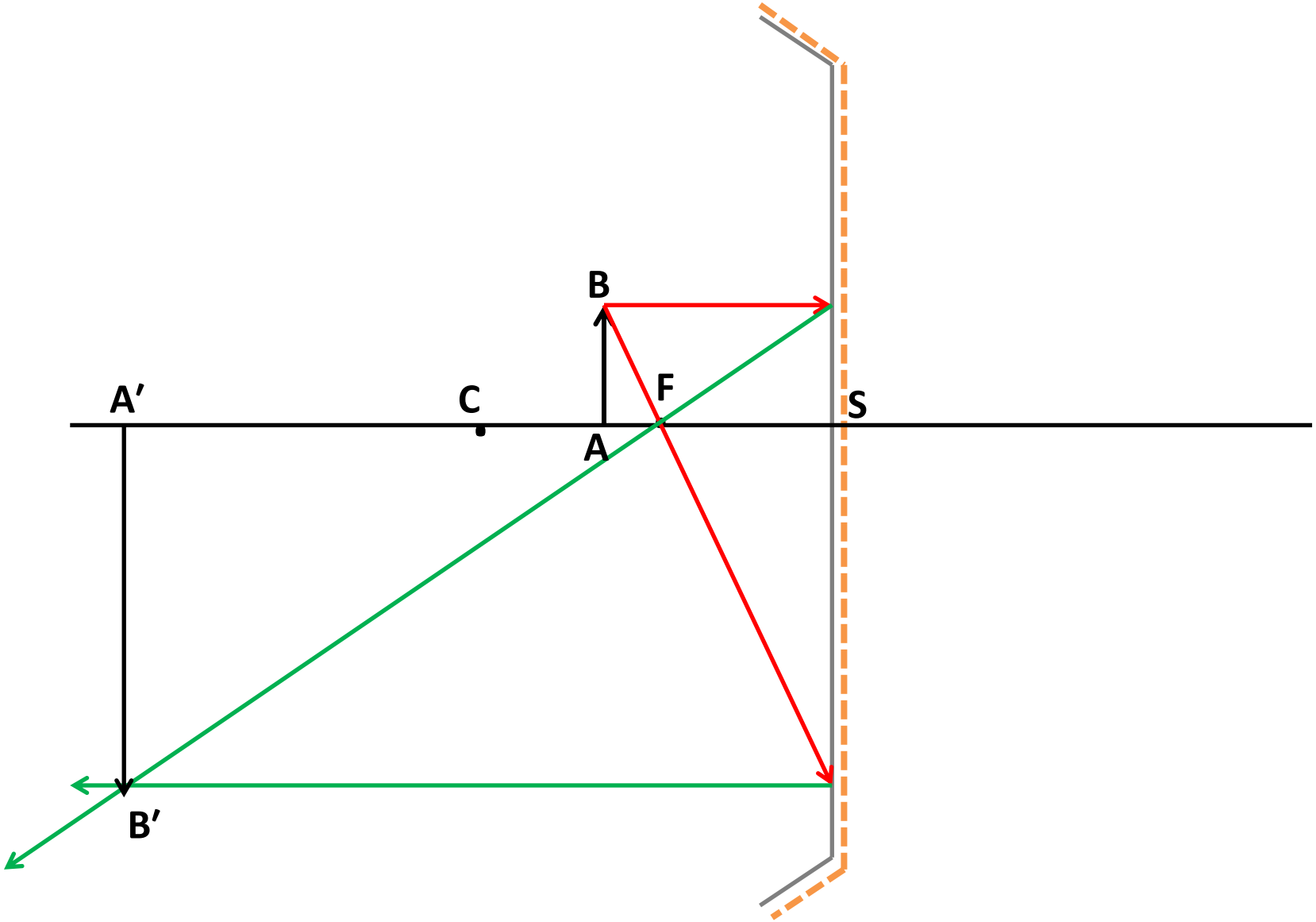
Ona :

$$\frac{1}{p'} + \frac{1}{p} = \frac{2}{R} \quad \Rightarrow \quad p' = \frac{pR}{2p-R} = \mathbf{-60cm}$$

$\boldsymbol{p'} < \mathbf{0} \Rightarrow$ l'image est réelle.

$$\gamma = \frac{\overline{A'B'}}{\overline{AB}} = -\frac{p'}{p} = -\frac{-60}{-20} = \mathbf{-3} \qquad \boldsymbol{\gamma} < \mathbf{0} \Rightarrow \text{image renvrsée}$$

$|\boldsymbol{\gamma}| > \mathbf{1} \Rightarrow$ image 3 fois plus grande que l'objet


B
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3ème cas p=+10cm

Laposition du foyer $f = \frac{R}{2} = \frac{-30cm}{2} = \mathbf{-15cm}$

La position, la nature et le sens de l'image pour $\overline{SA} = p = +10cm$

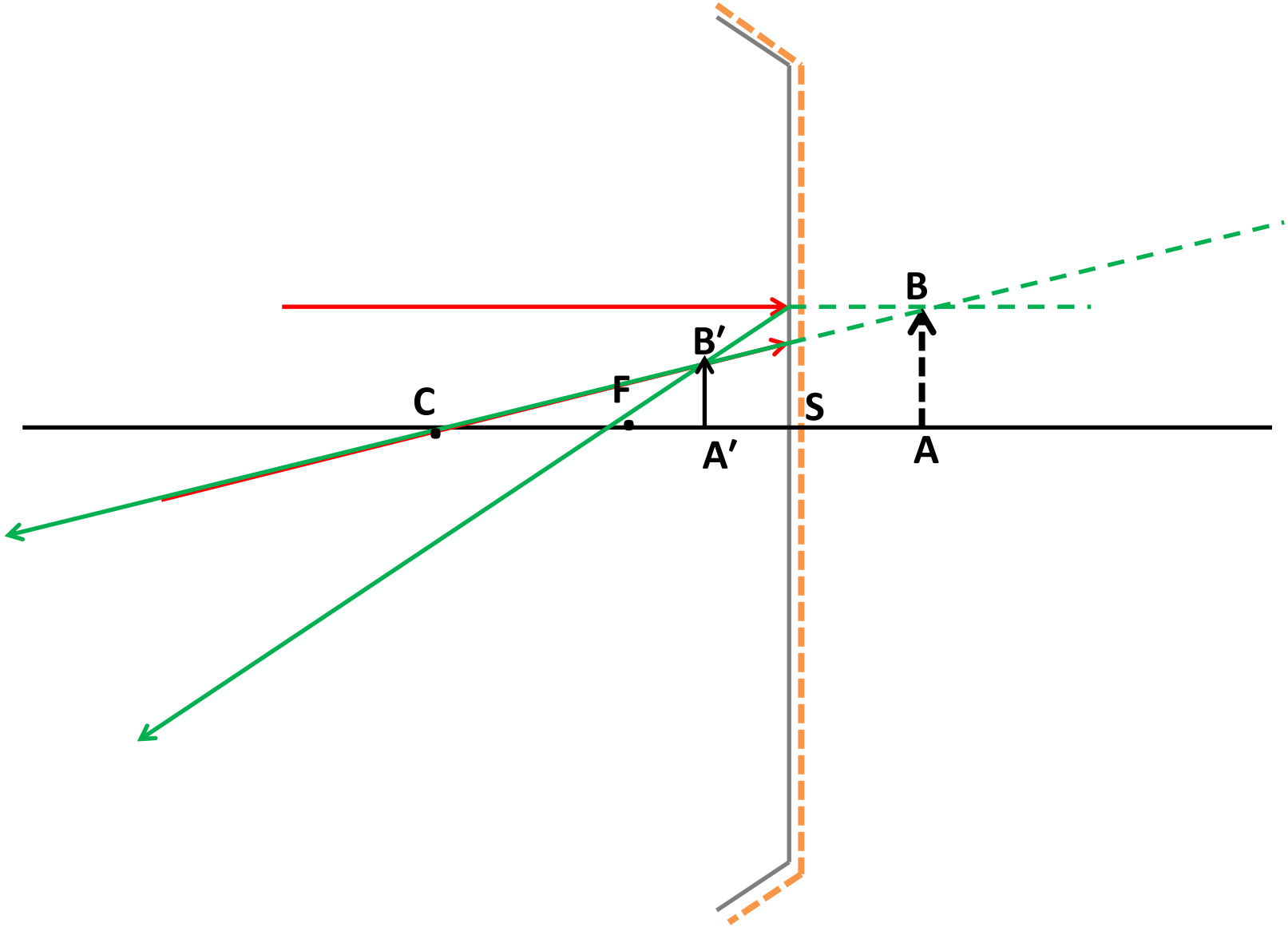
Ona :

$$\frac{1}{p'} + \frac{1}{p} = \frac{2}{R} \quad \Rightarrow \quad p' = \frac{pR}{2p-R} = \mathbf{-6cm}$$

$\boldsymbol{p'} < \mathbf{0} \Rightarrow$ l'image est réelle.

$$\gamma = \frac{\overline{A'B'}}{\overline{AB}} = -\frac{p'}{p} = -\frac{-6}{10} = \mathbf{0.6} \quad \boldsymbol{\gamma} > \mathbf{0} \Rightarrow \text{image droite}$$

$$|\boldsymbol{\gamma}| < \mathbf{1} \Rightarrow \text{ image est réduite}$$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