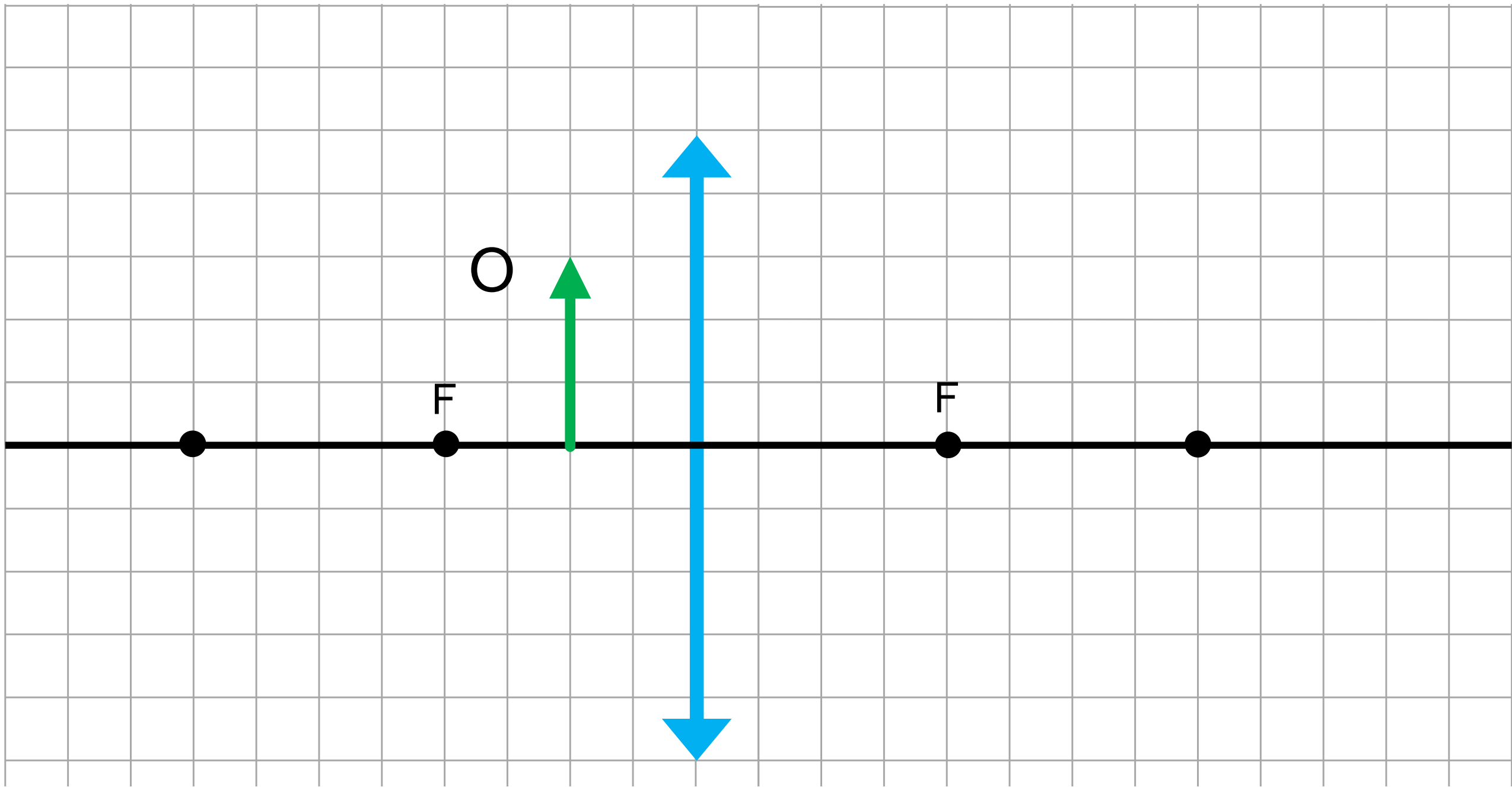


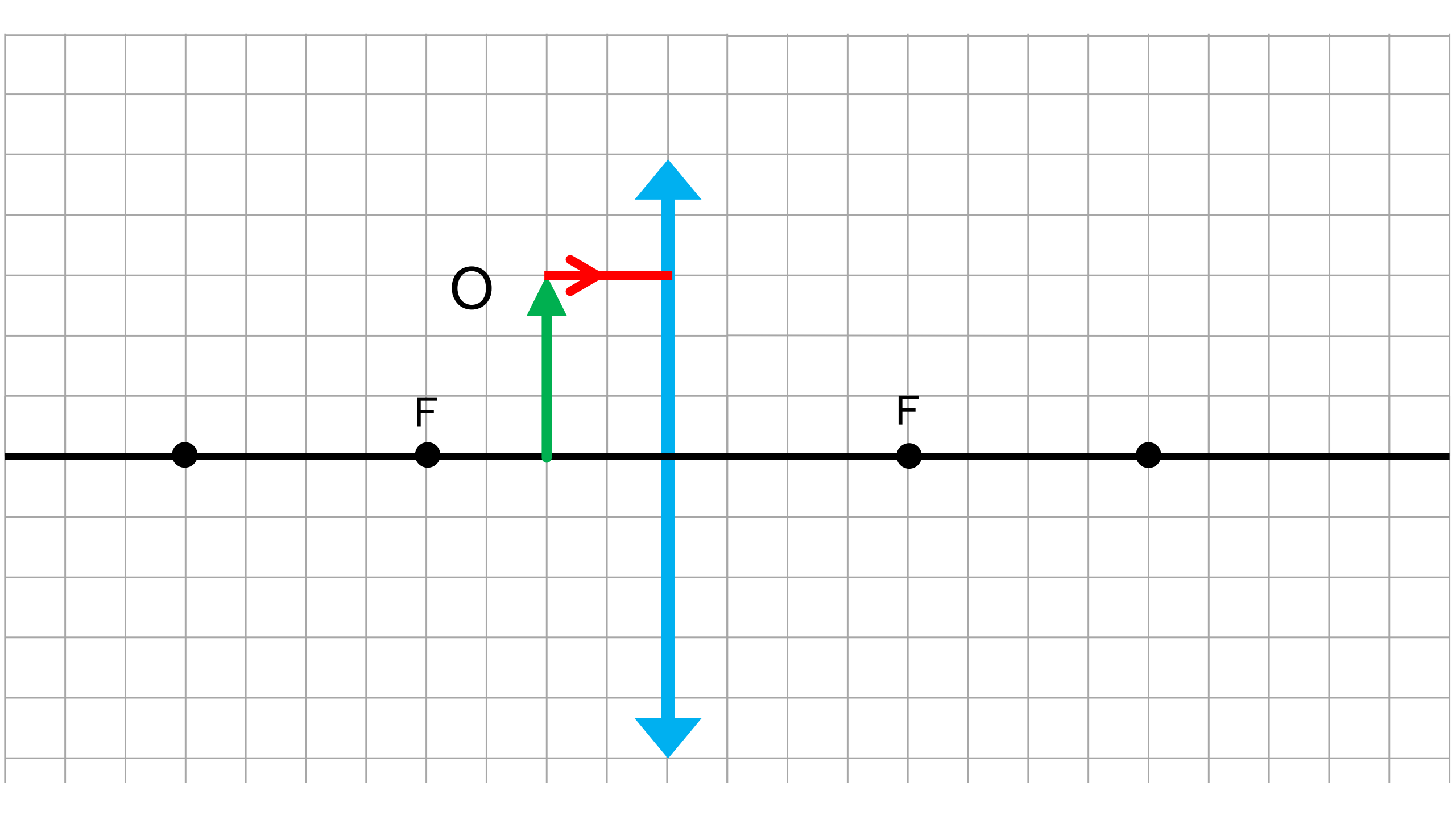
INSTRUMENTOS ÓTICOS

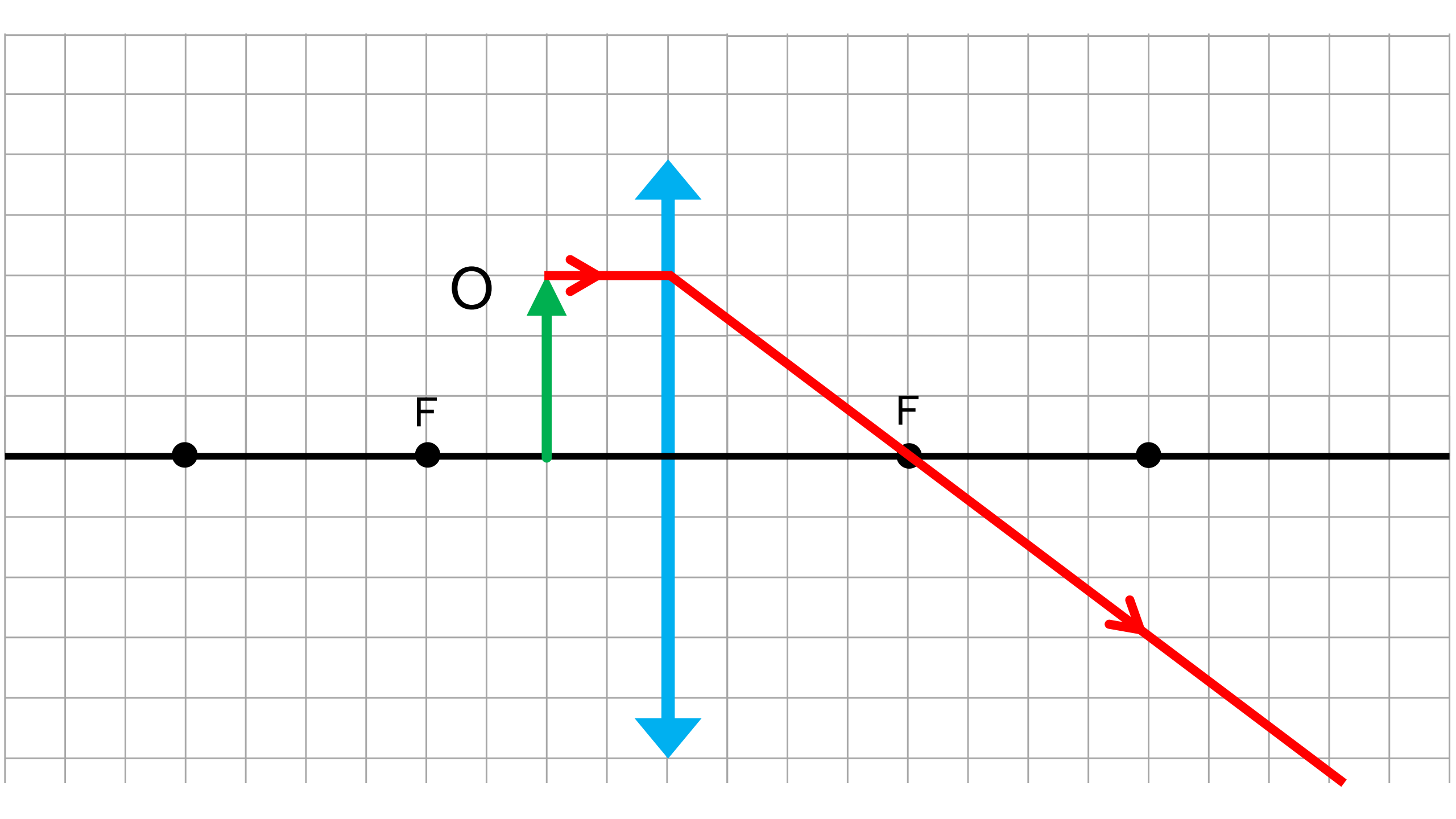
FÍSICA

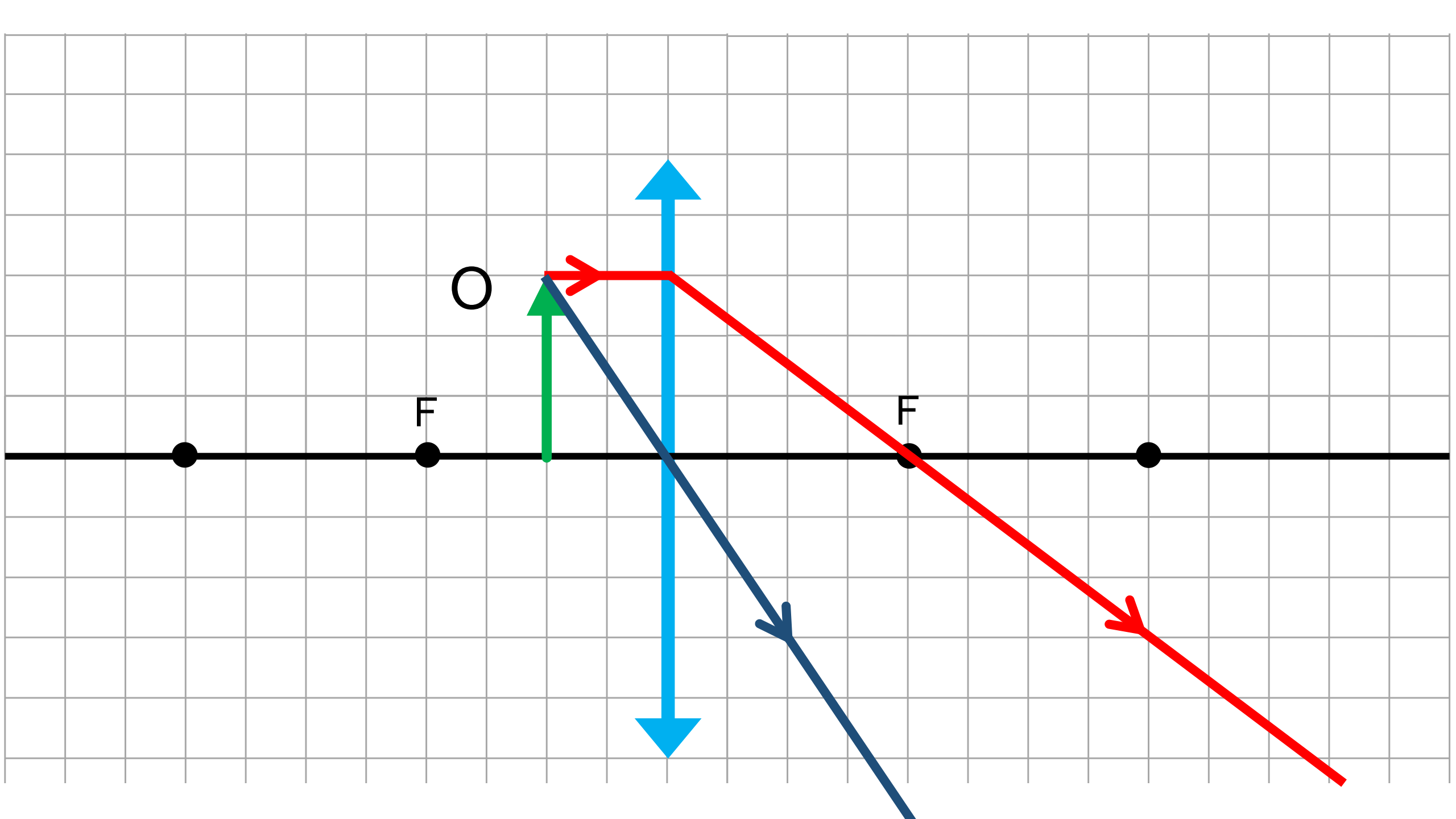
Professor Danilo

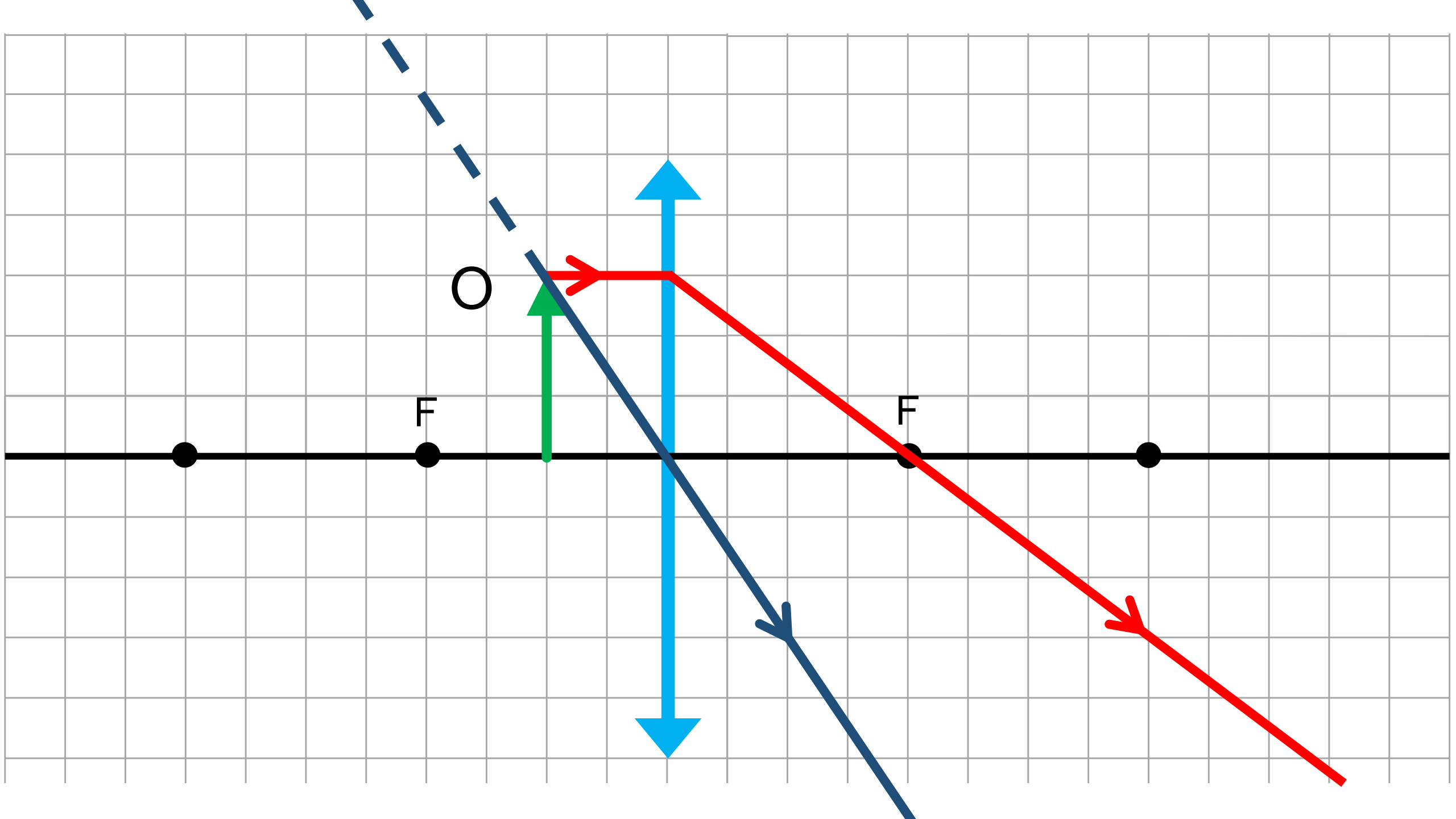
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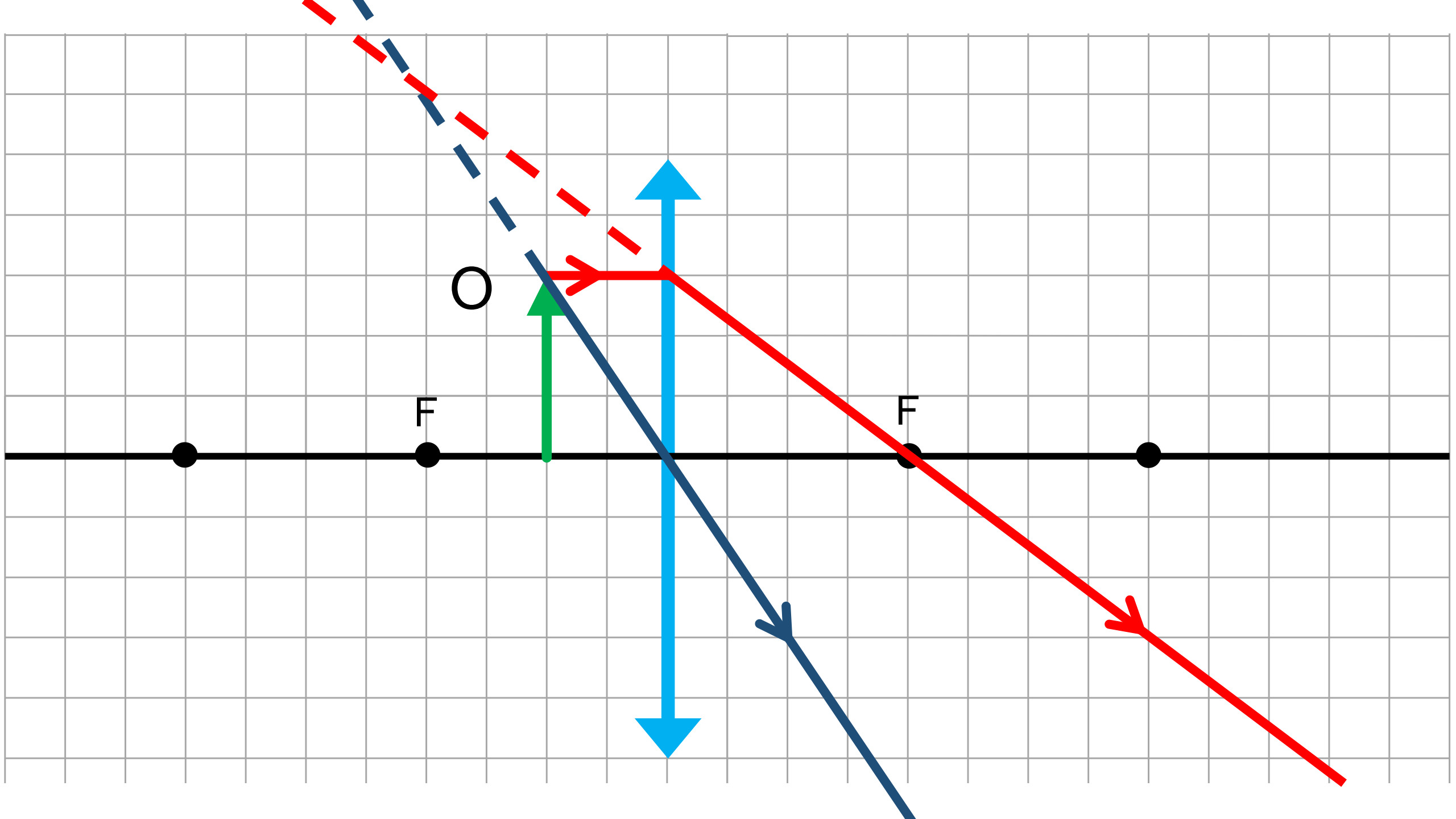


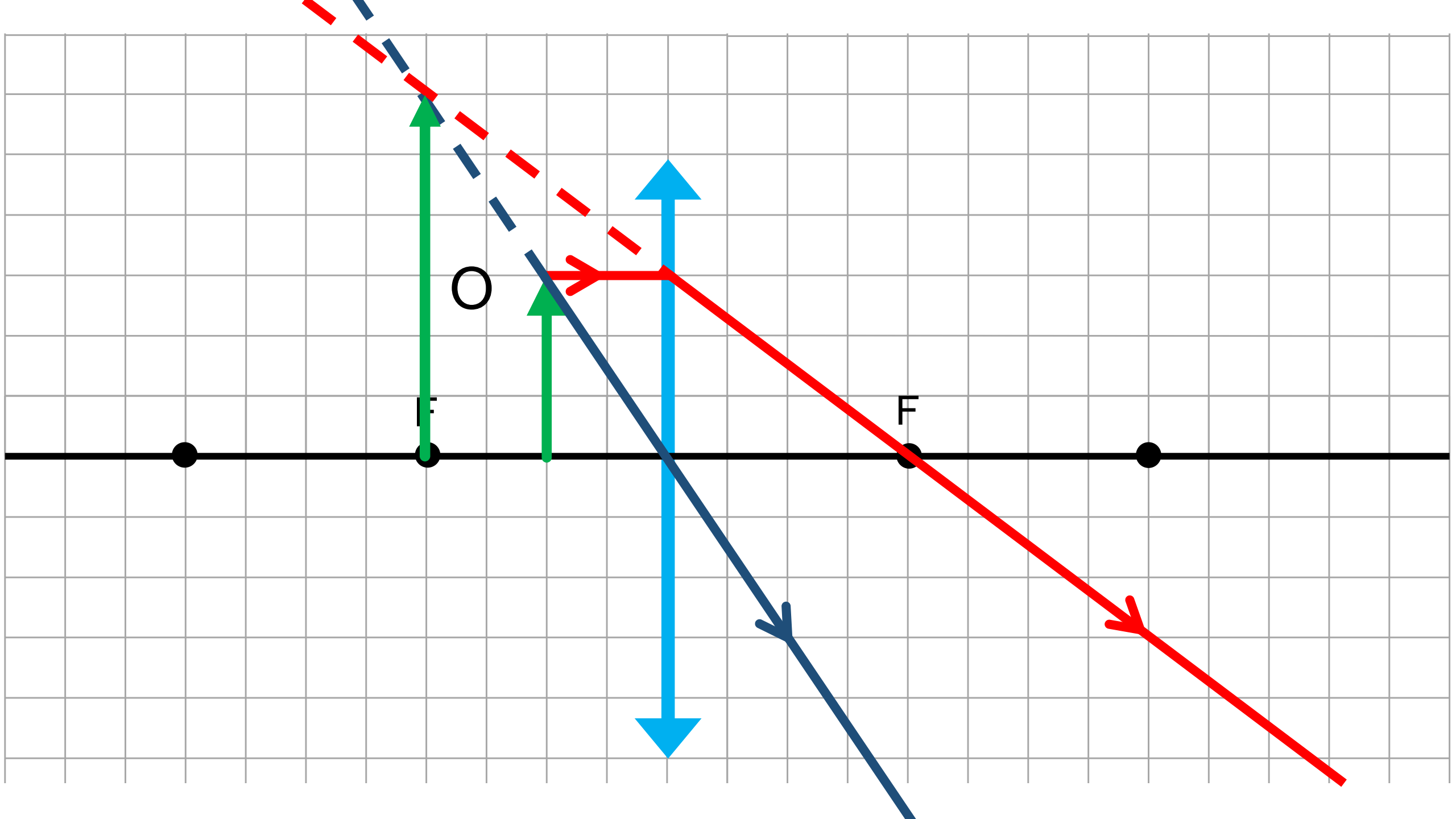












LUPA

LUPA

- IMAGEM:

LUPA

- IMAGEM:
 - VIRTUAL

LUPA

- IMAGEM:
 - VIRTUAL
 - DIREITA

LUPA

- IMAGEM:
 - VIRTUAL
 - DIREITA
 - MAIOR

LUPA

- IMAGEM:
 - VIRTUAL
 - DIREITA
 - MAIOR
 - Mais distante da lente que o objeto

LUPA

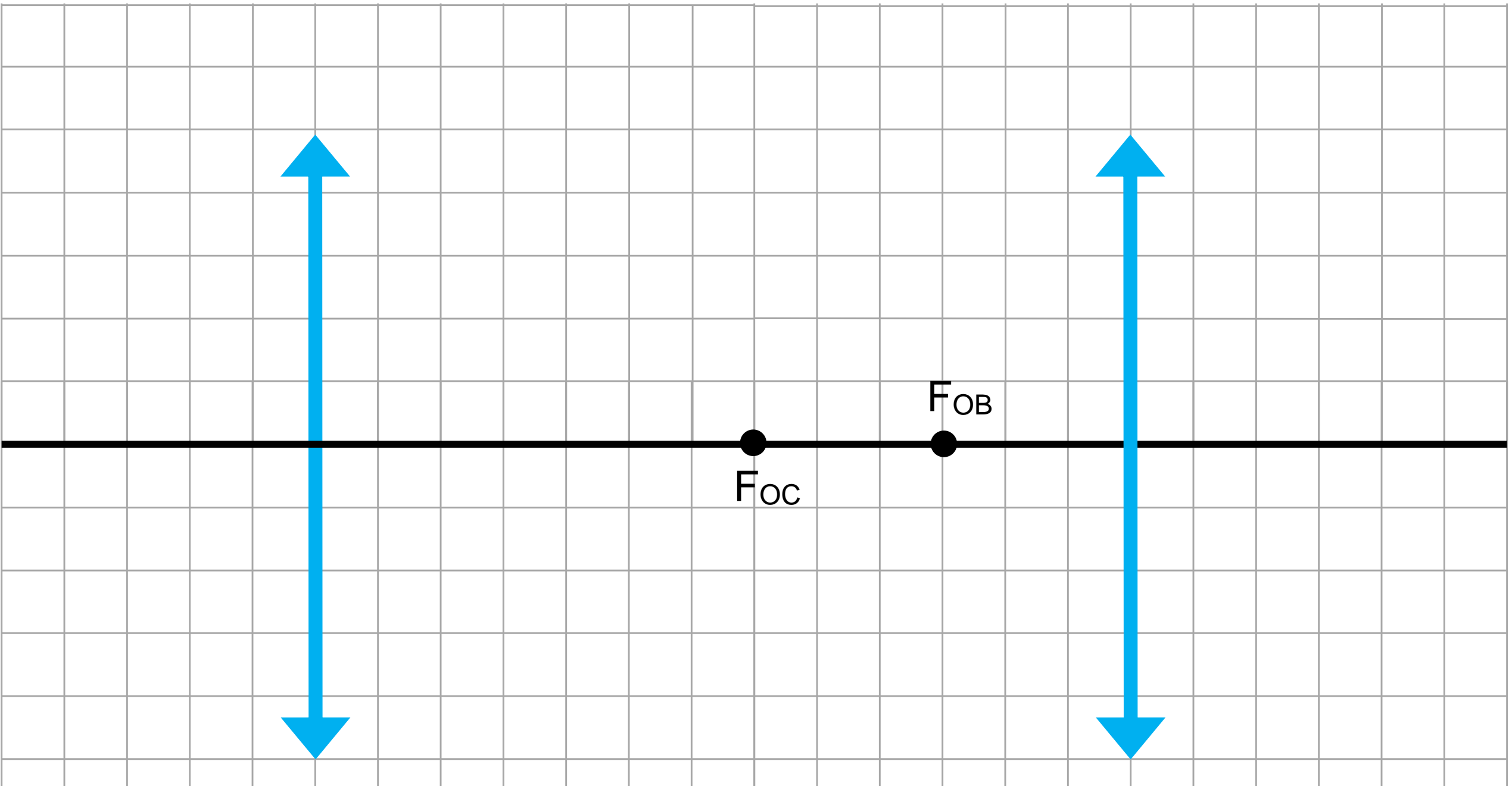
- IMAGEM:
 - VIRTUAL
 - DIREITA
 - MAIOR
 - Mais distante da lente que o objeto
- Qualquer lente convergente pode servir como lupa

LUPA

- IMAGEM:
 - VIRTUAL
 - DIREITA
 - MAIOR
 - Mais distante da lente que o objeto
- Qualquer lente convergente pode servir como lupa



LUNETAS ASTRONÔMICAS



Objetiva



Ocular

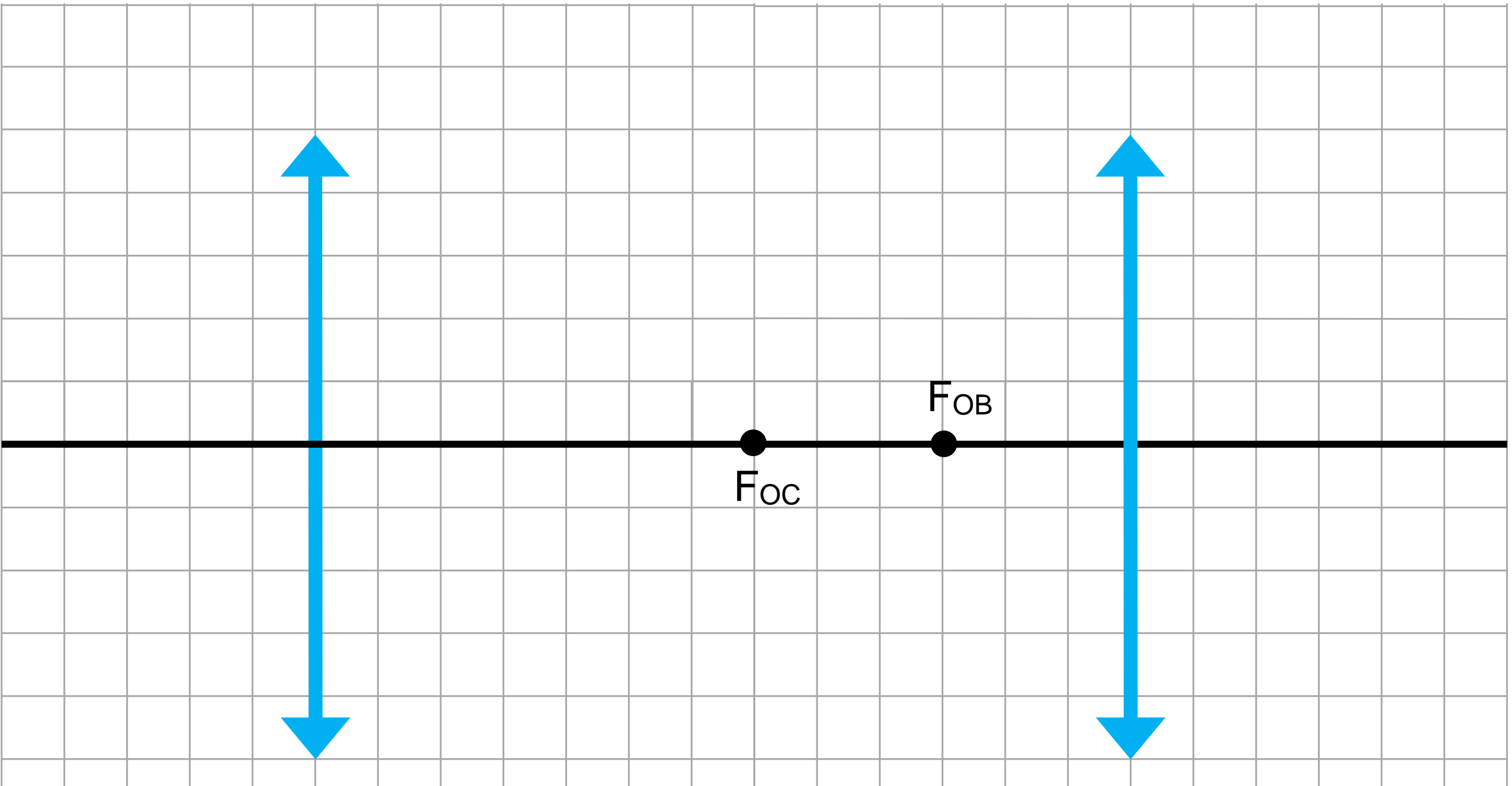


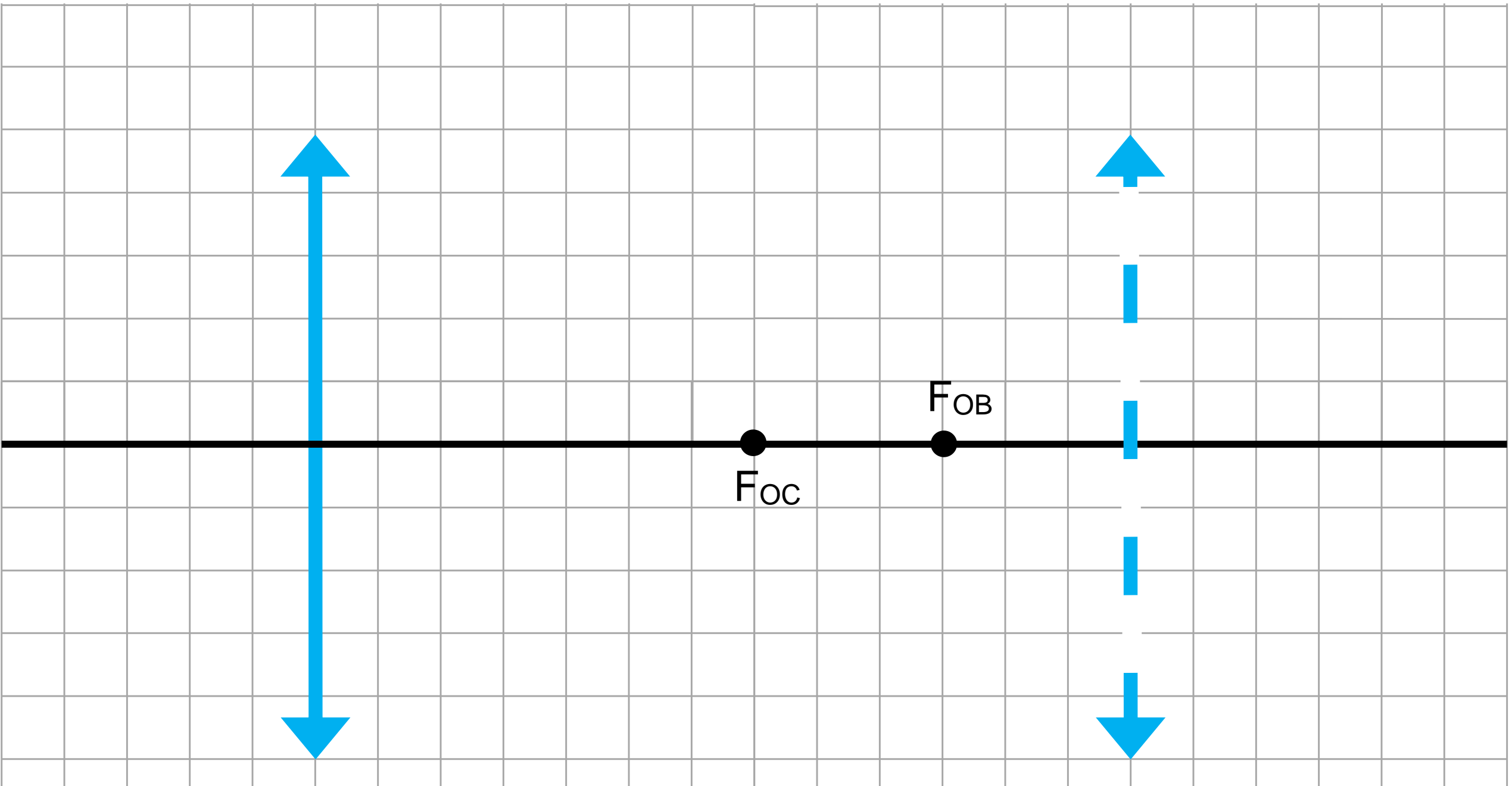
F_{oc}

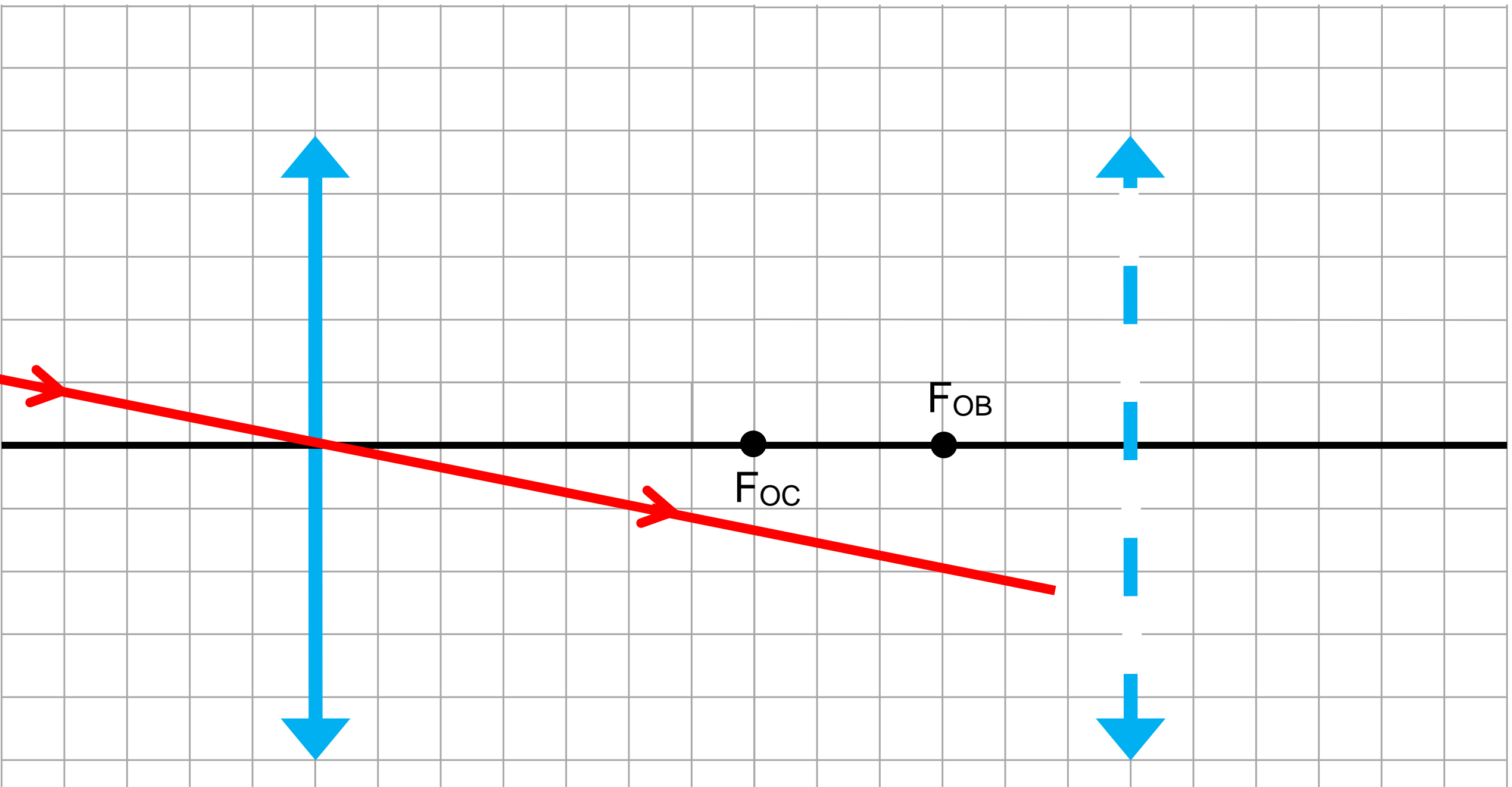


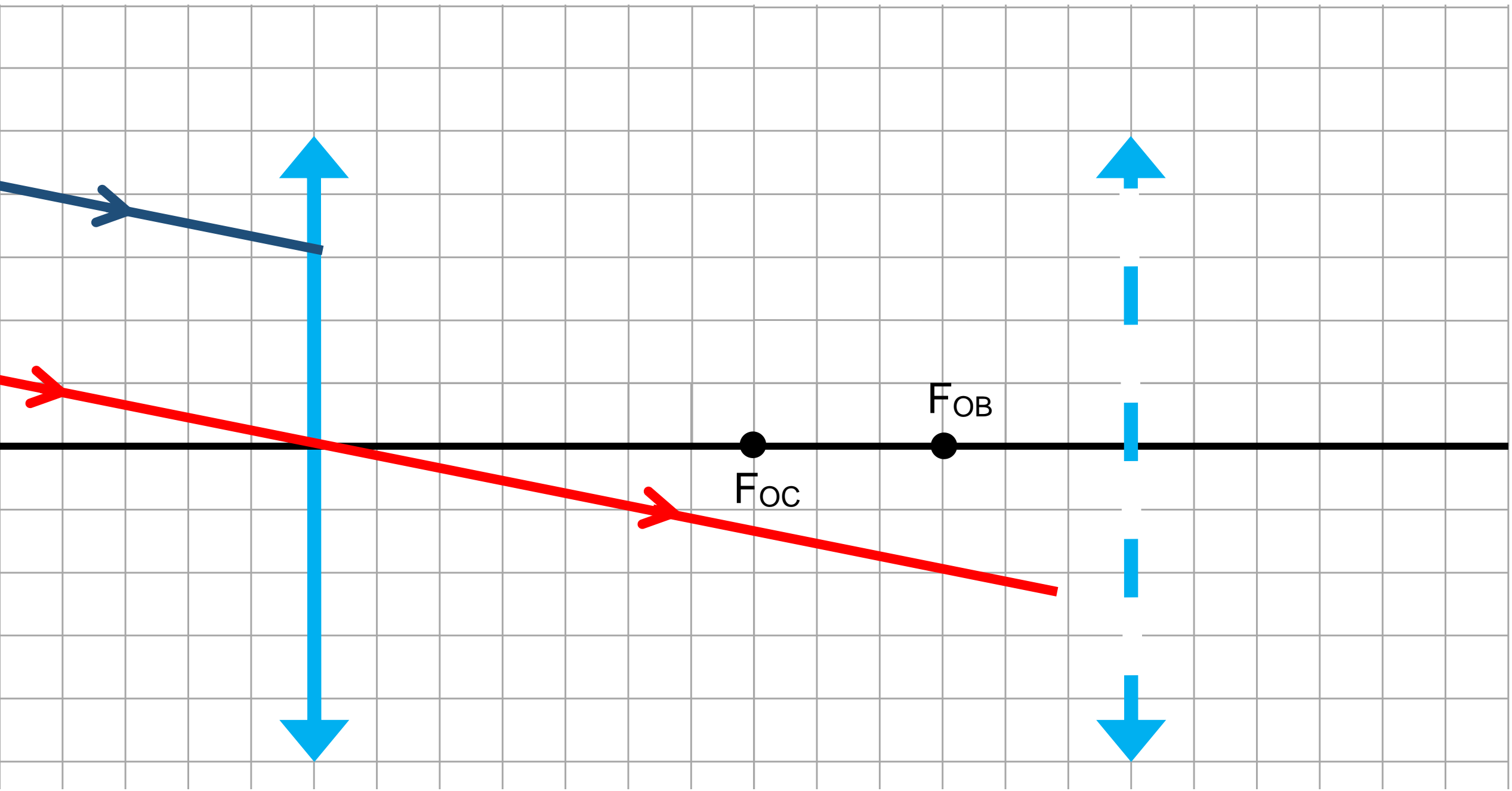
F_{OB}

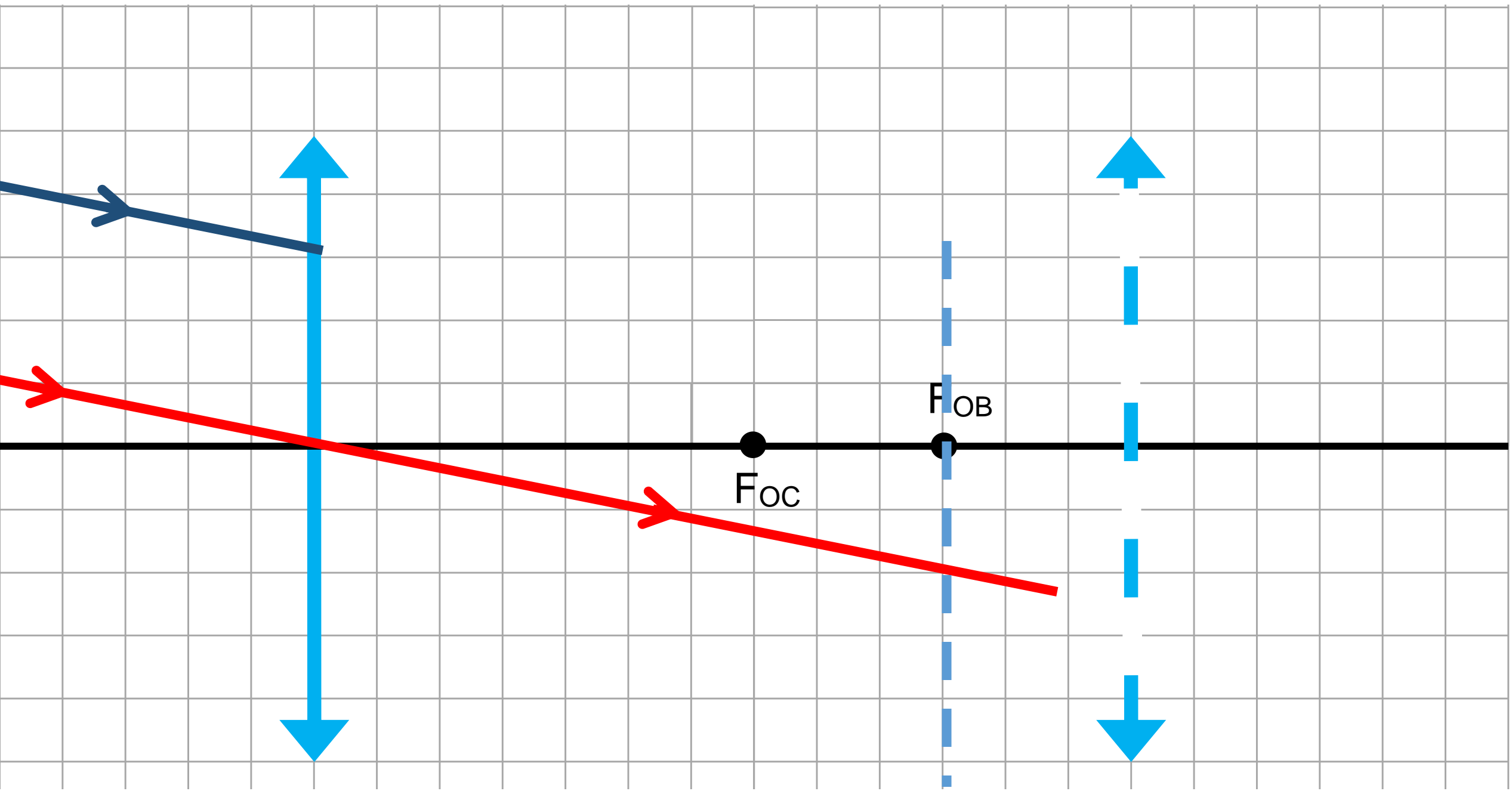


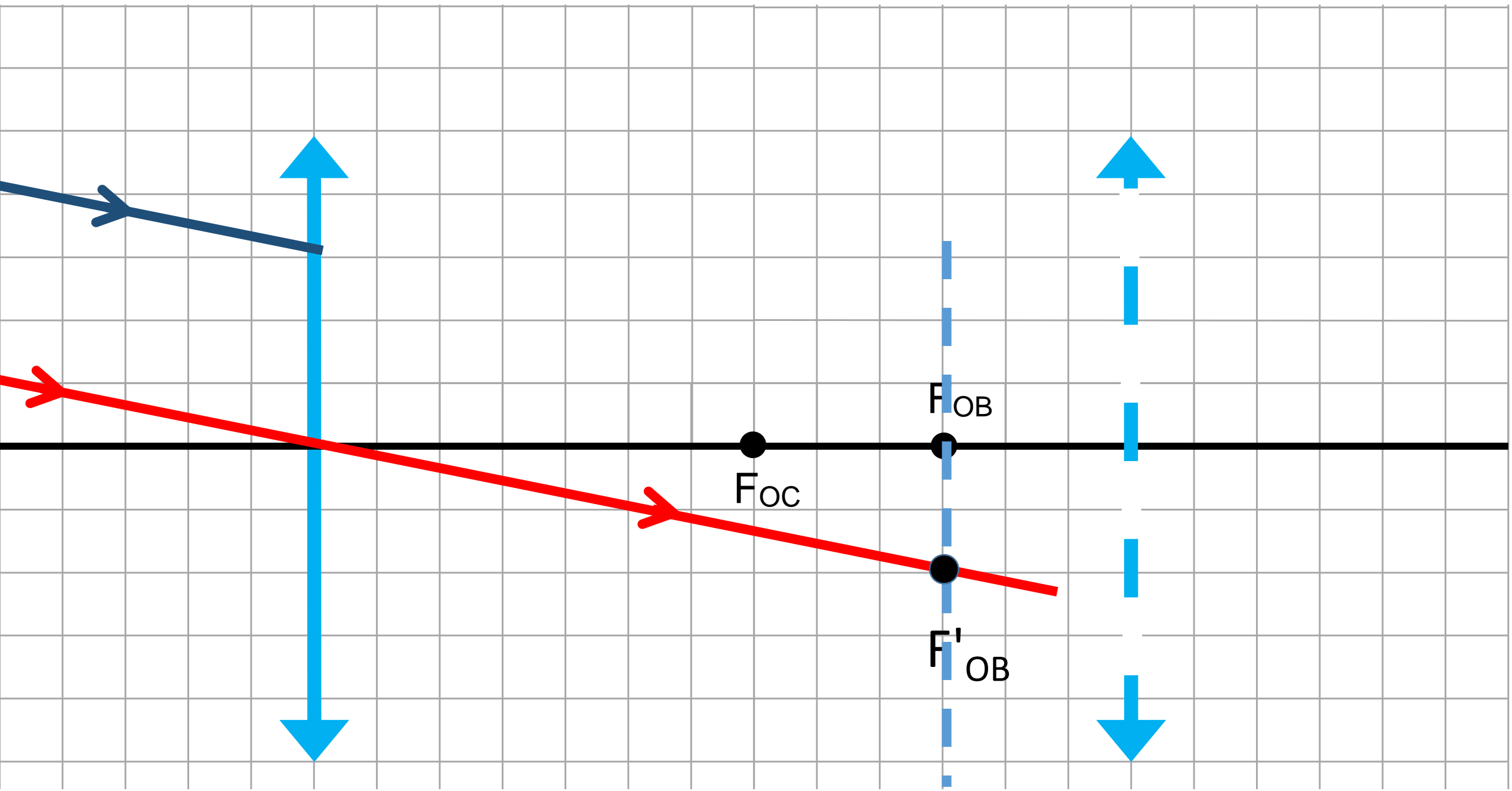


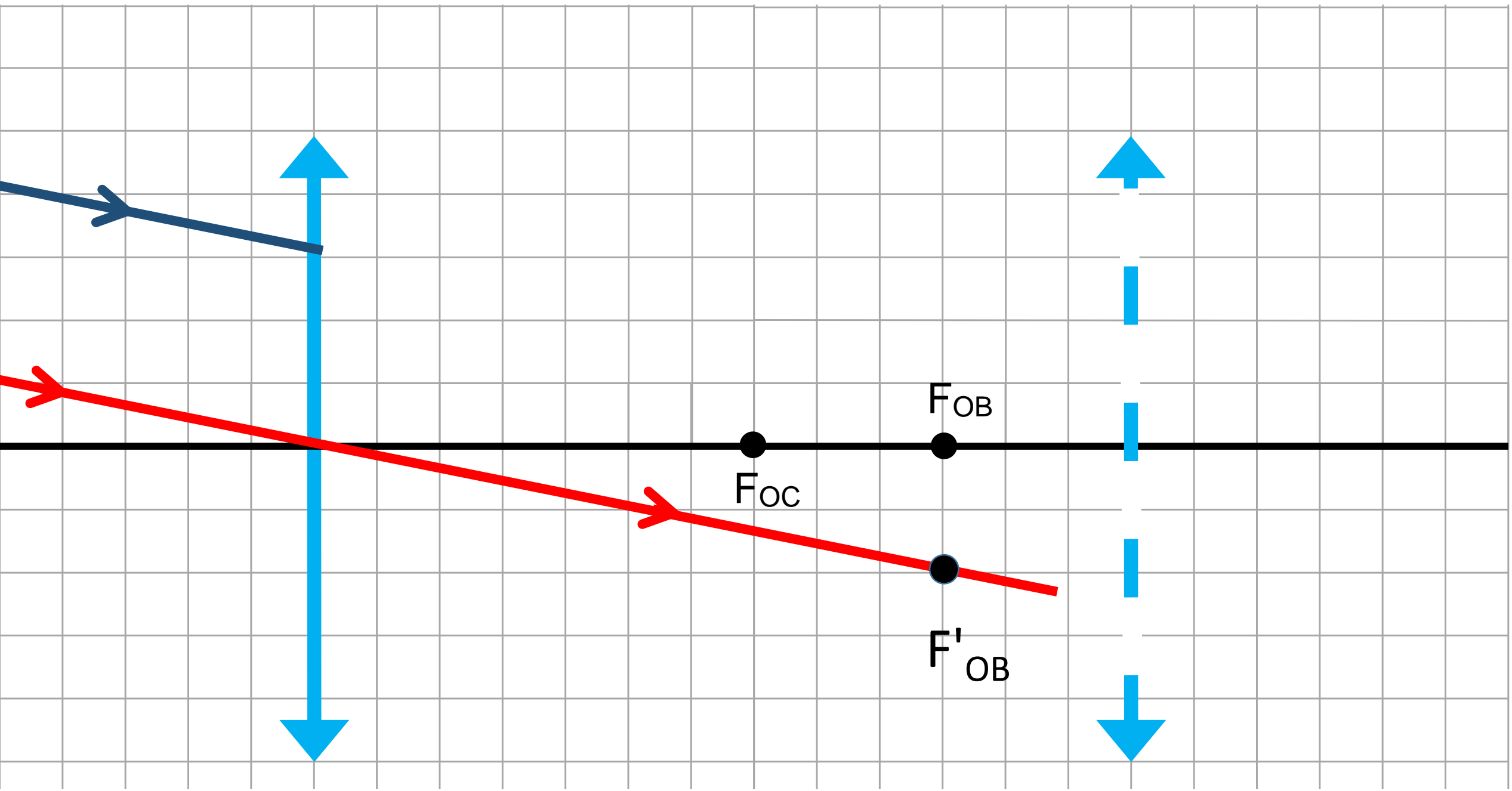


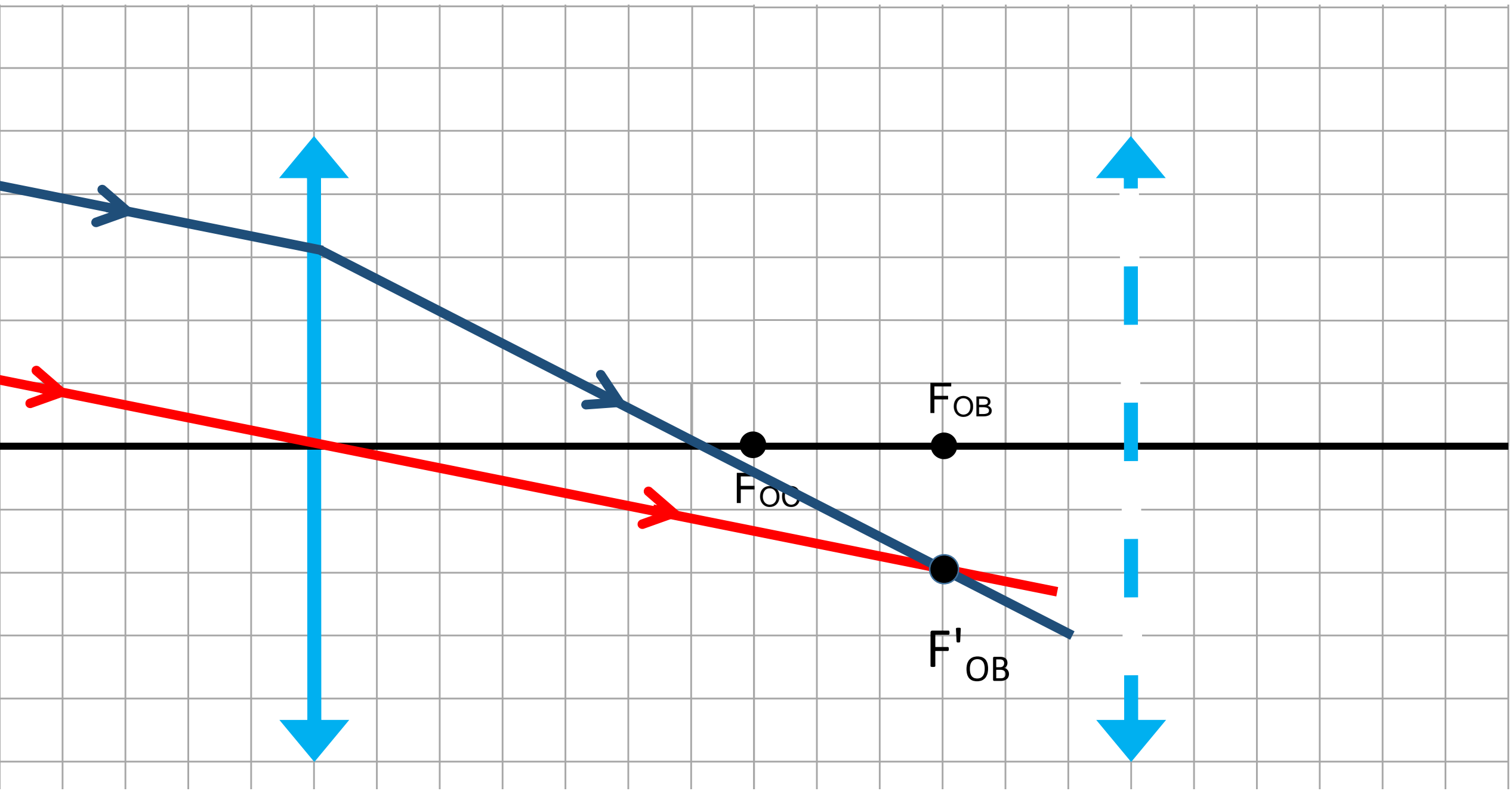


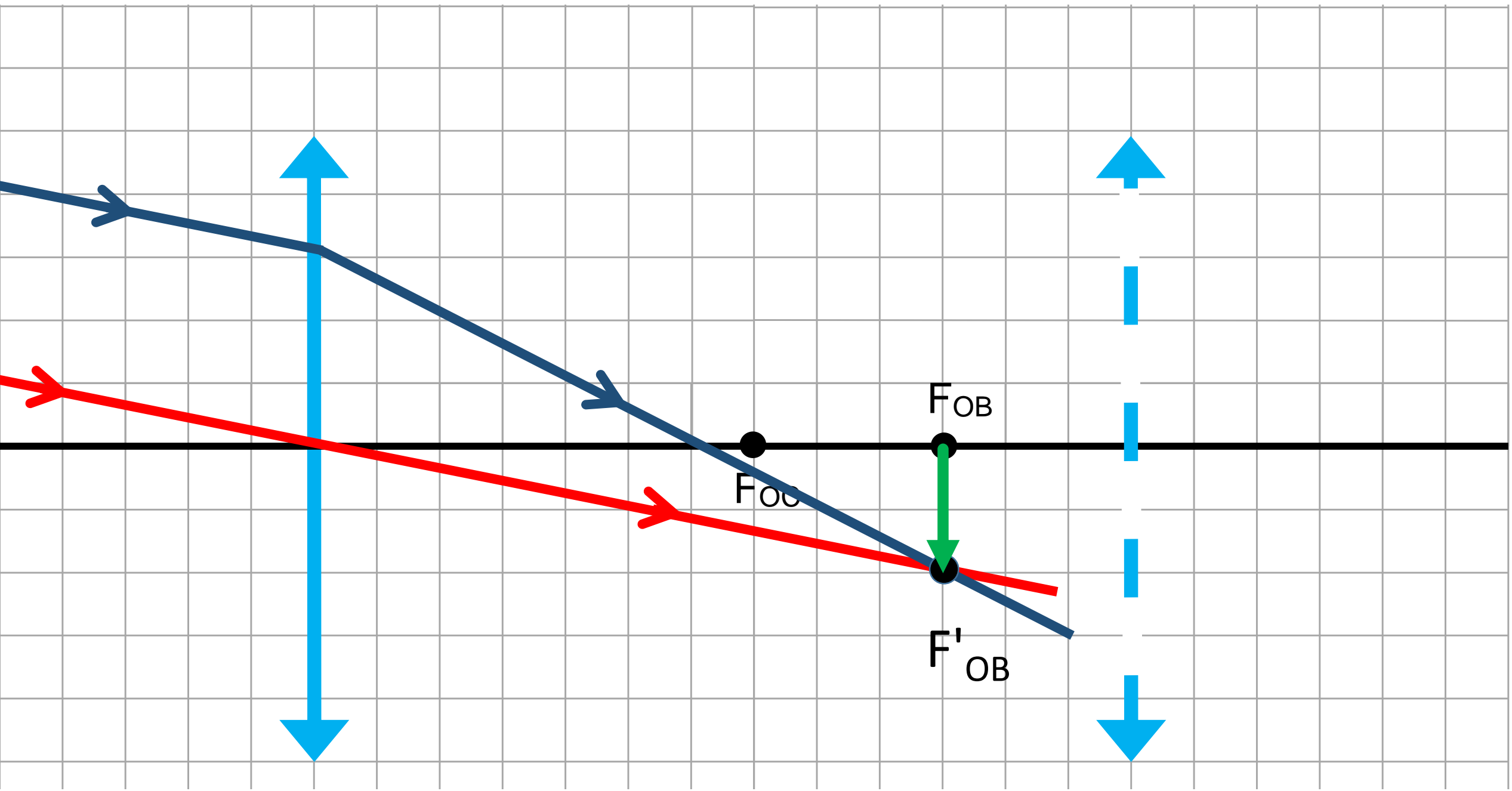


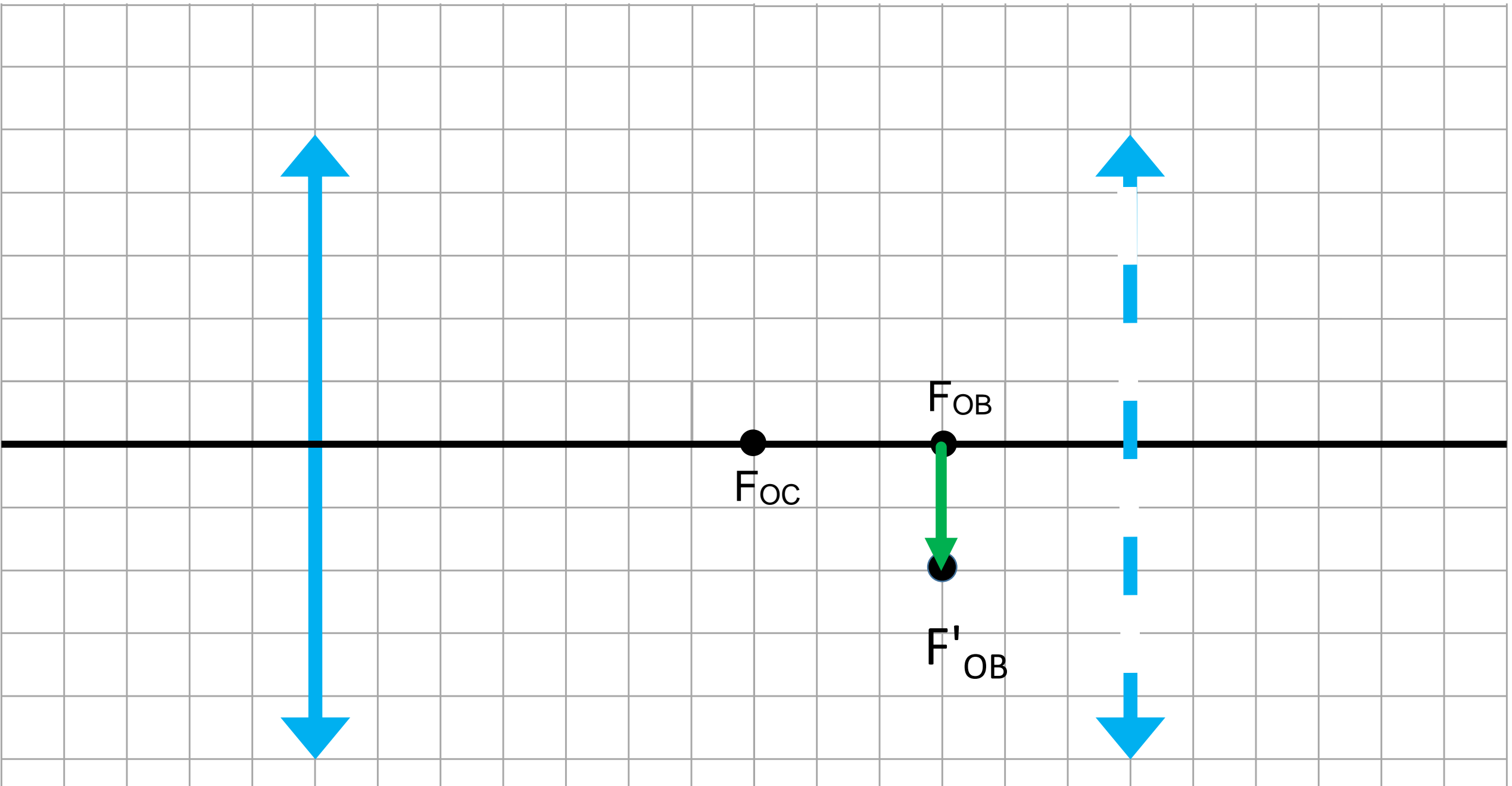


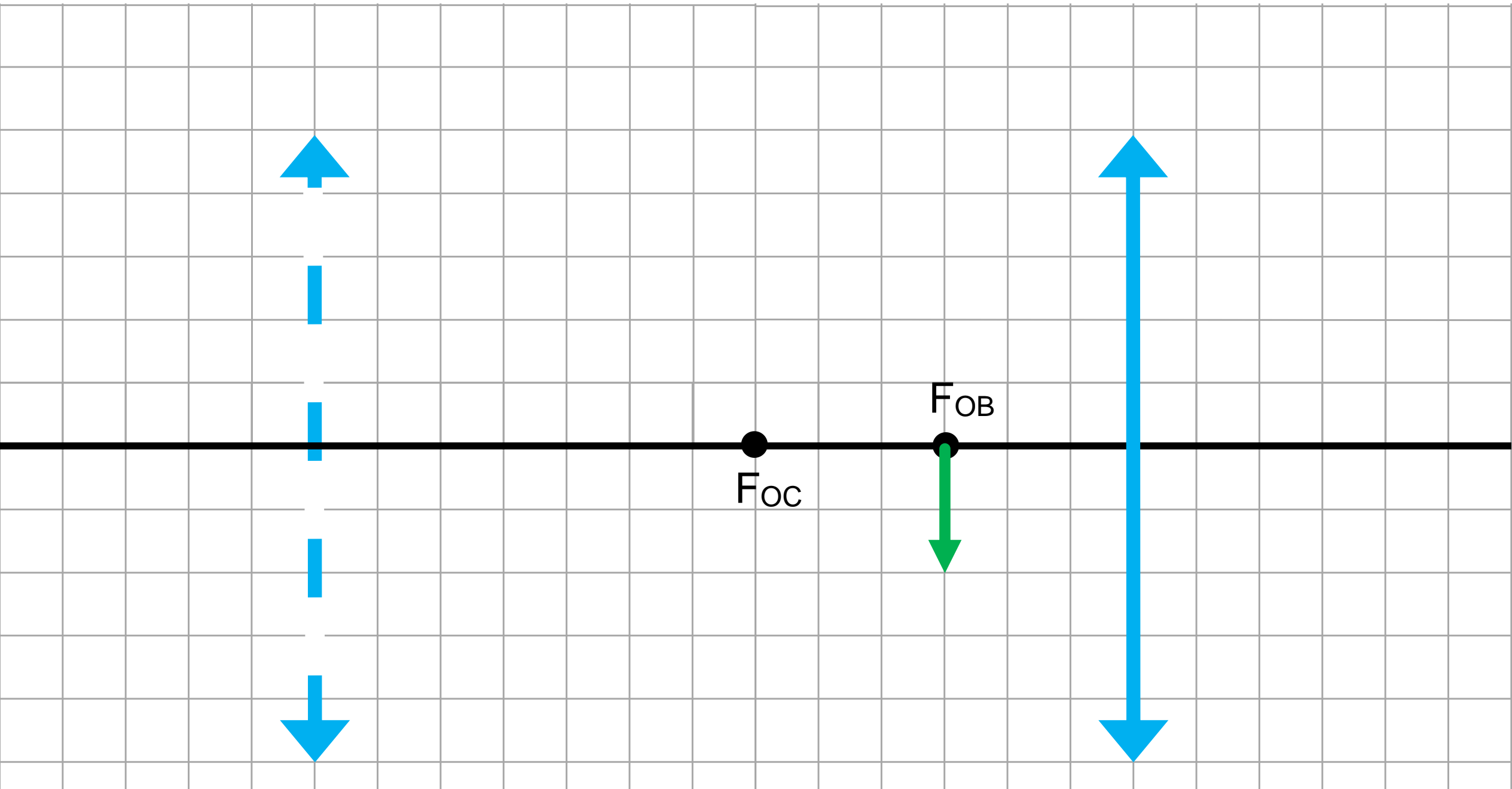


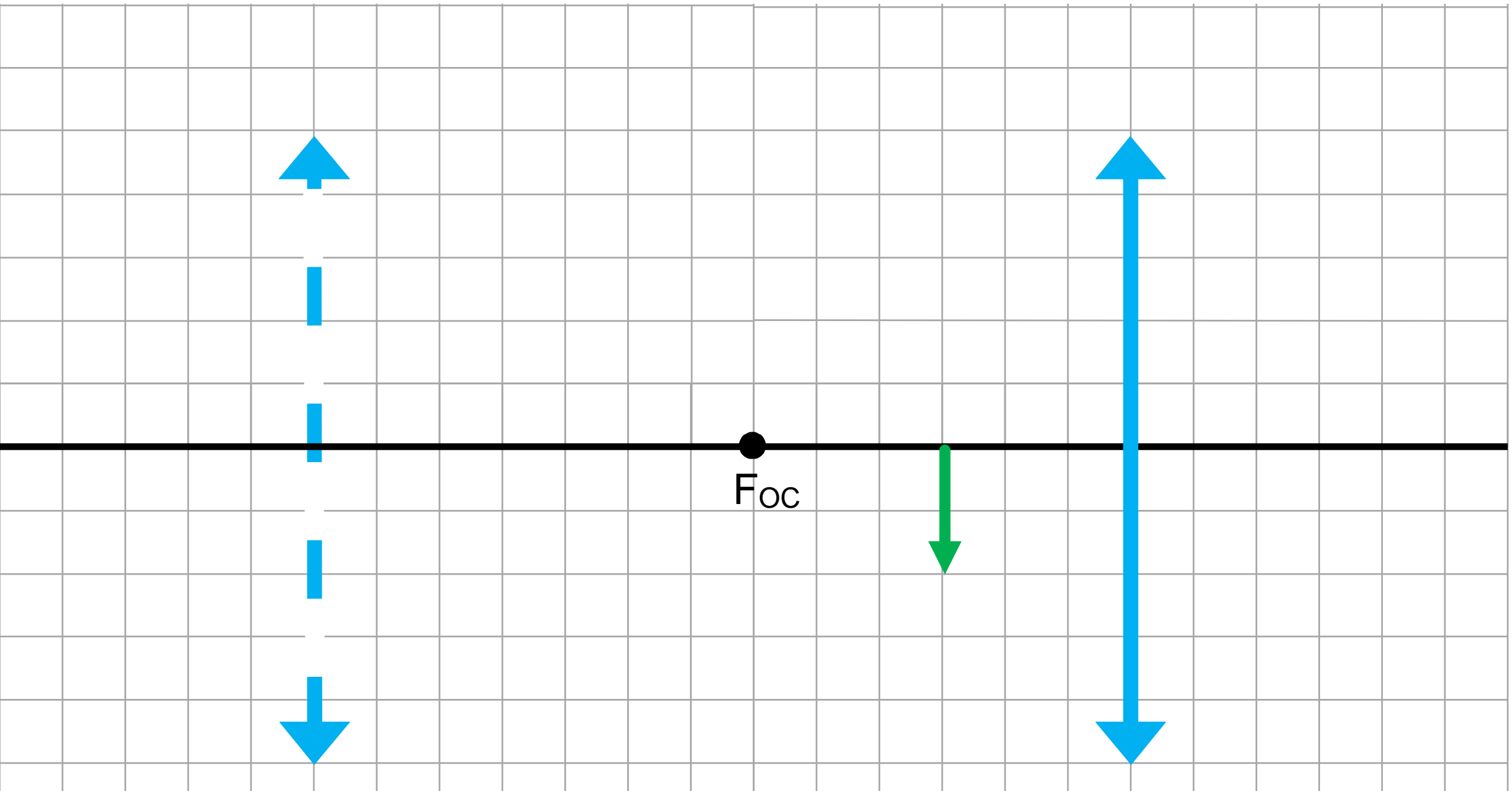


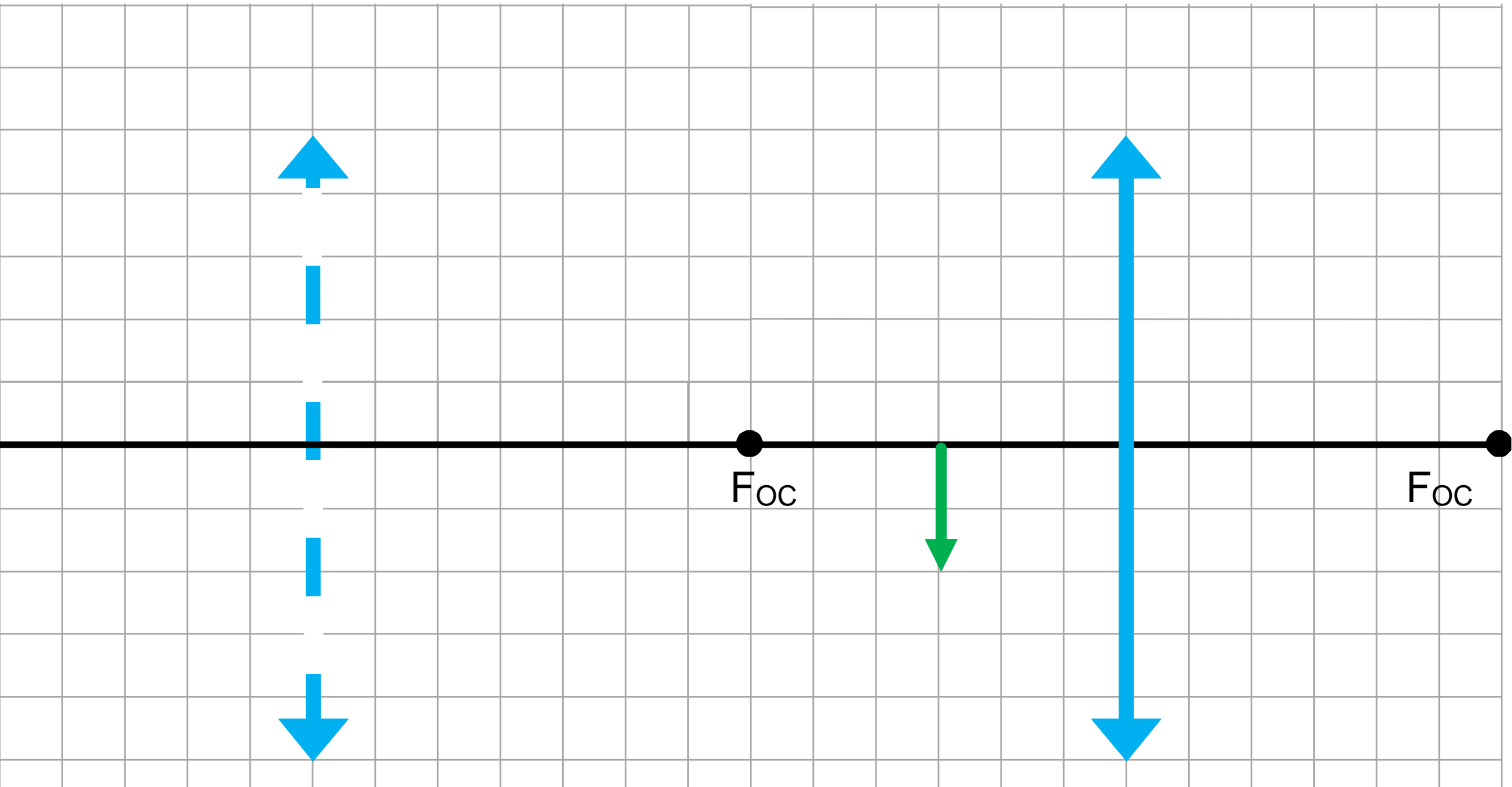


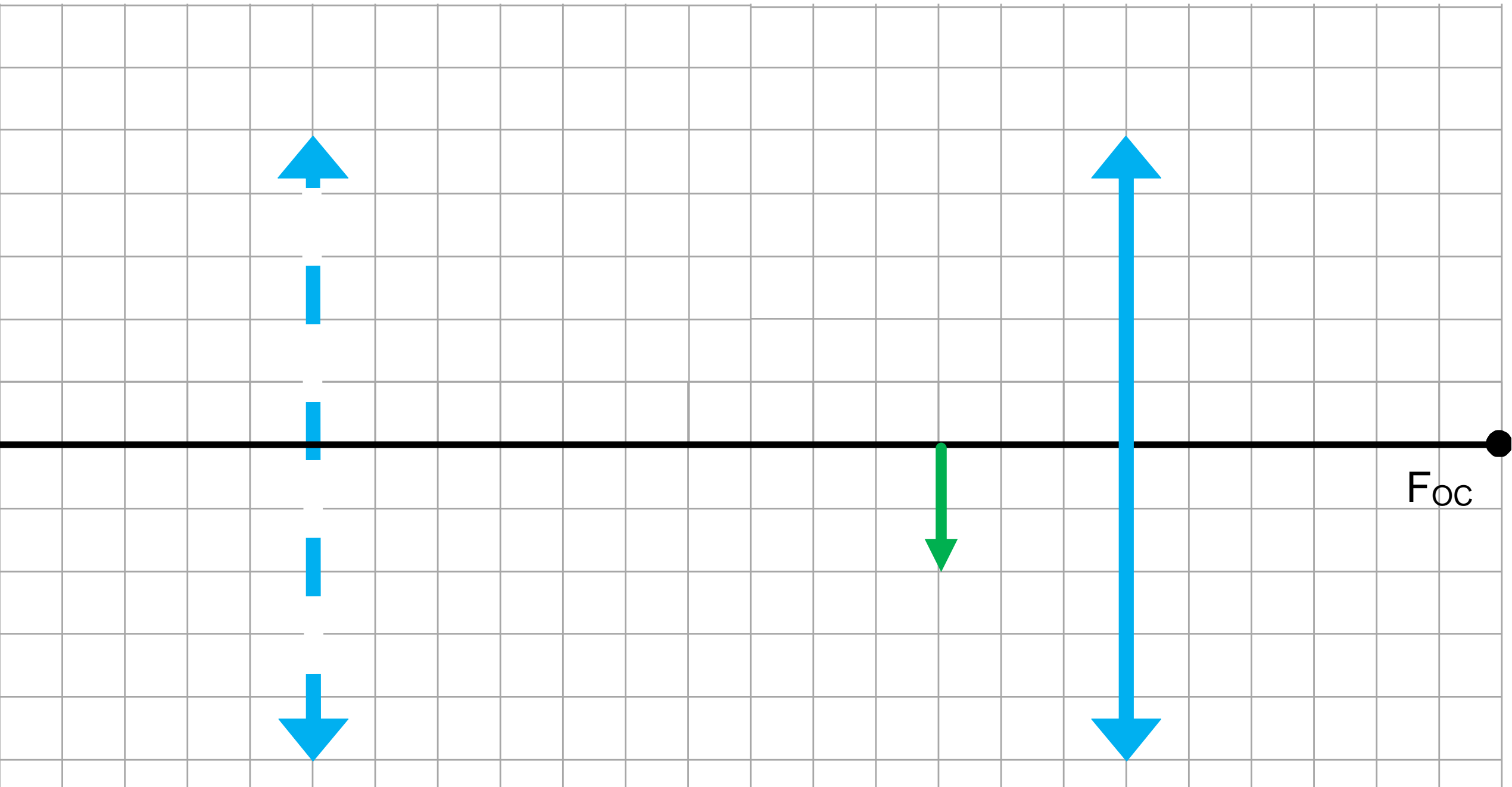


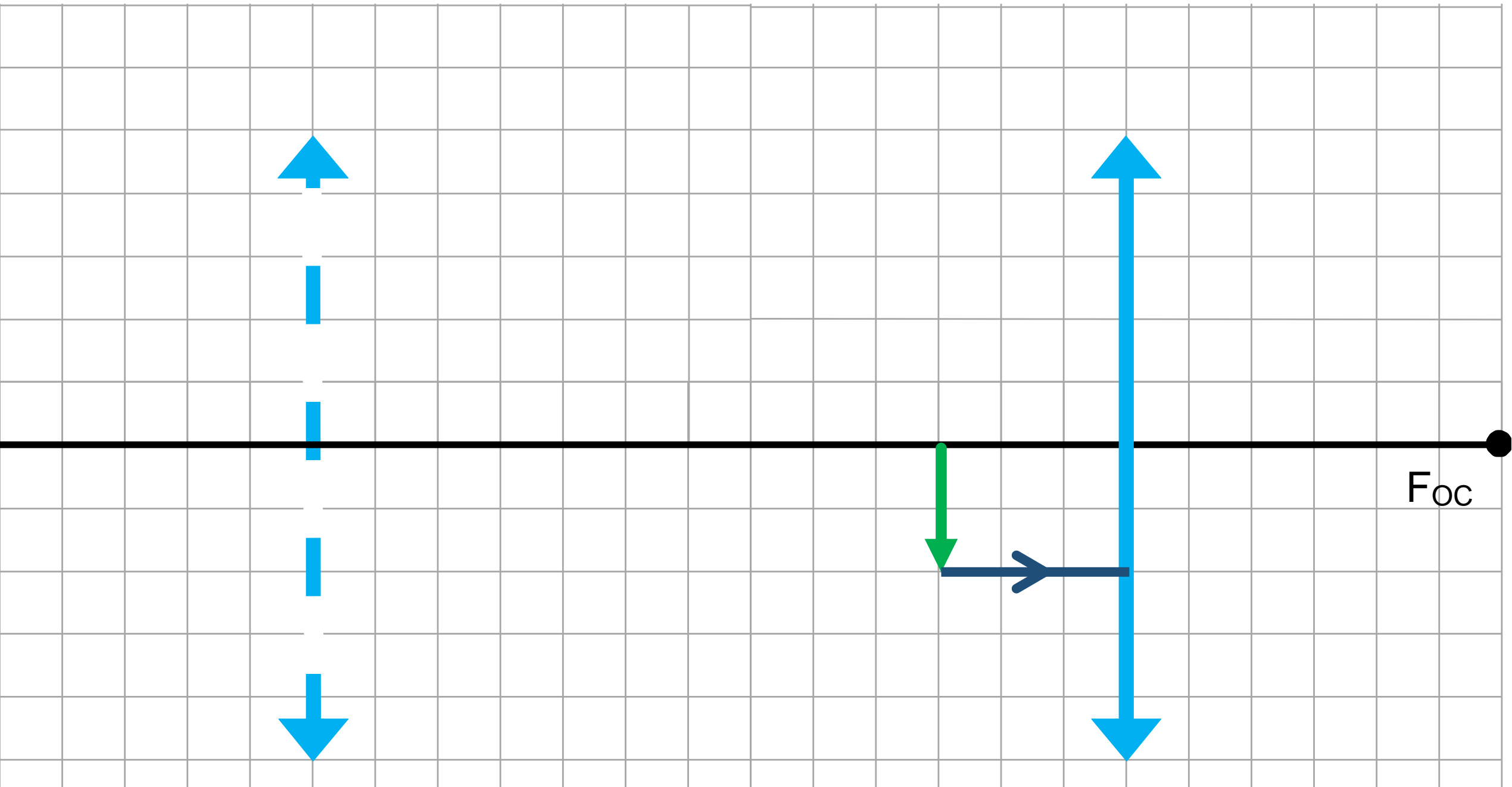


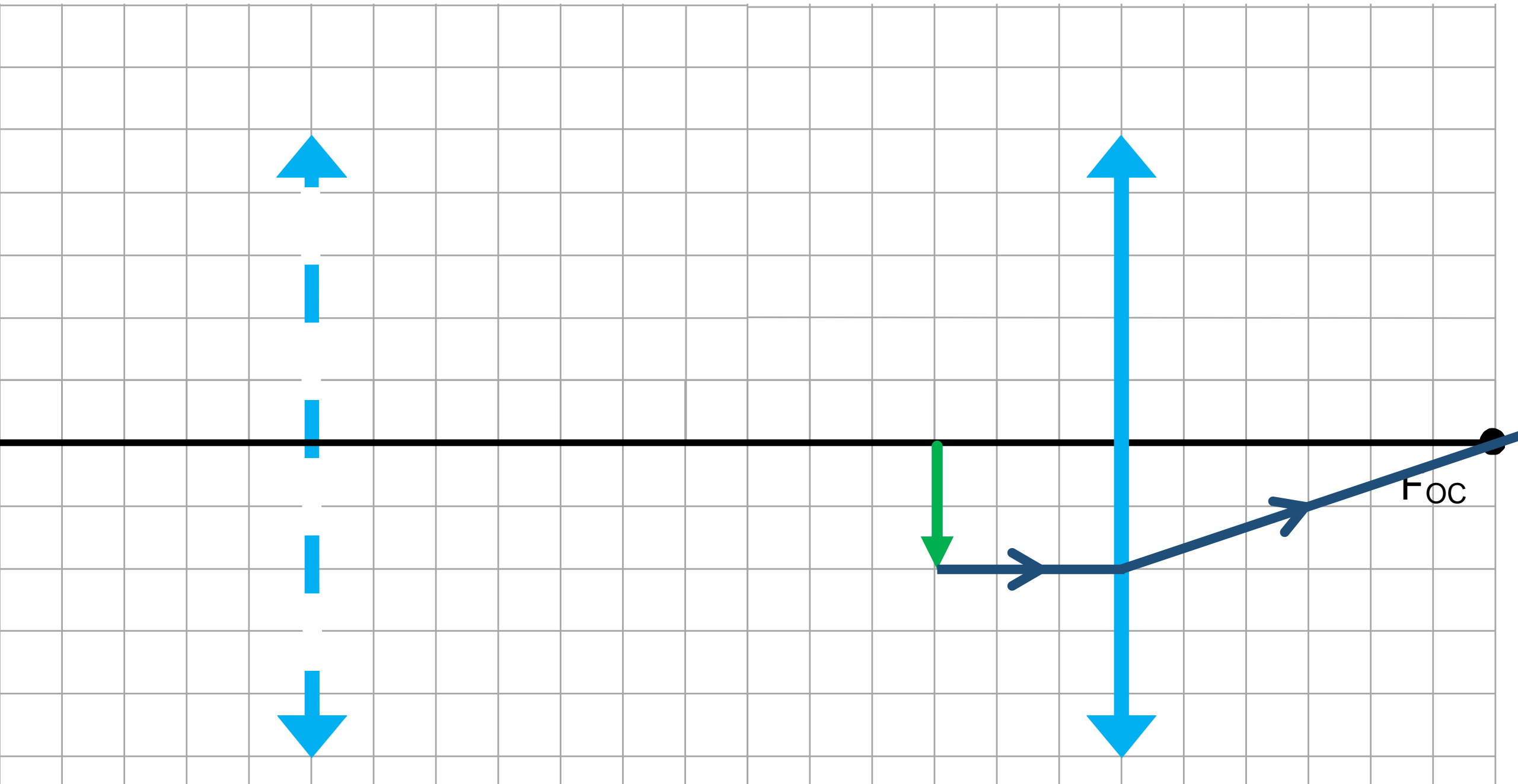


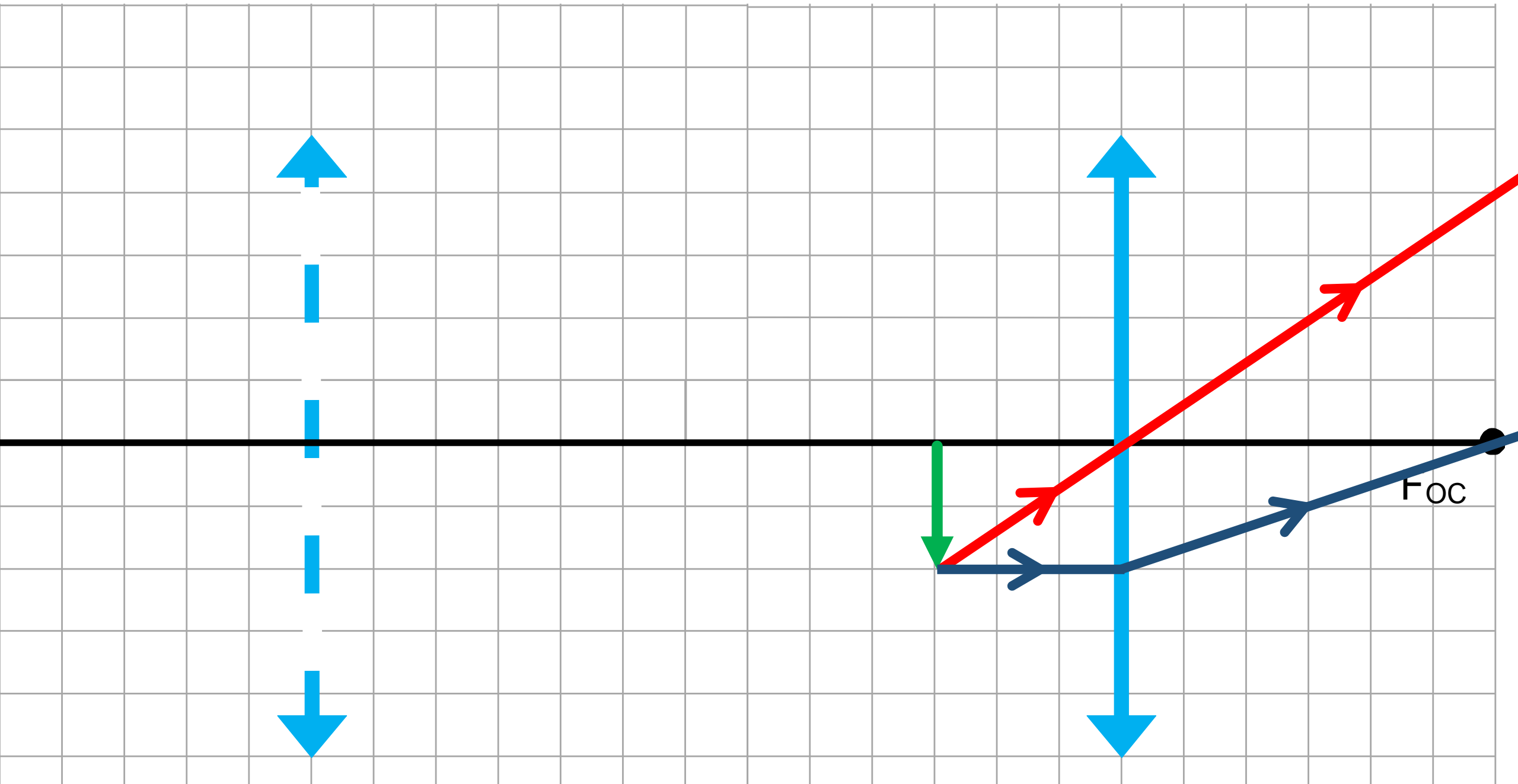


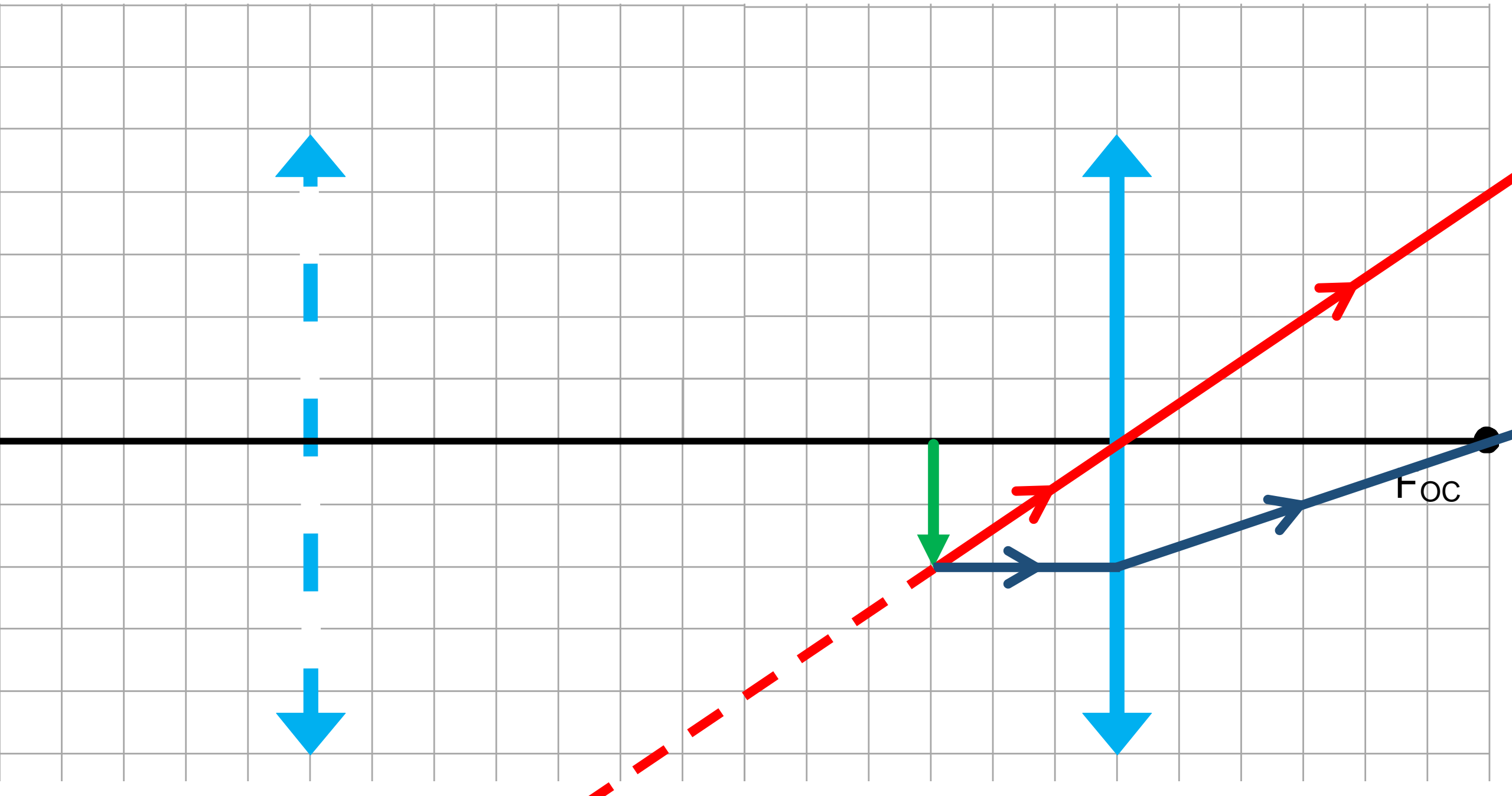


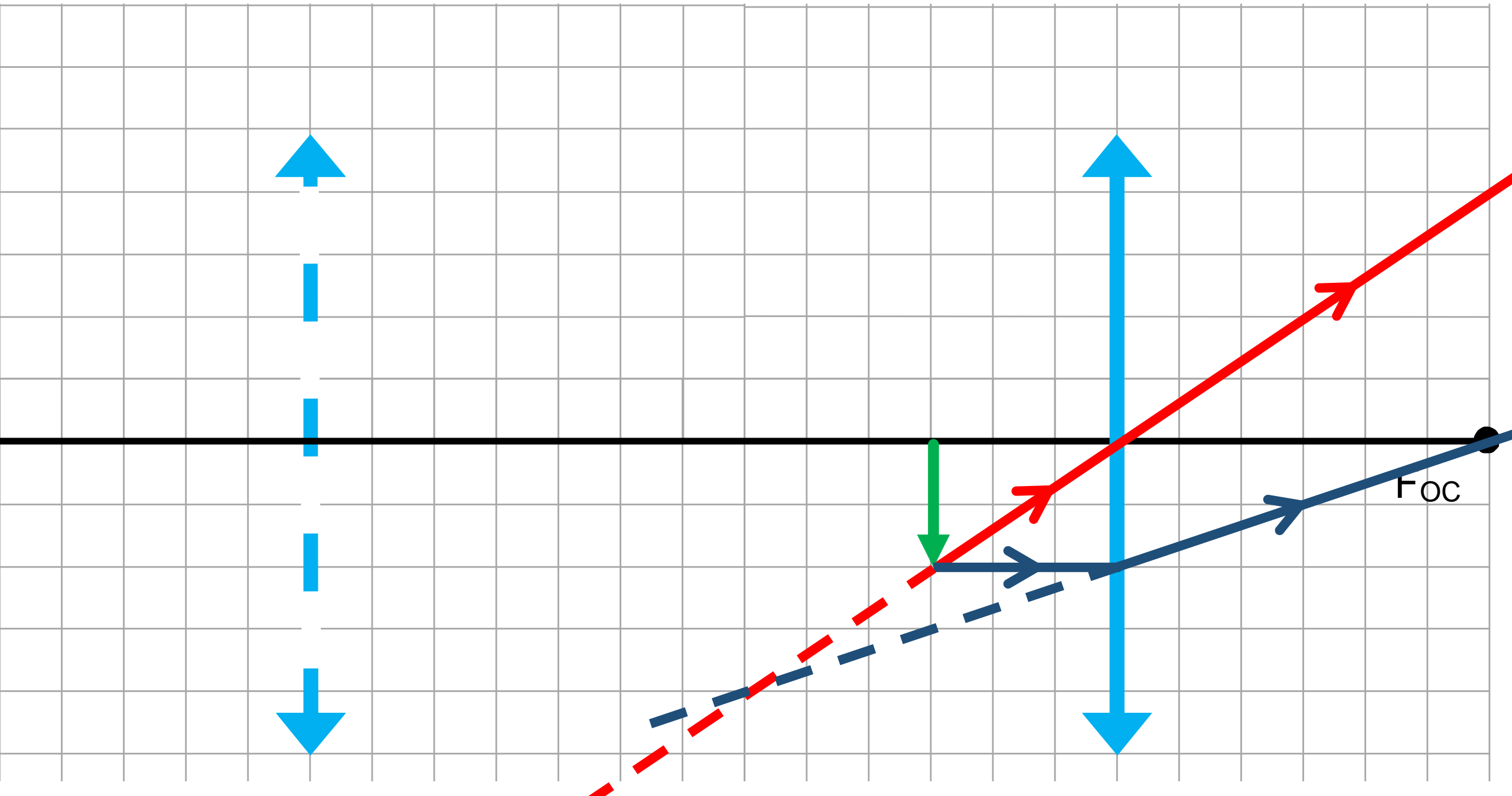


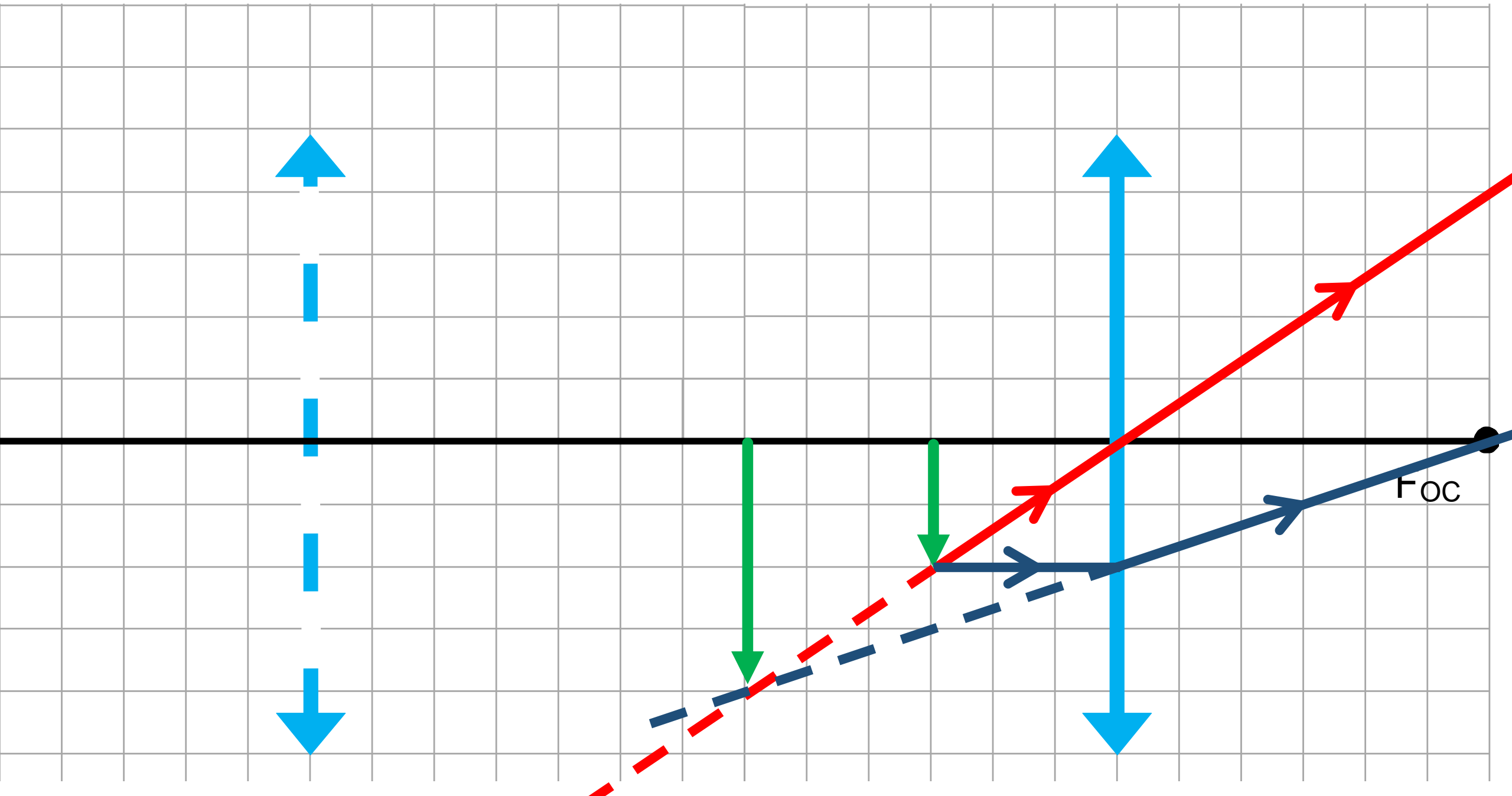


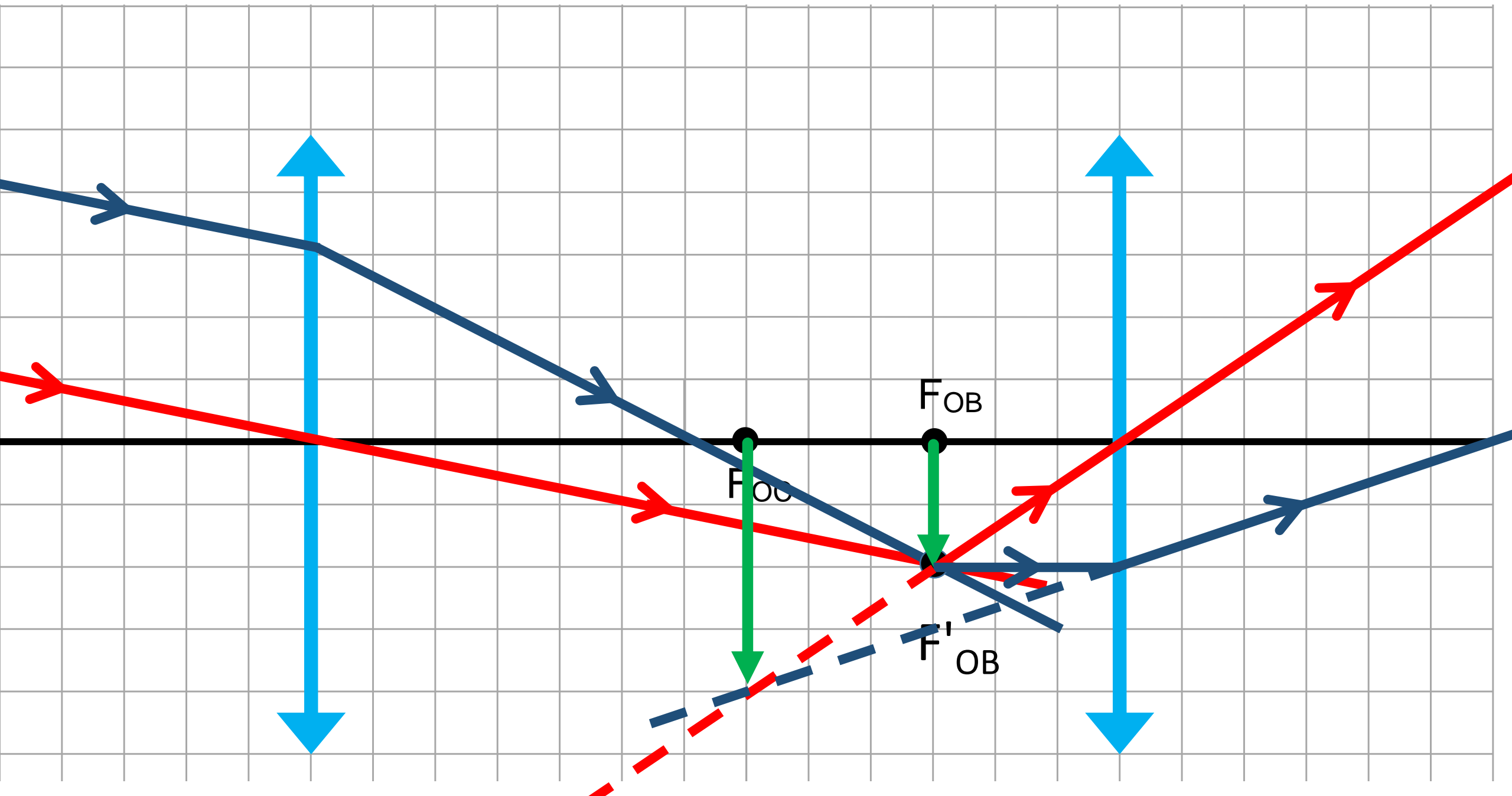












LUNETAS ASTRONÔMICAS

LUNETAS ASTRONÔMICAS

- IMAGEM:

LUNETAS ASTRONÔMICAS

- IMAGEM:
 - VIRTUAL

LUNETAS ASTRONÔMICAS

- IMAGEM:
 - VIRTUAL
 - INVERTIDA

LUNETAS ASTRONÔMICAS

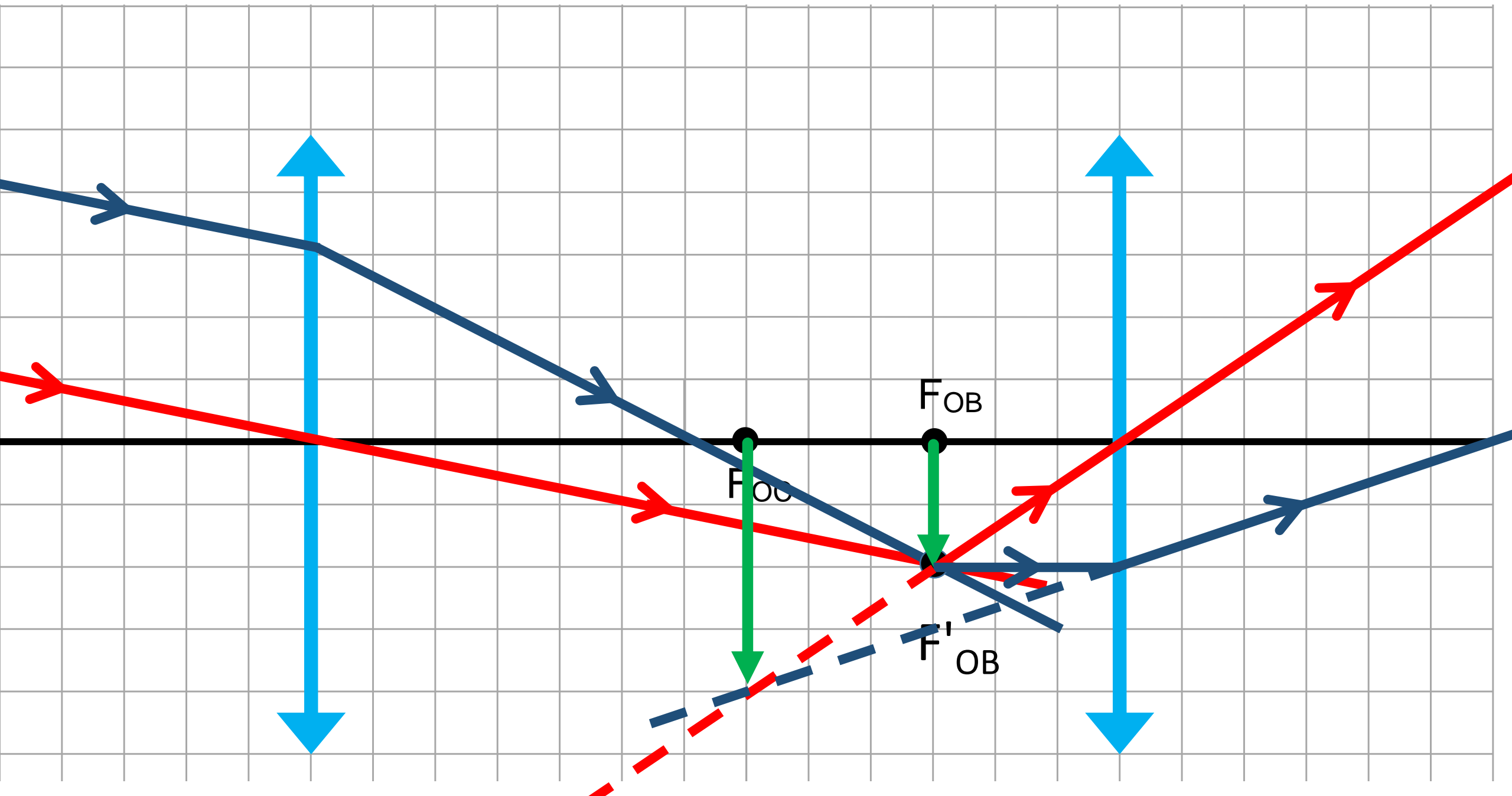
- IMAGEM:
 - VIRTUAL
 - INVERTIDA
 - MAIOR

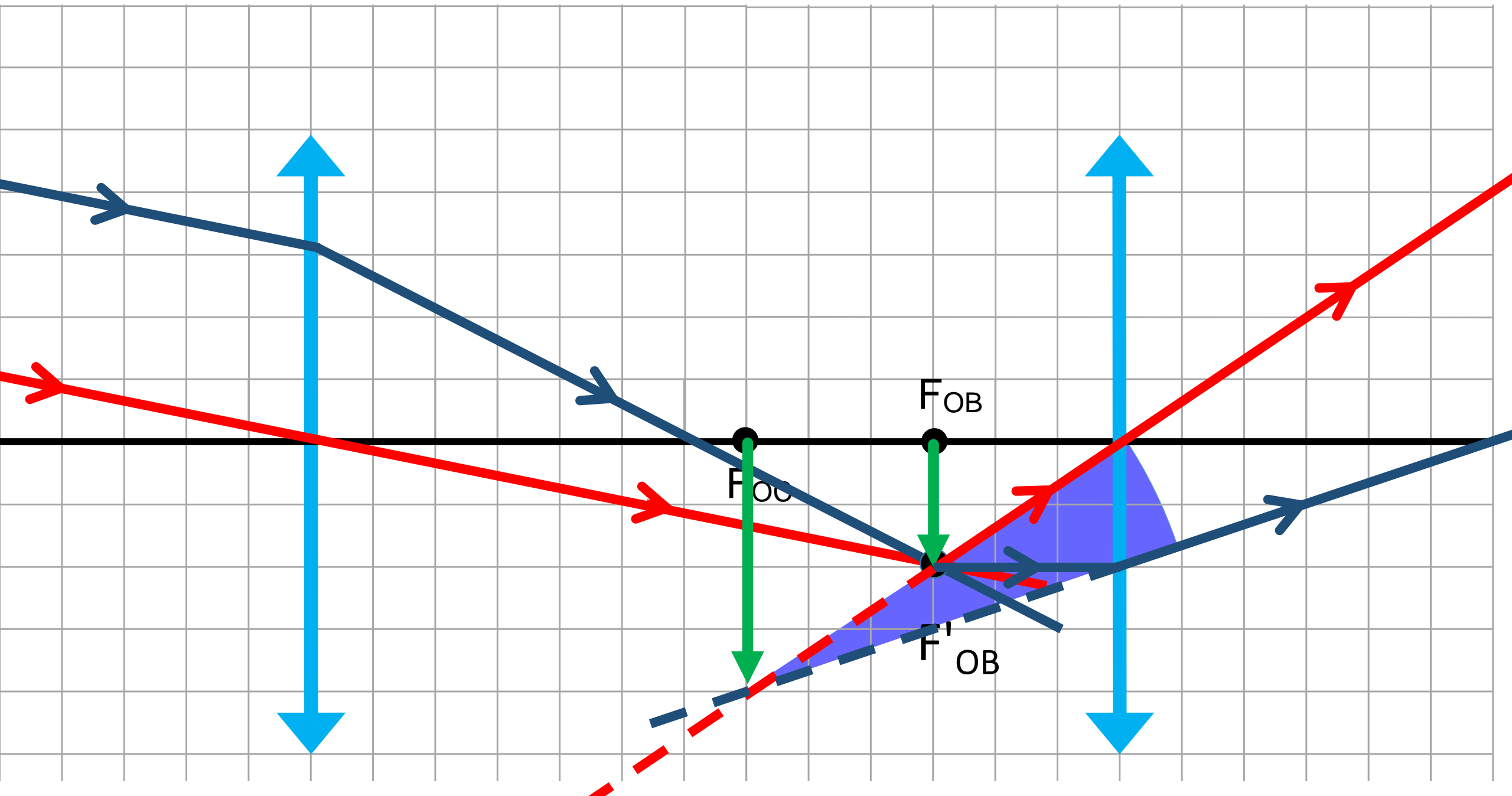
LUNETAS ASTRONÔMICAS

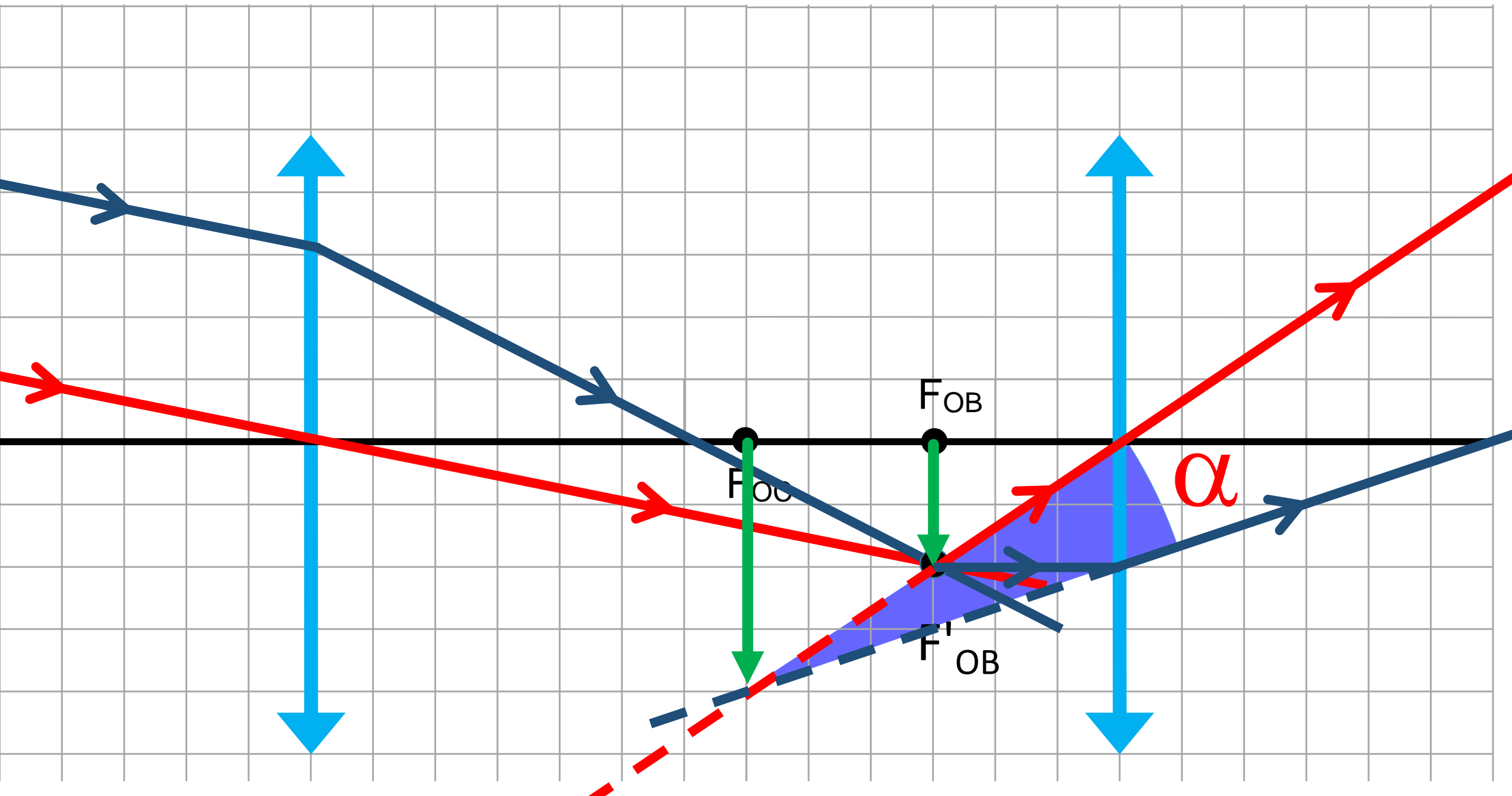
- IMAGEM:
 - VIRTUAL
 - INVERTIDA
 - MAIOR ???

LUNETAS ASTRONÔMICAS

- IMAGEM:
 - VIRTUAL
 - INVERTIDA
 - MAIOR ???
 - Maior aumento angular!!!







LUNETAS ASTRONÔMICAS

- IMAGEM:
 - VIRTUAL
 - INVERTIDA
 - MAIOR ???
 - Maior aumento angular!!!

LUNETAS ASTRONÔMICAS

- IMAGEM:
 - VIRTUAL
 - INVERTIDA
 - MAIOR ???
 - Maior aumento angular!!!
- Como a imagem é invertida, não é usada como luneta terrestre

LUNETAS ASTRONÔMICAS

- IMAGEM:
 - VIRTUAL
 - INVERTIDA
 - MAIOR ???
 - Maior aumento angular!!!
- Como a imagem é invertida, não é usada como luneta terrestre



LUNETAS ASTRONÔMICAS

- IMAGEM:
 - VIRTUAL
 - INVERTIDA
 - MAIOR ???
 - Maior aumento angular!!!
- Como a imagem é invertida, não é usada como luneta terrestre
- Imagem final semelhante ao do Telescópio



TELESCÓPIO

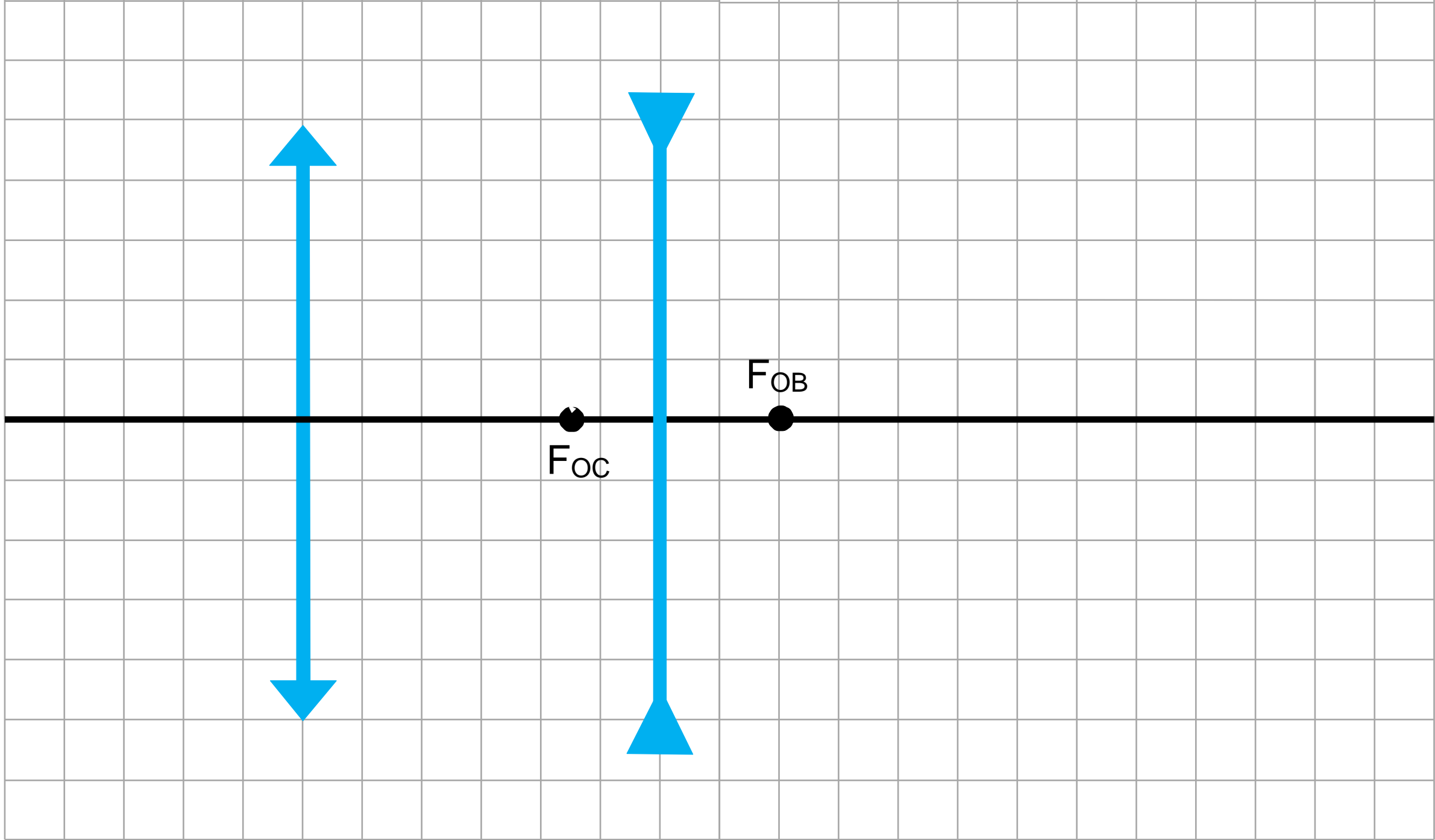
- Semelhante à Luneta astronômica. Portanto:

TELESCÓPIO

- Semelhante à Luneta astronômica. Portanto:
- IMAGEM:
 - VIRTUAL
 - INVERTIDA
 - MAIOR ???
 - Maior aumento angular!!!
- Como a imagem é invertida, não é usada como luneta terrestre



LUNETTA TERRESTRE

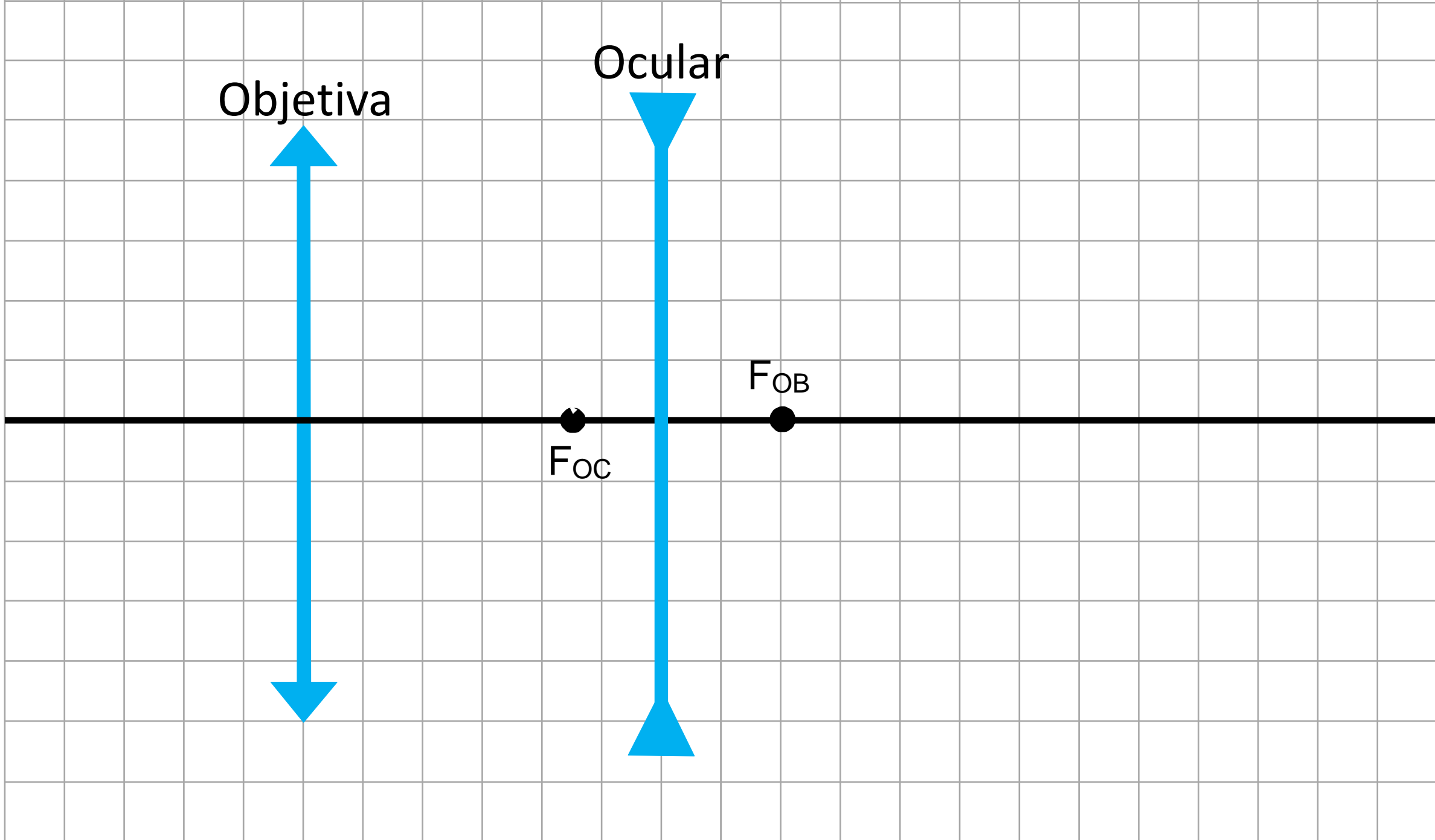


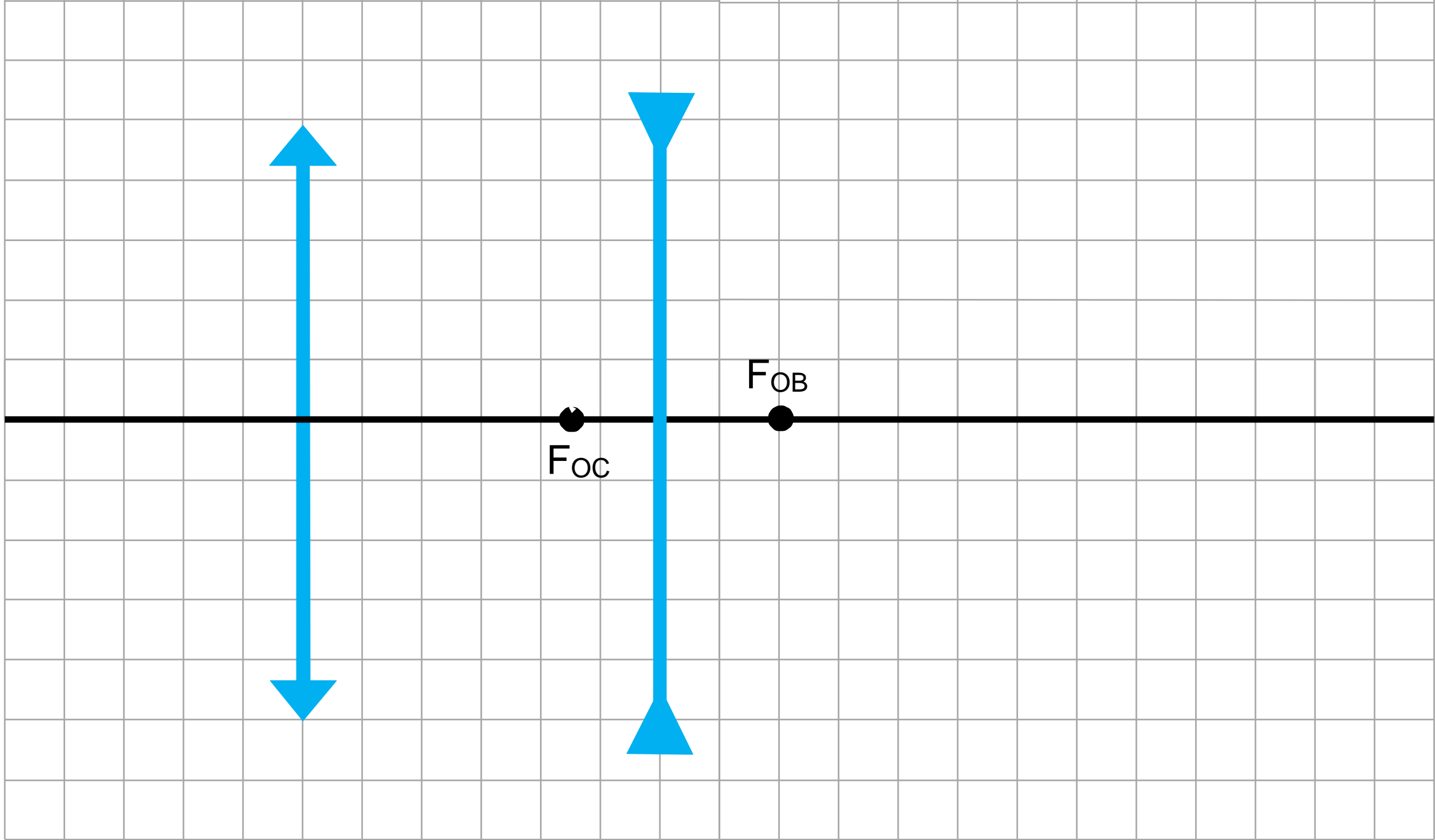
Objetiva

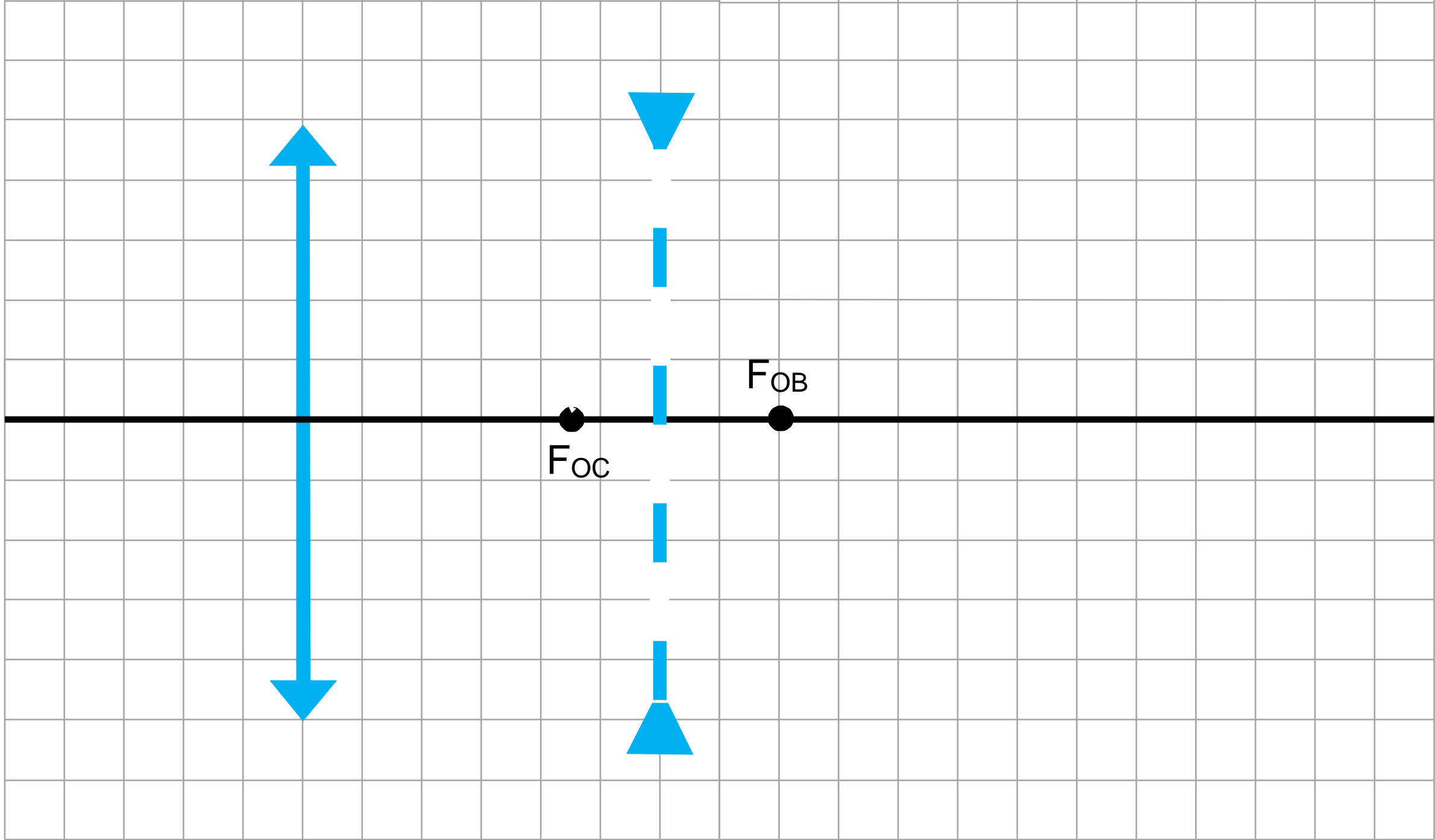
Ocular

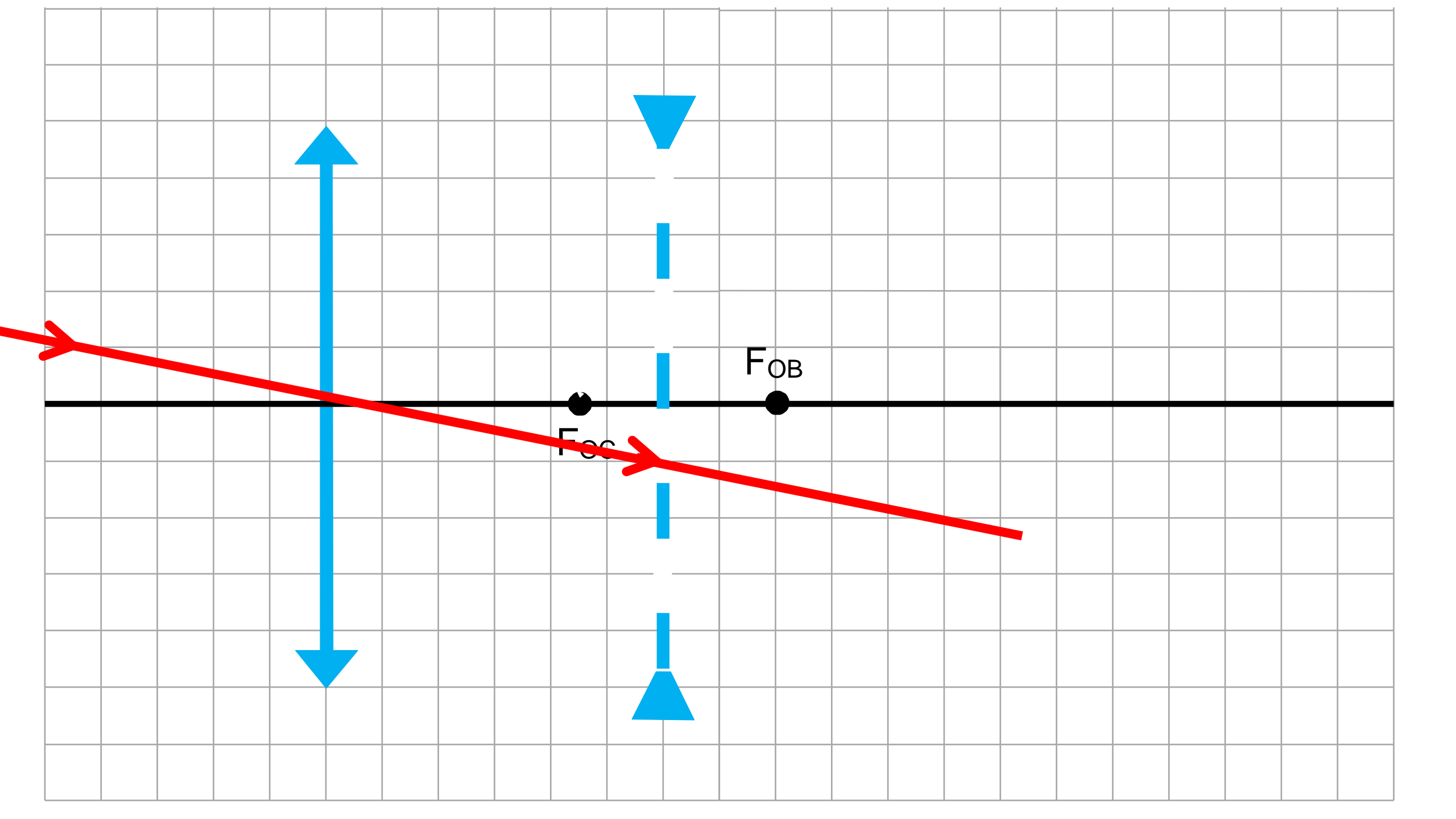
F_{OC}

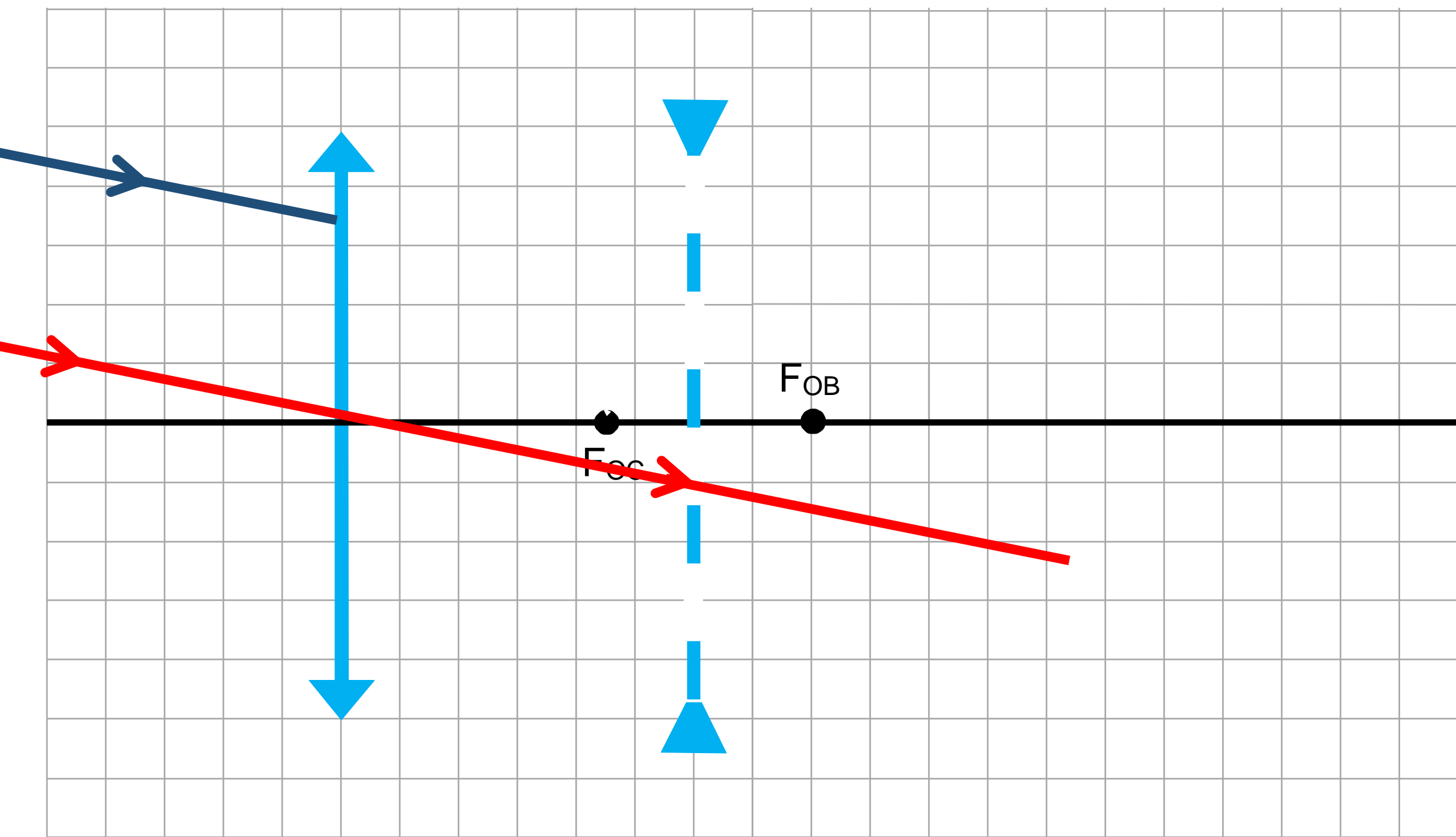
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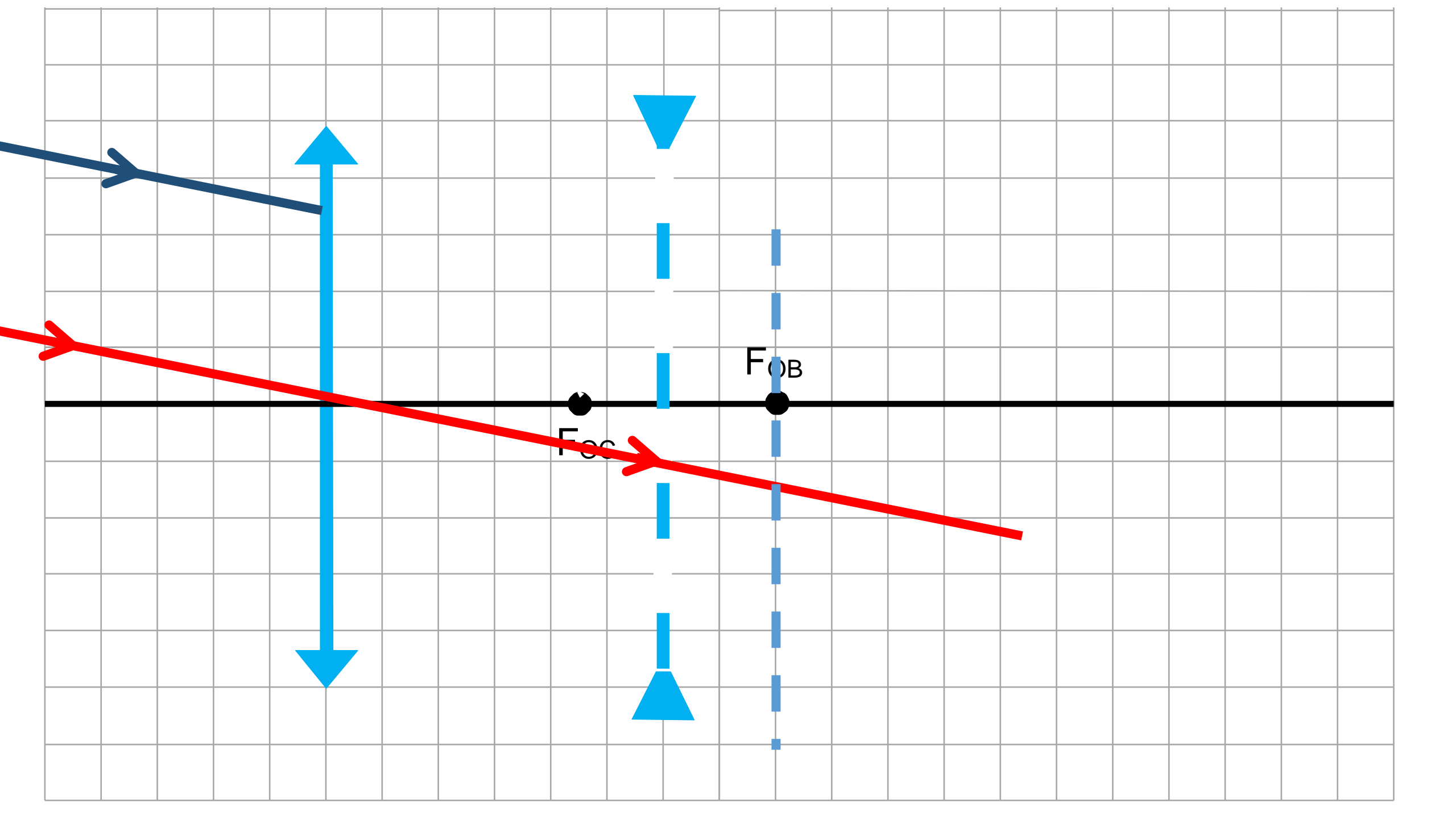


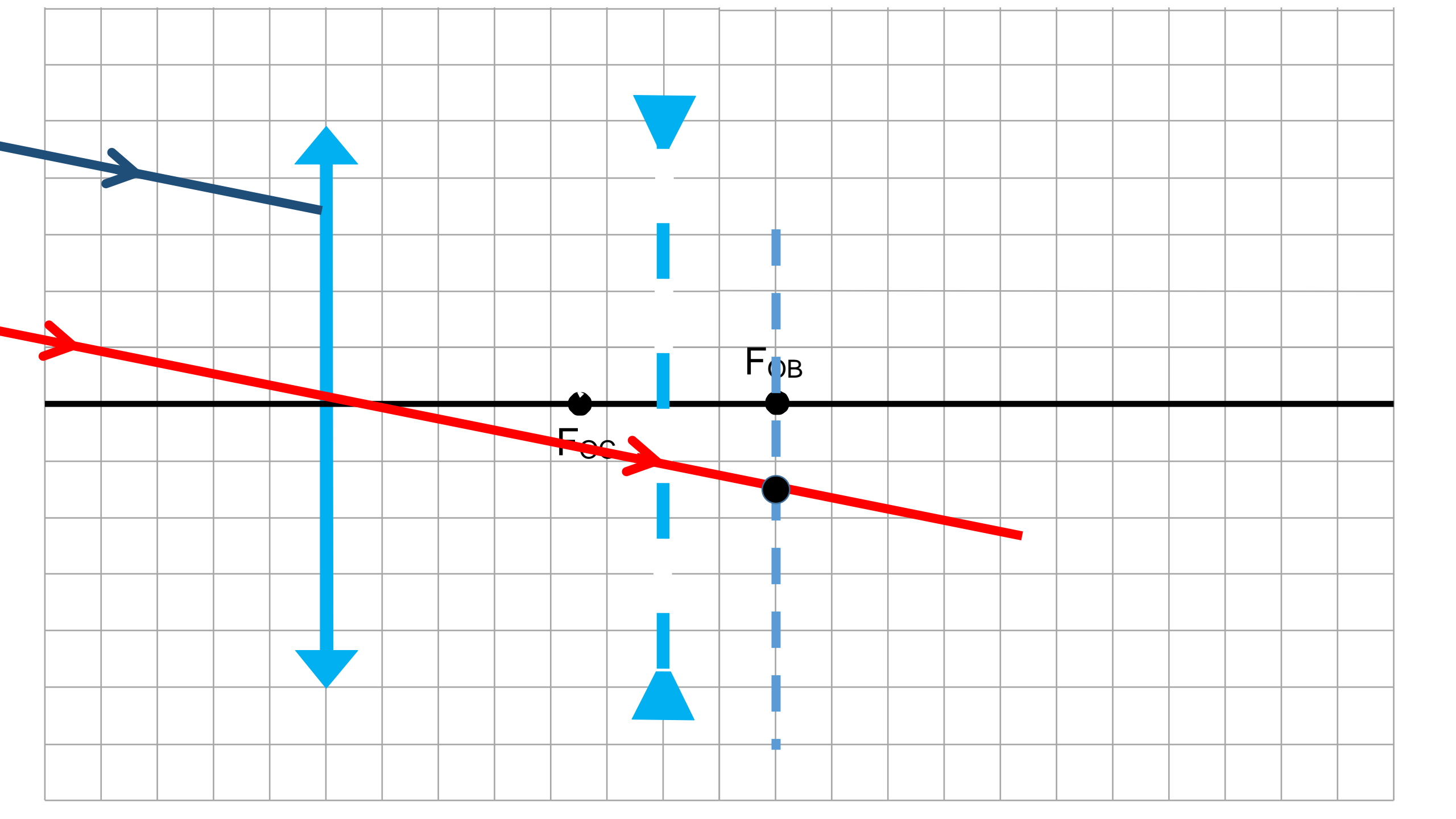


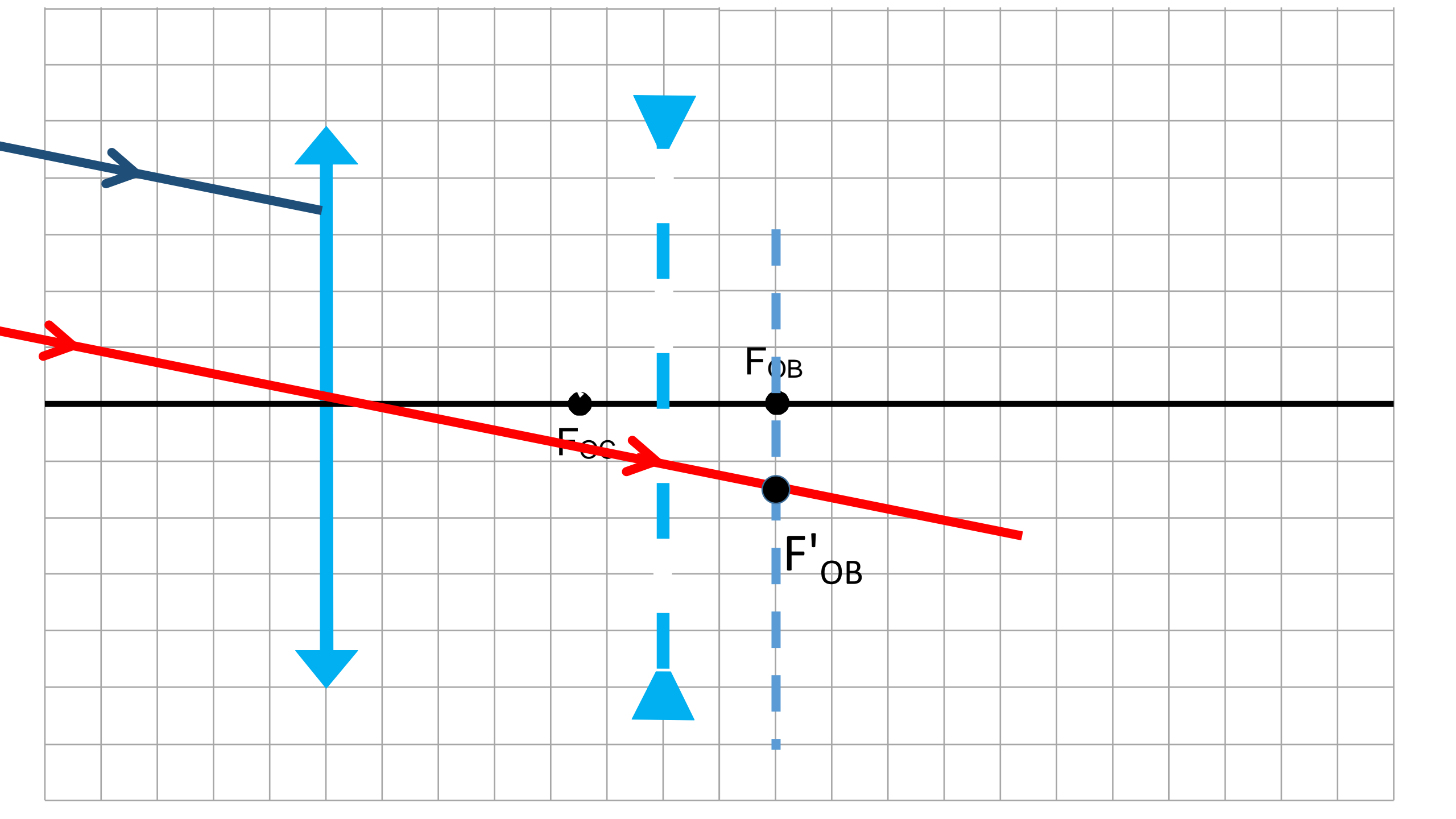


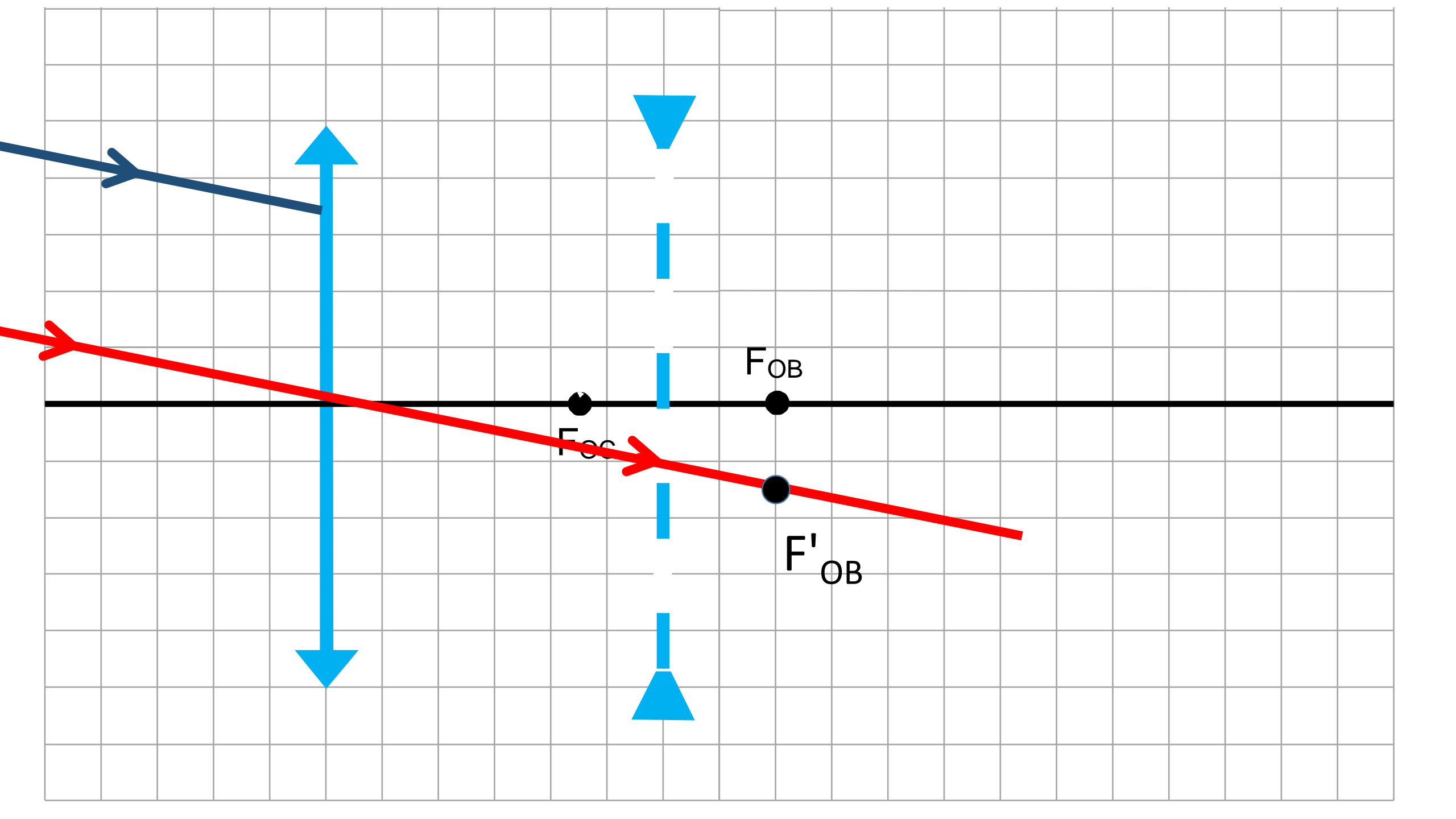


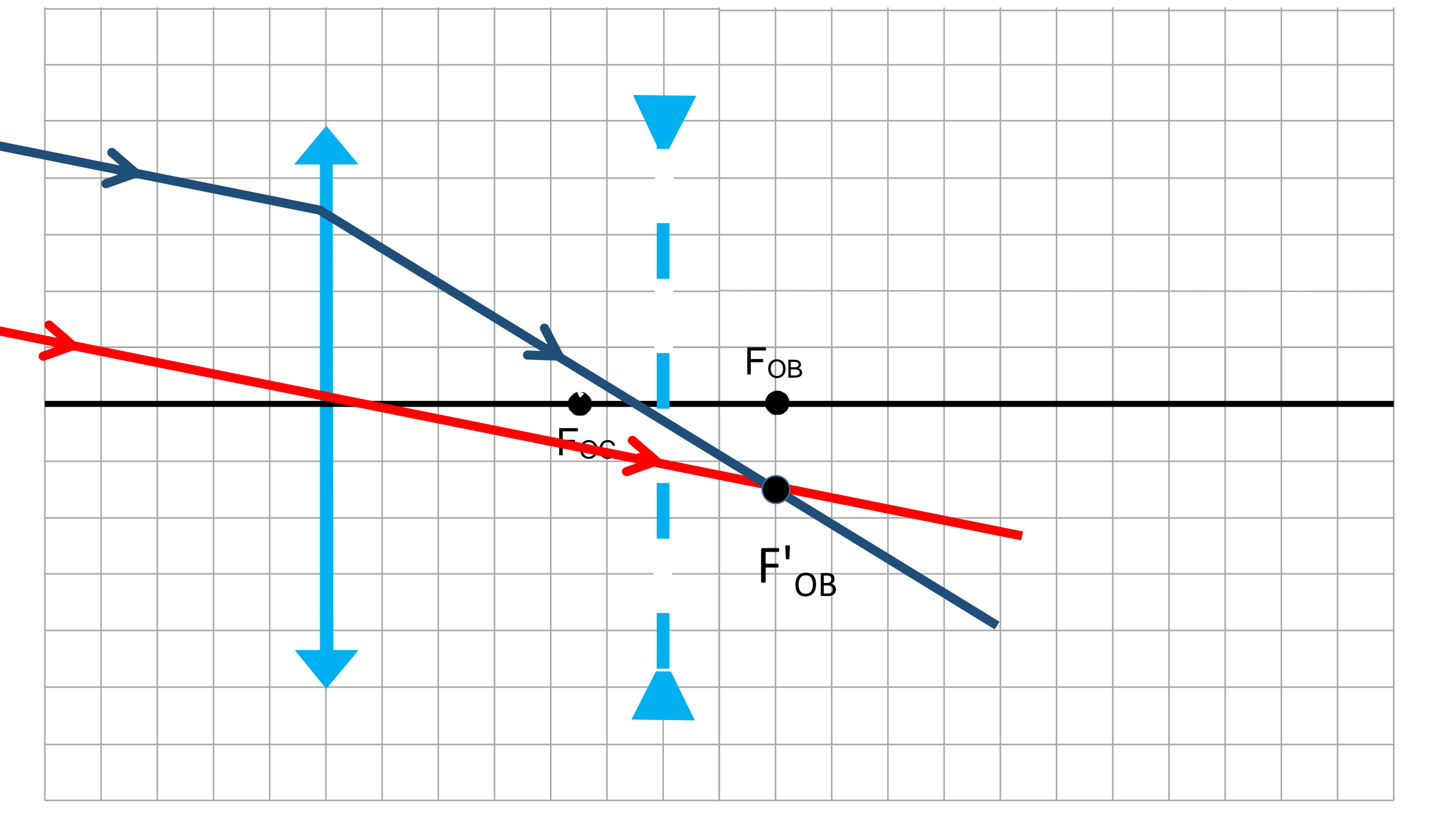


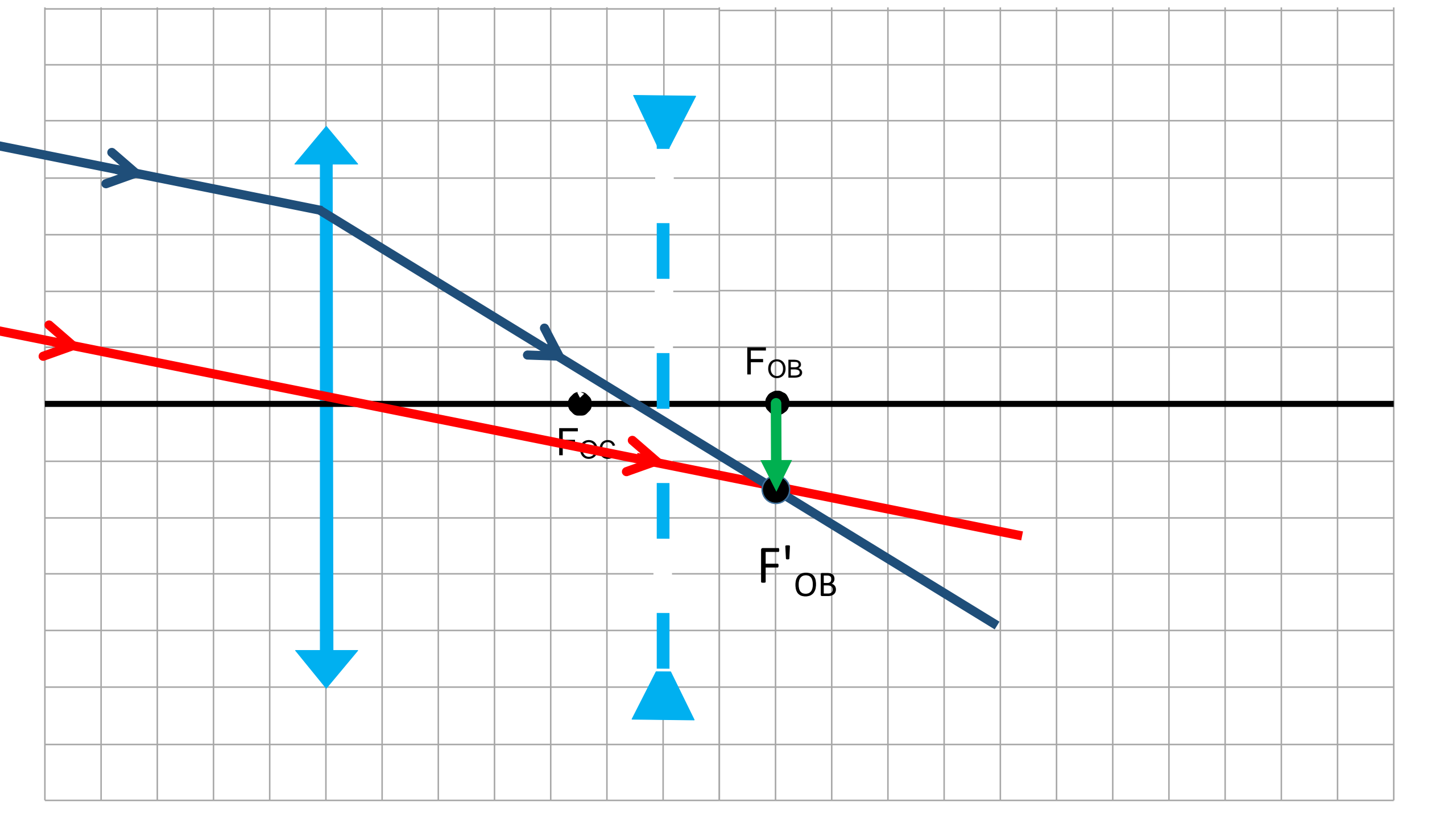


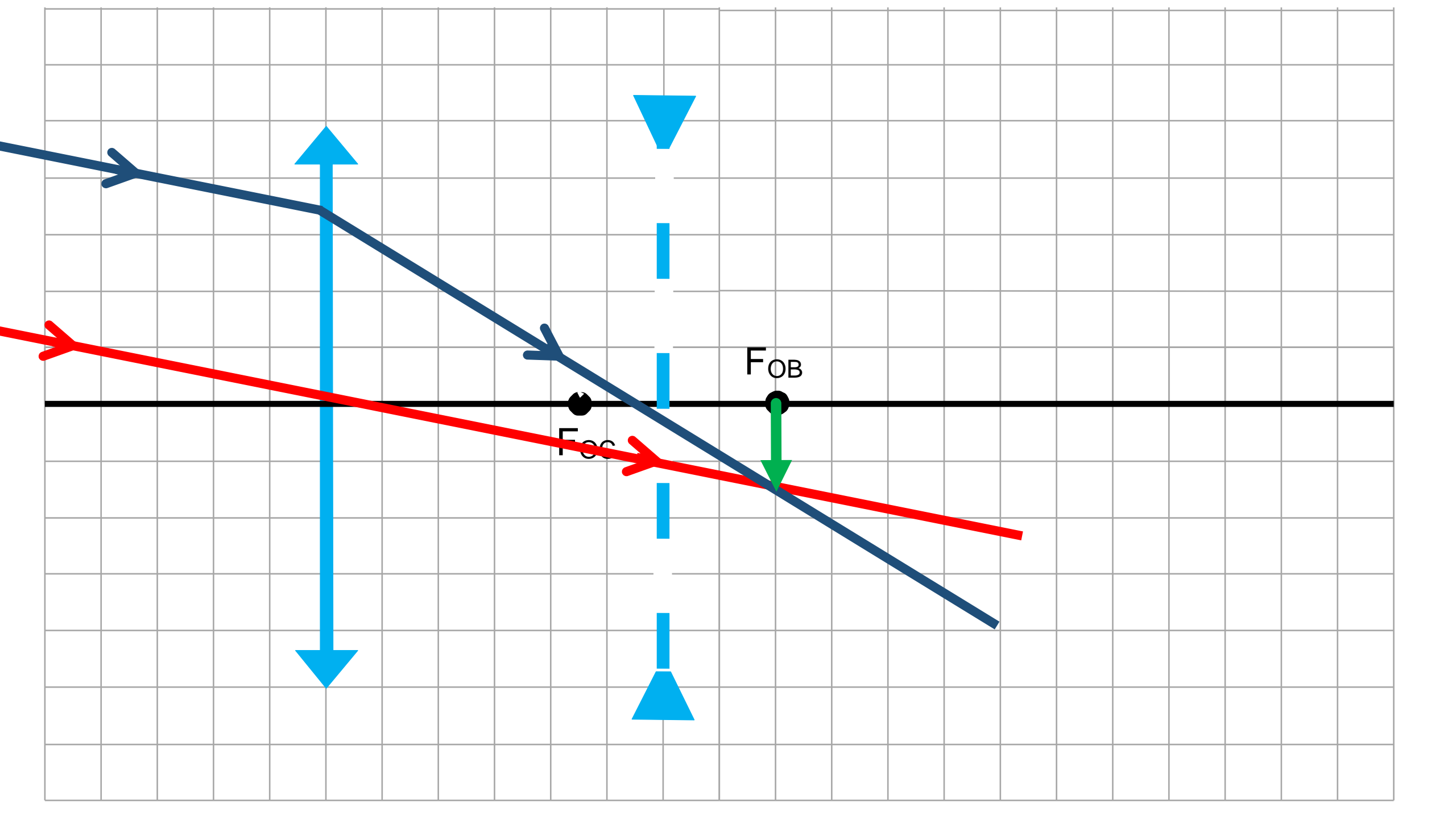


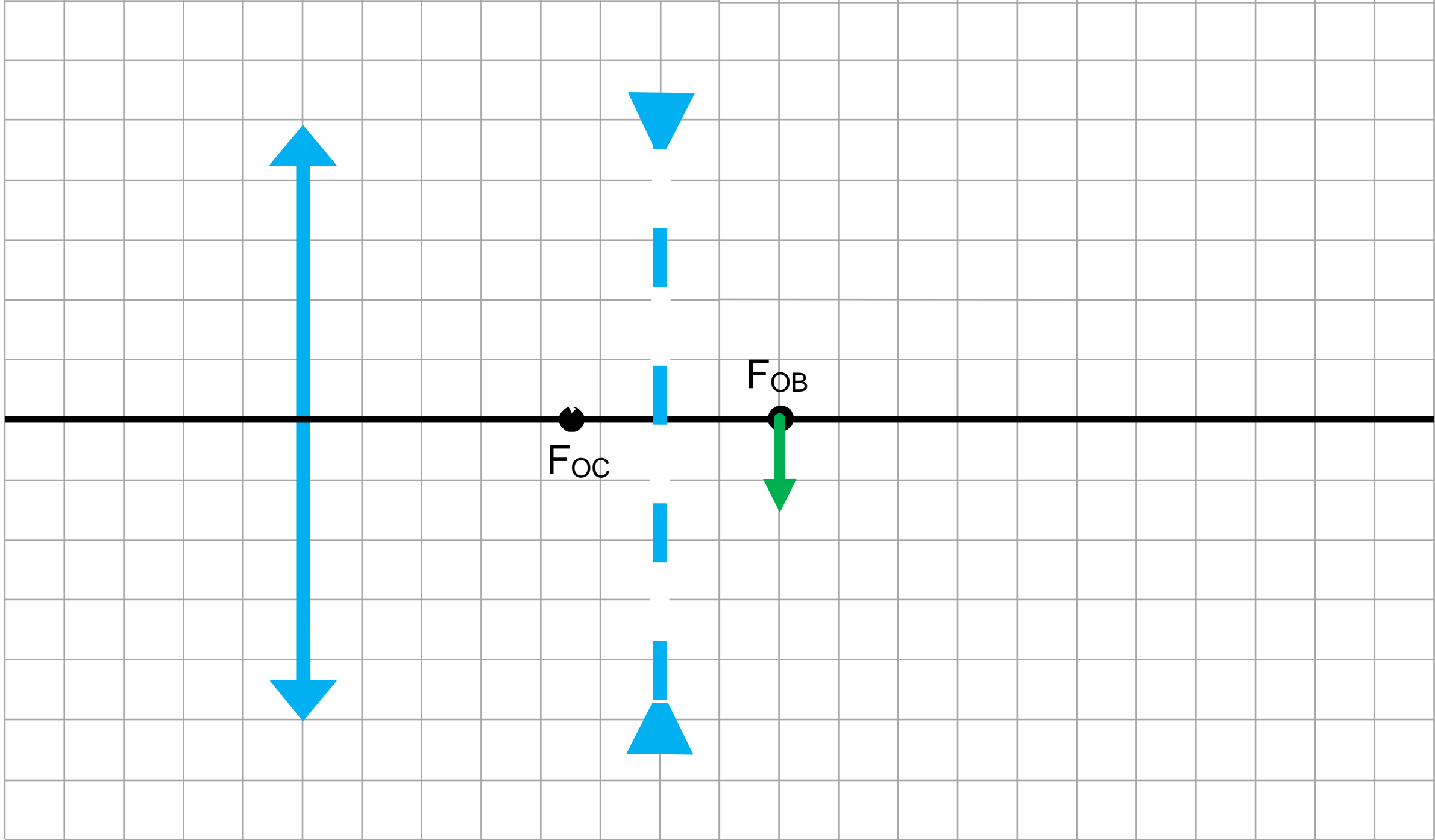


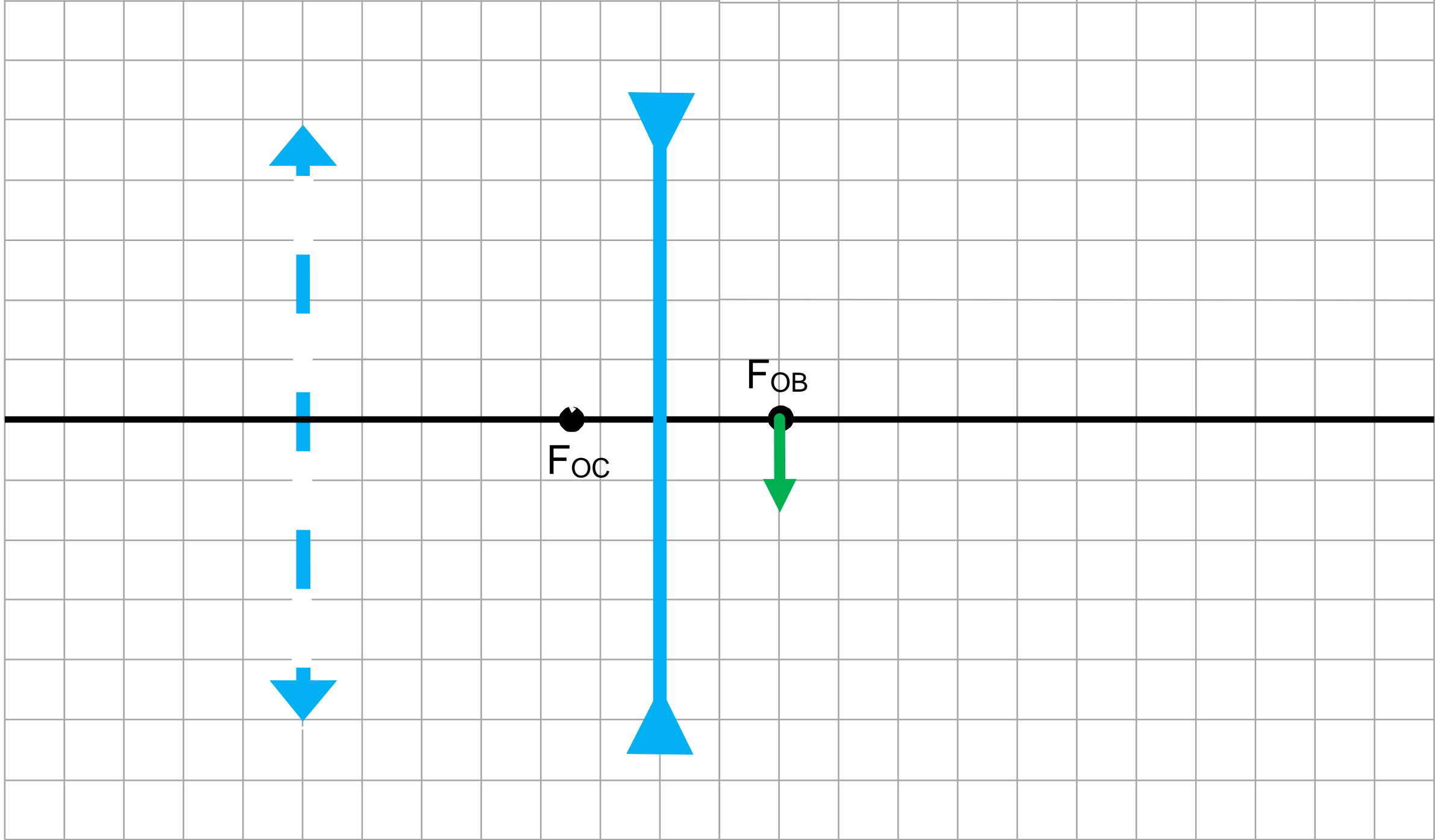


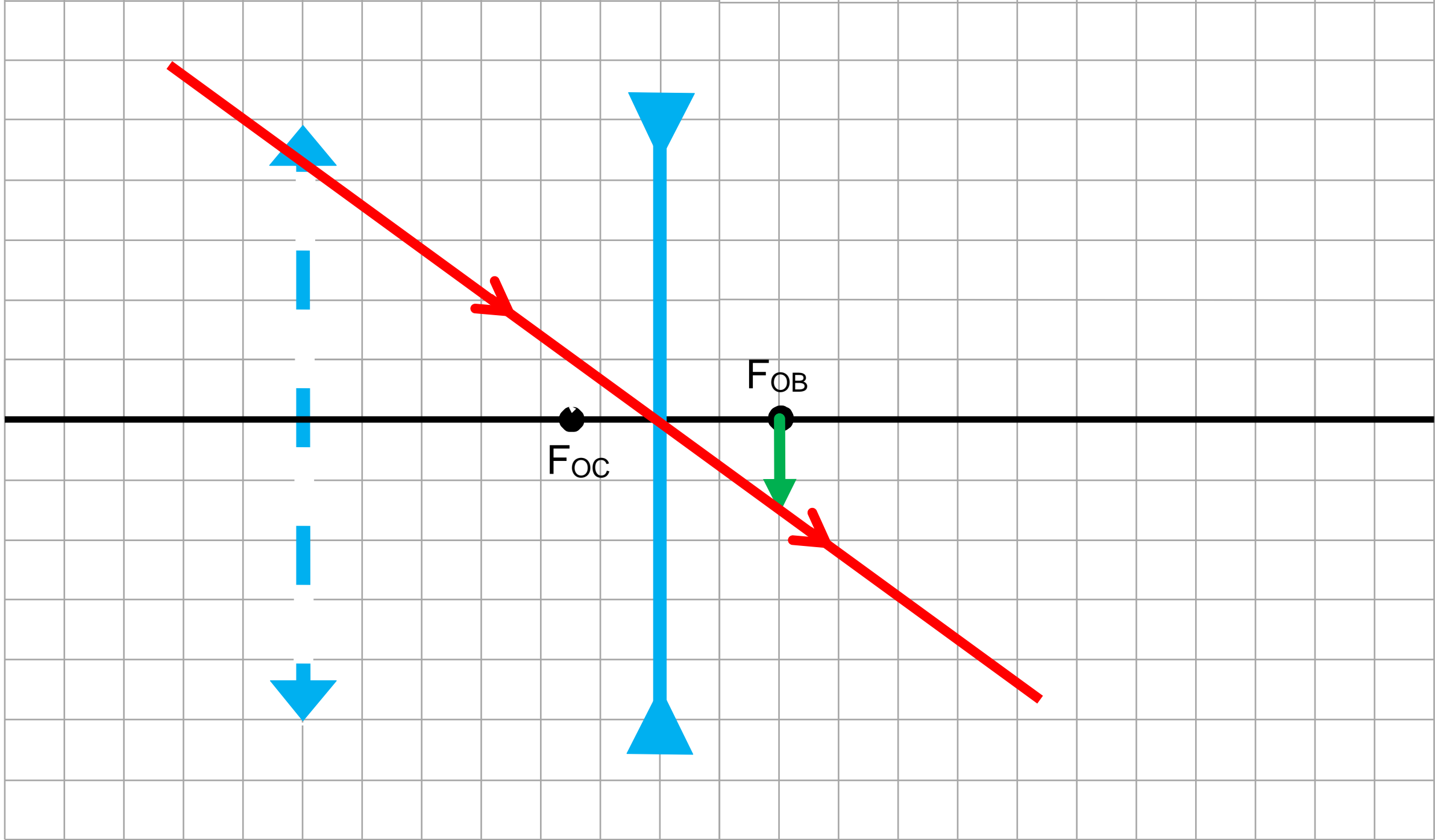


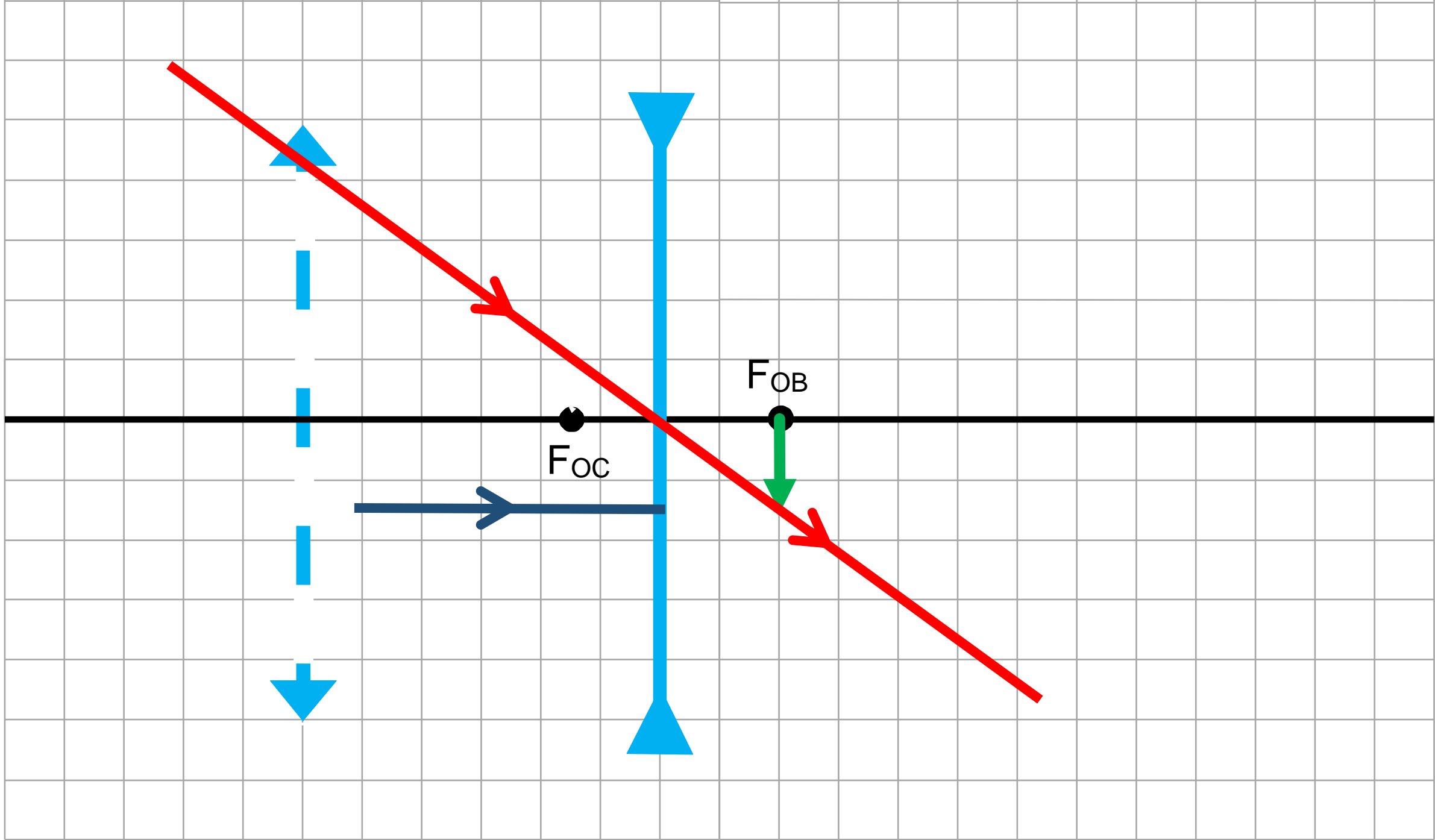


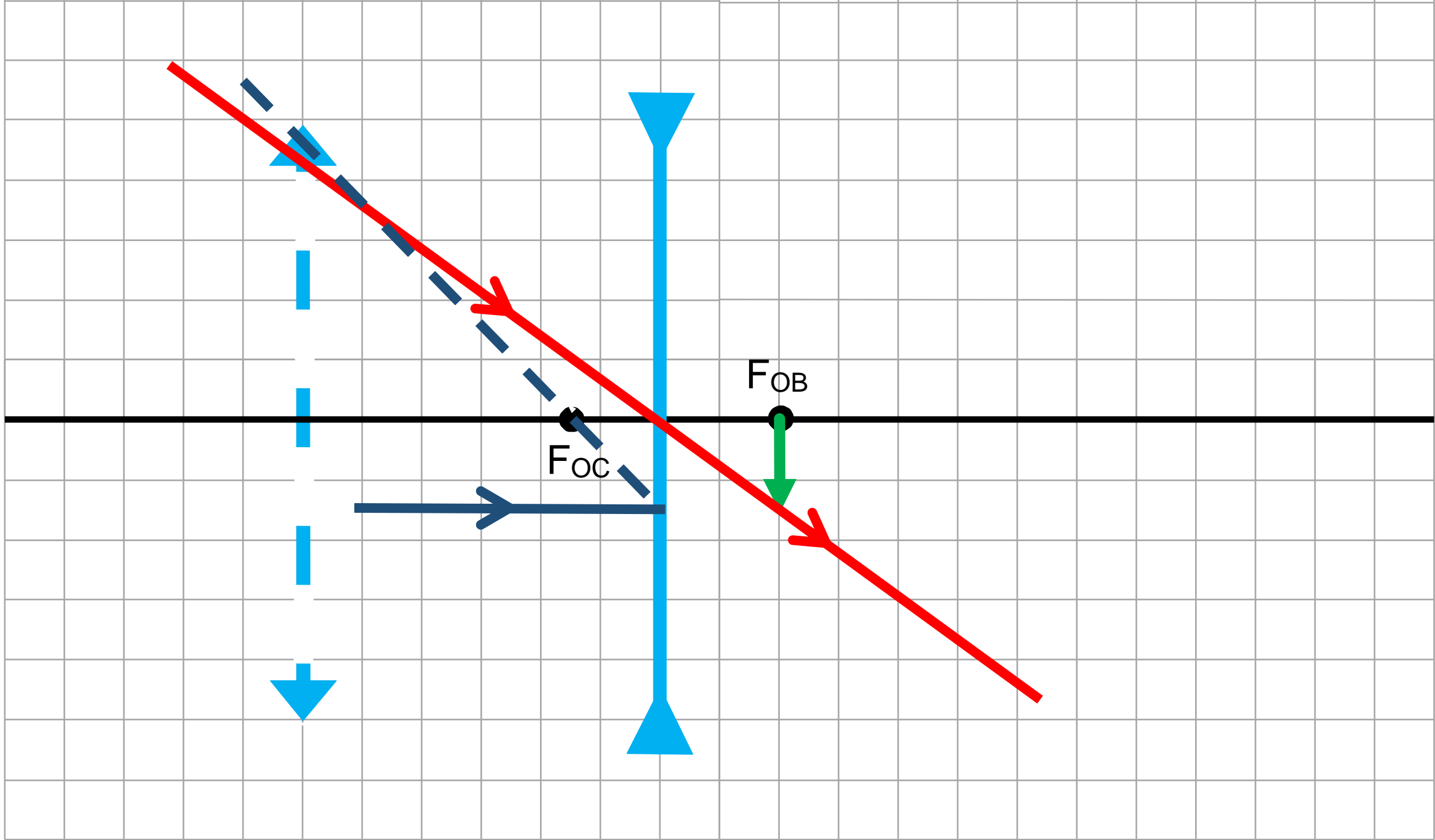


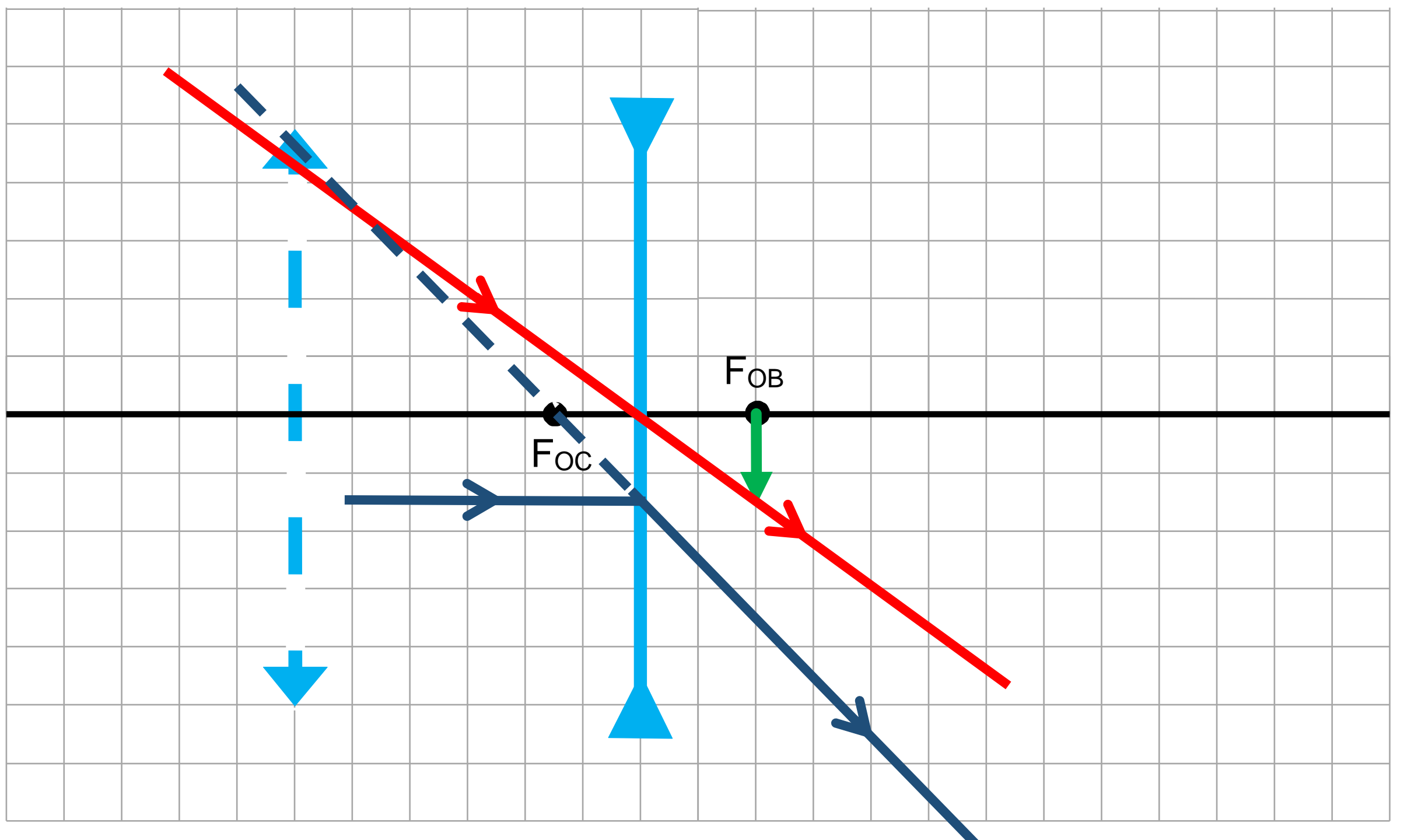


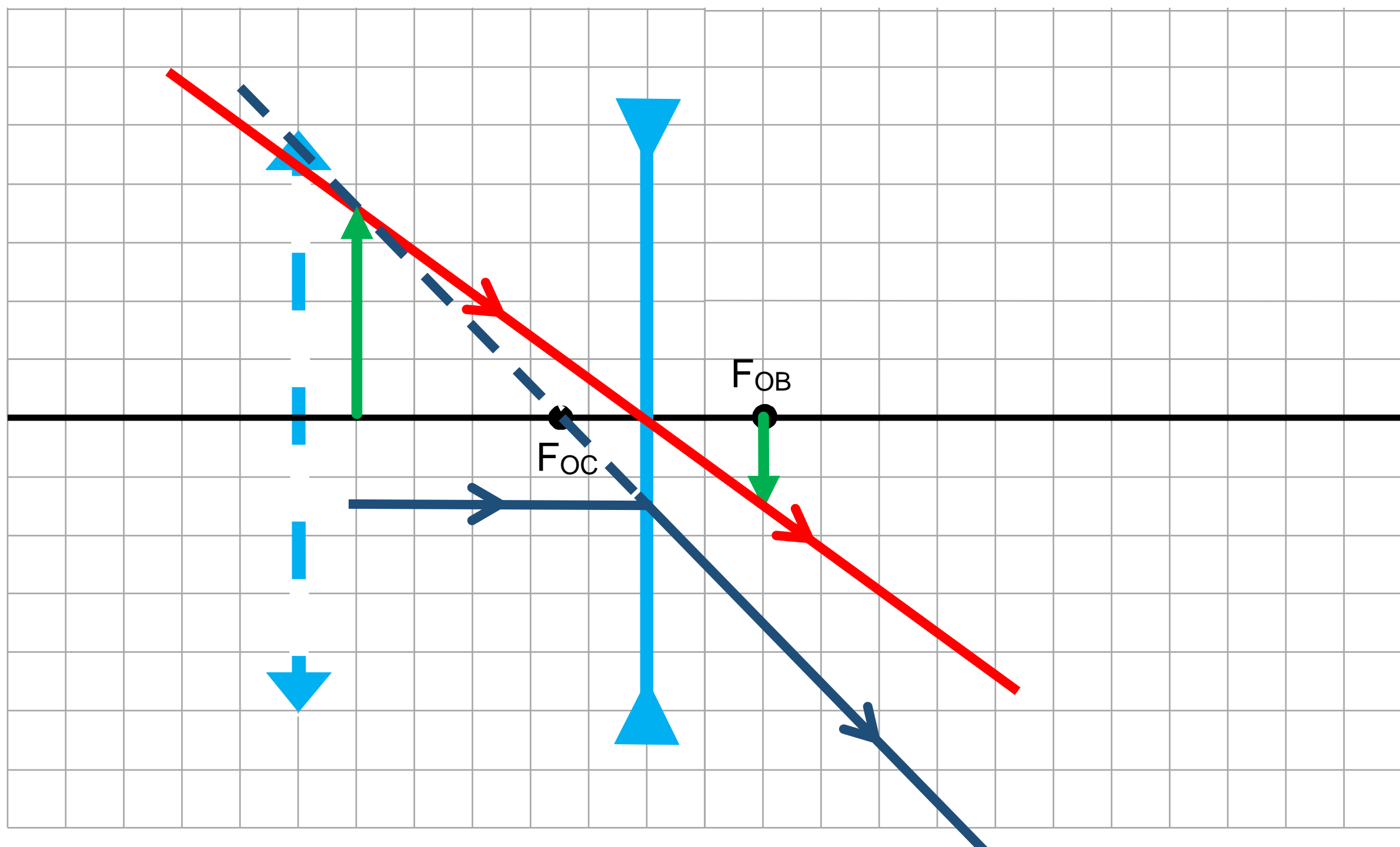


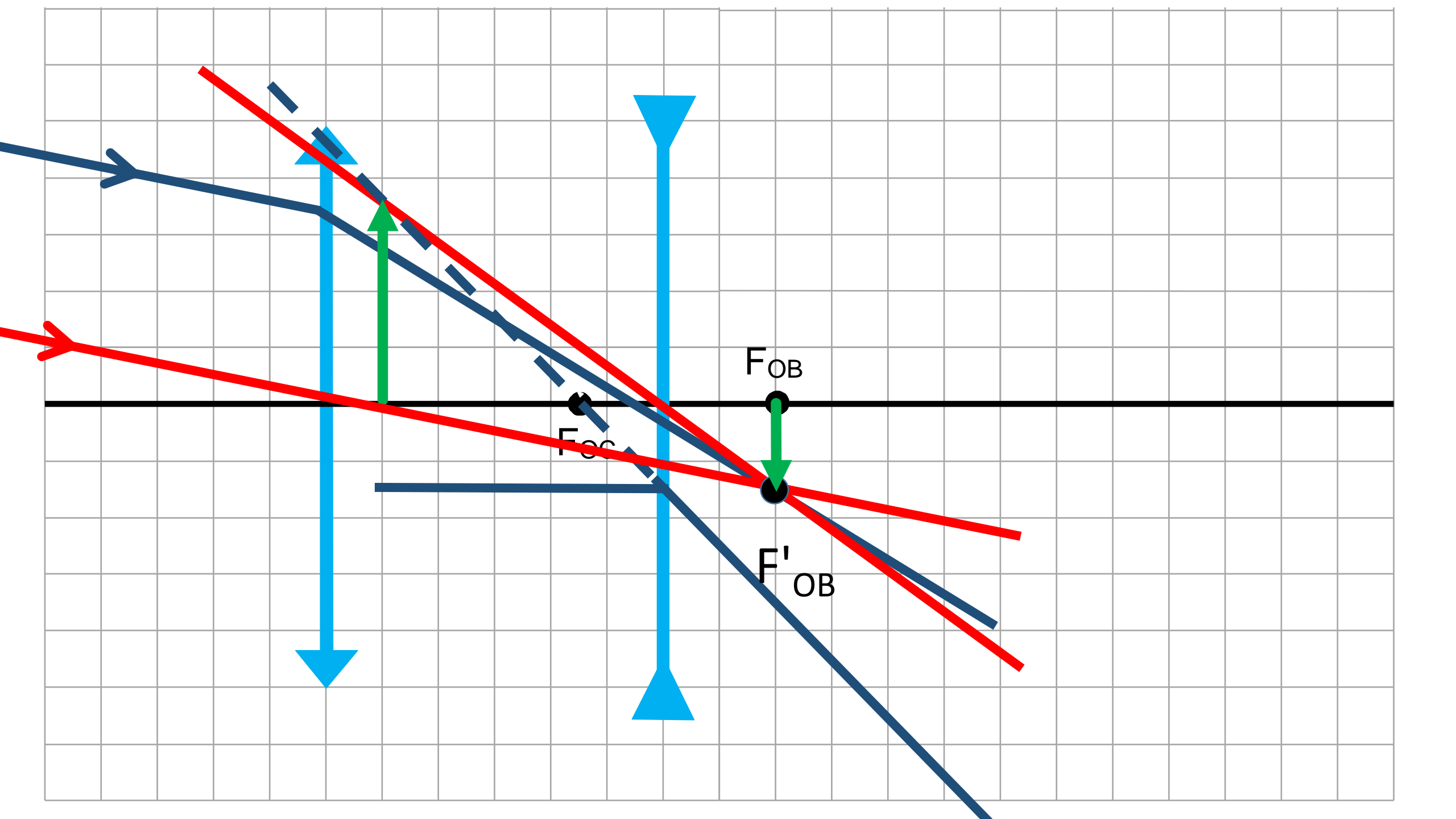












LUNETTA TERRESTRE

LUNETAS TERRESTRES

- IMAGEM:

LUNETAS TERRESTRES

- IMAGEM:
 - VIRTUAL

LUNETAS TERRESTRES

- IMAGEM:
 - VIRTUAL
 - DIREITA

LUNETAS TERRESTRES

- IMAGEM:
 - VIRTUAL
 - DIREITA
 - MAIOR

LUNETAS TERRESTRES

- IMAGEM:
 - VIRTUAL
 - DIREITA
 - MAIOR ???

LUNETAS TERRESTRES

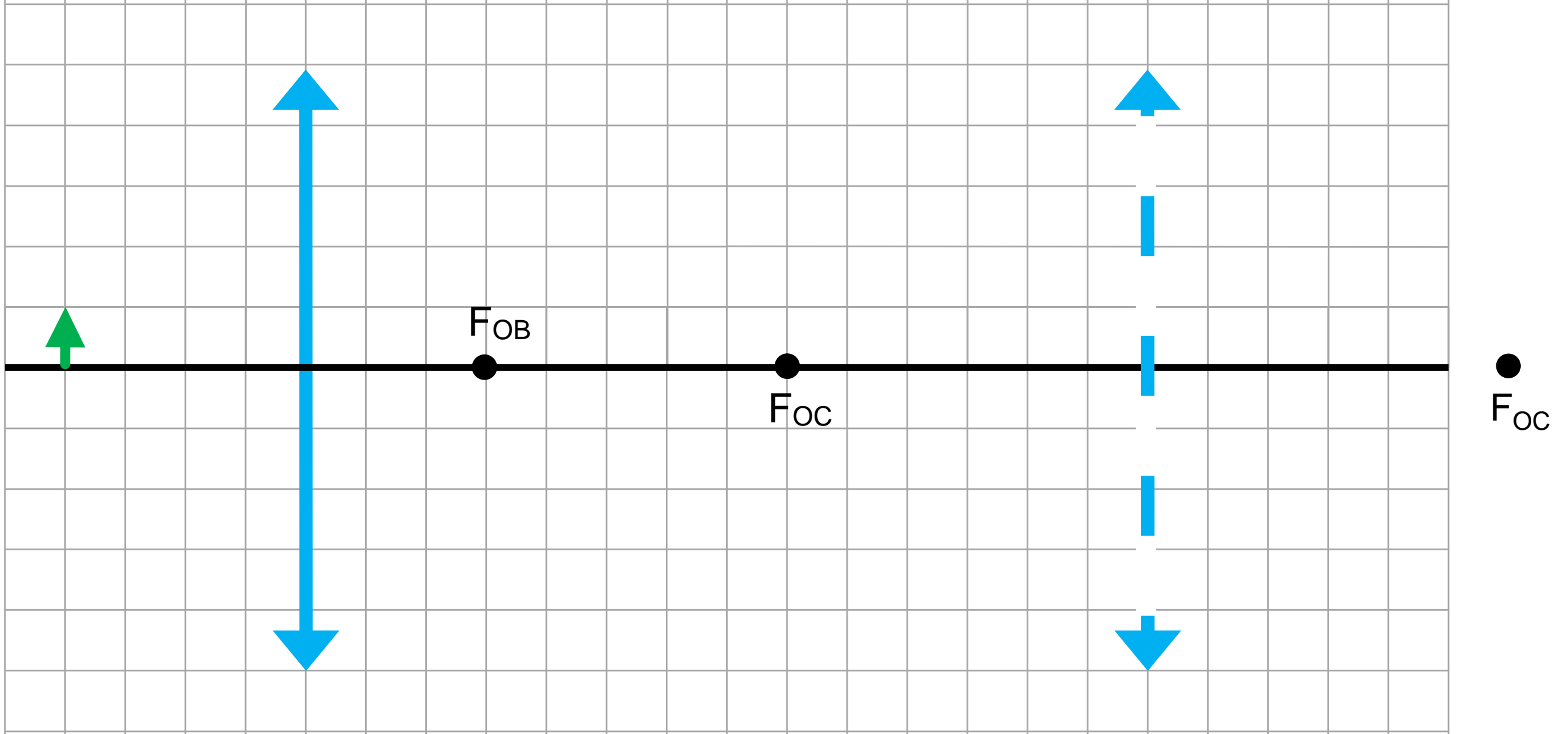
- IMAGEM:
 - VIRTUAL
 - DIREITA
 - MAIOR ???
 - Maior aumento angular!!!

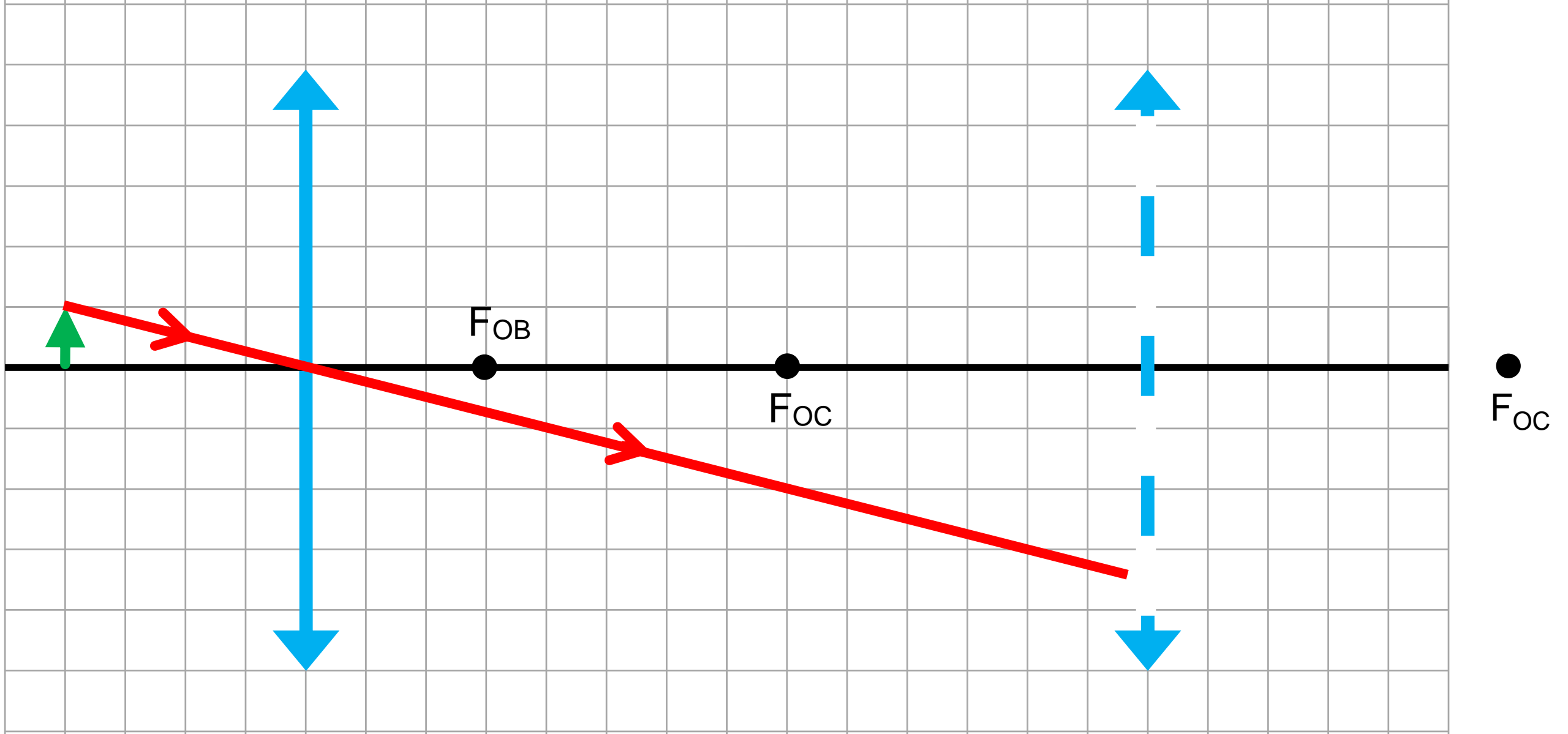
LUNETAS TERRESTRES

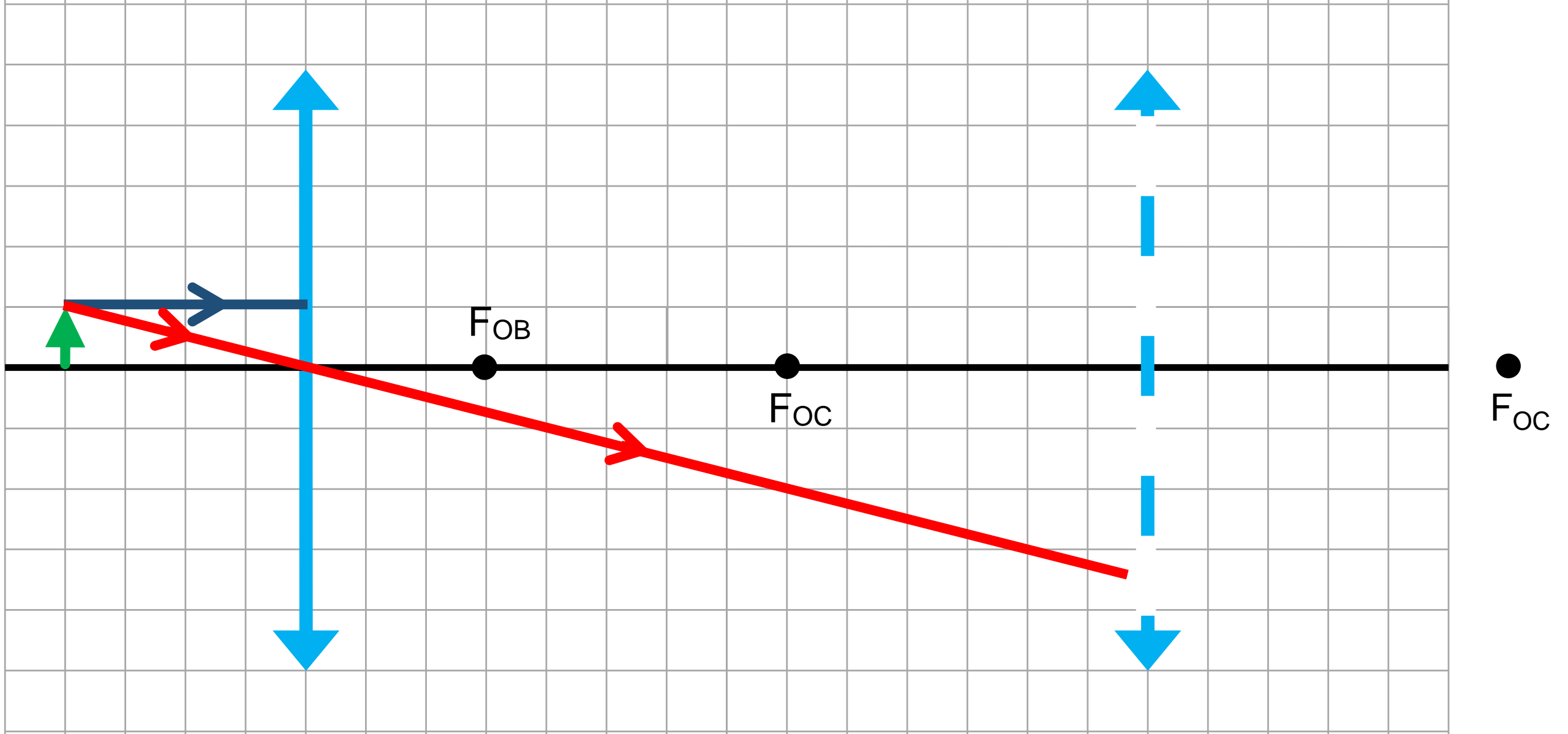
- IMAGEM:
 - VIRTUAL
 - DIREITA
 - MAIOR ???
 - Maior aumento angular!!!



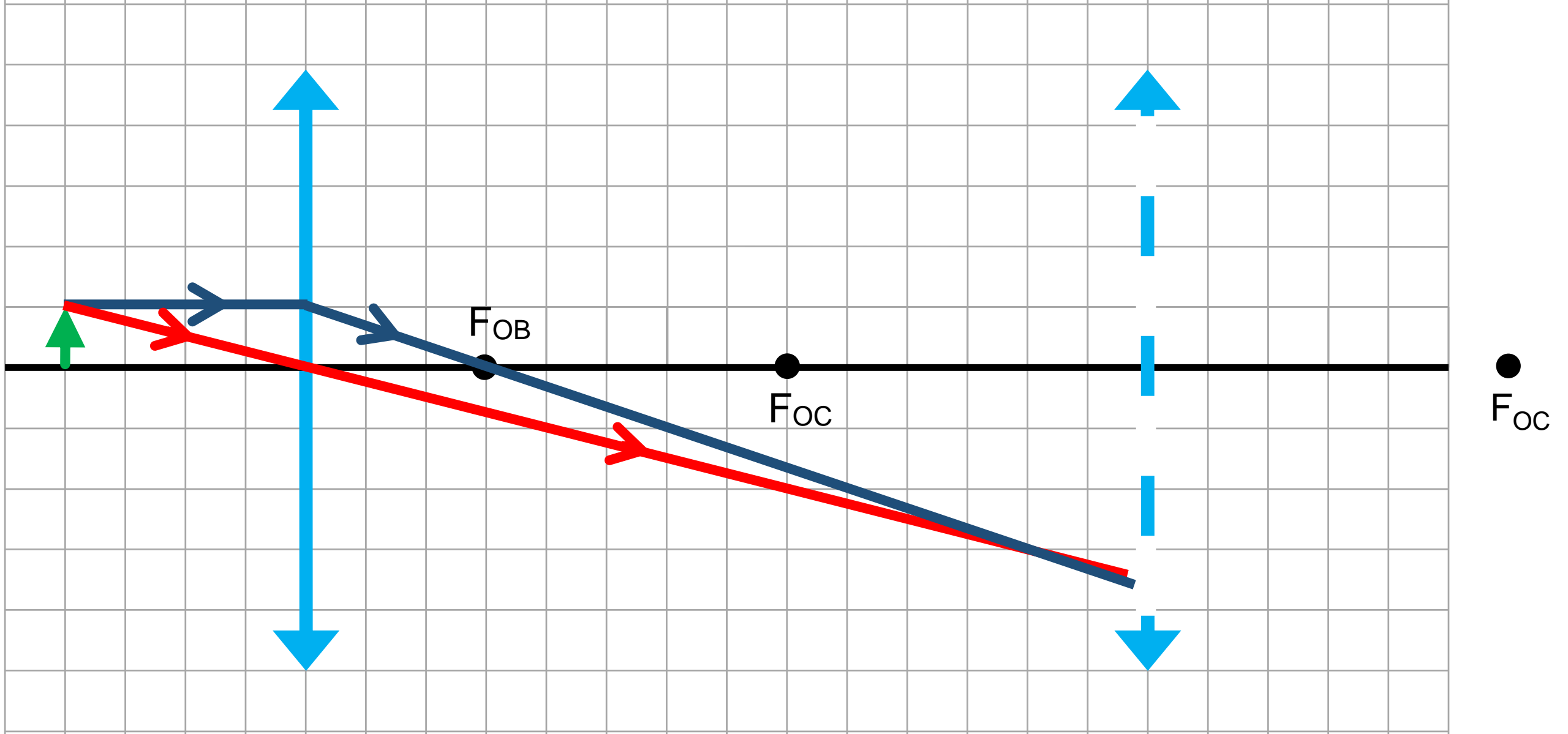
MICROSCÓPIO

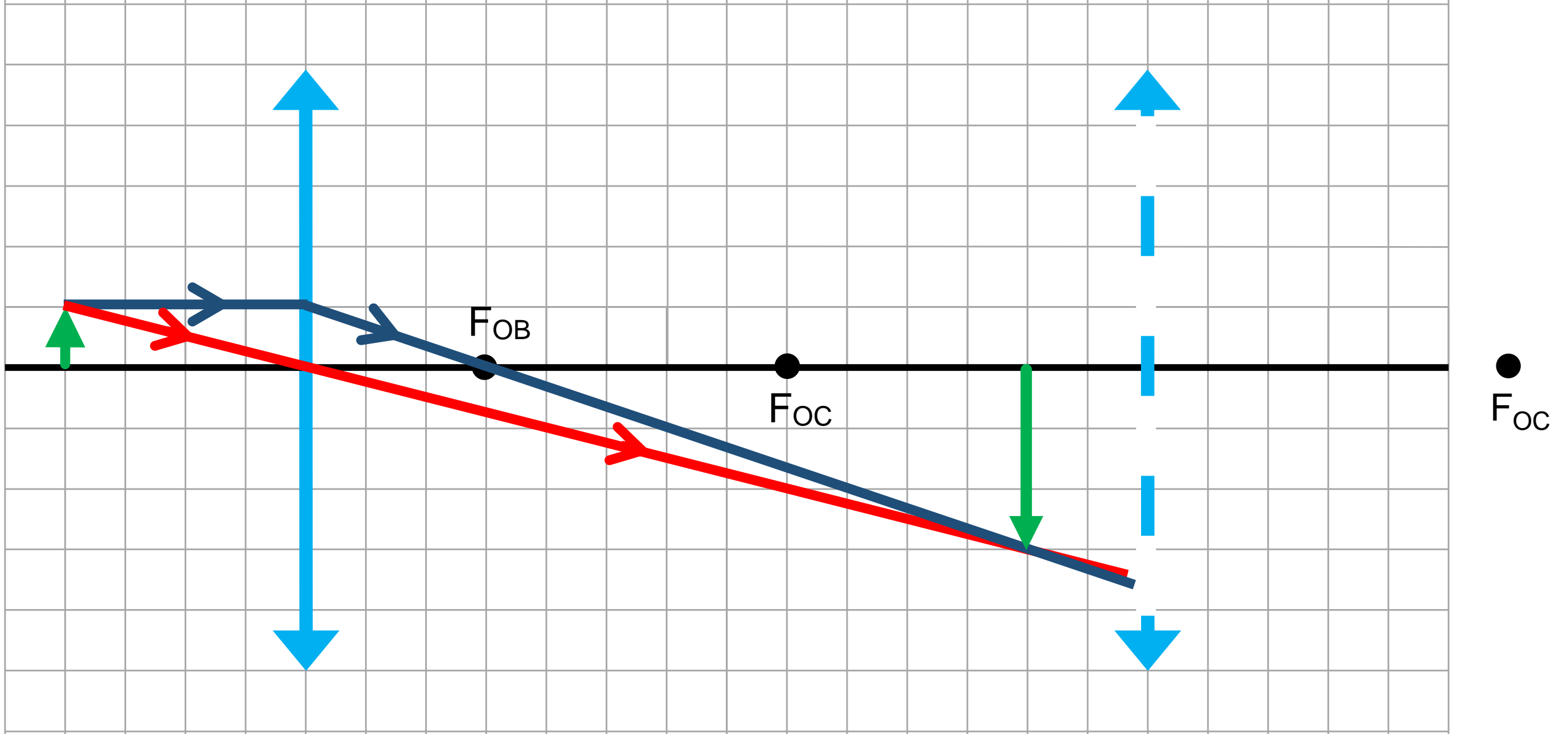


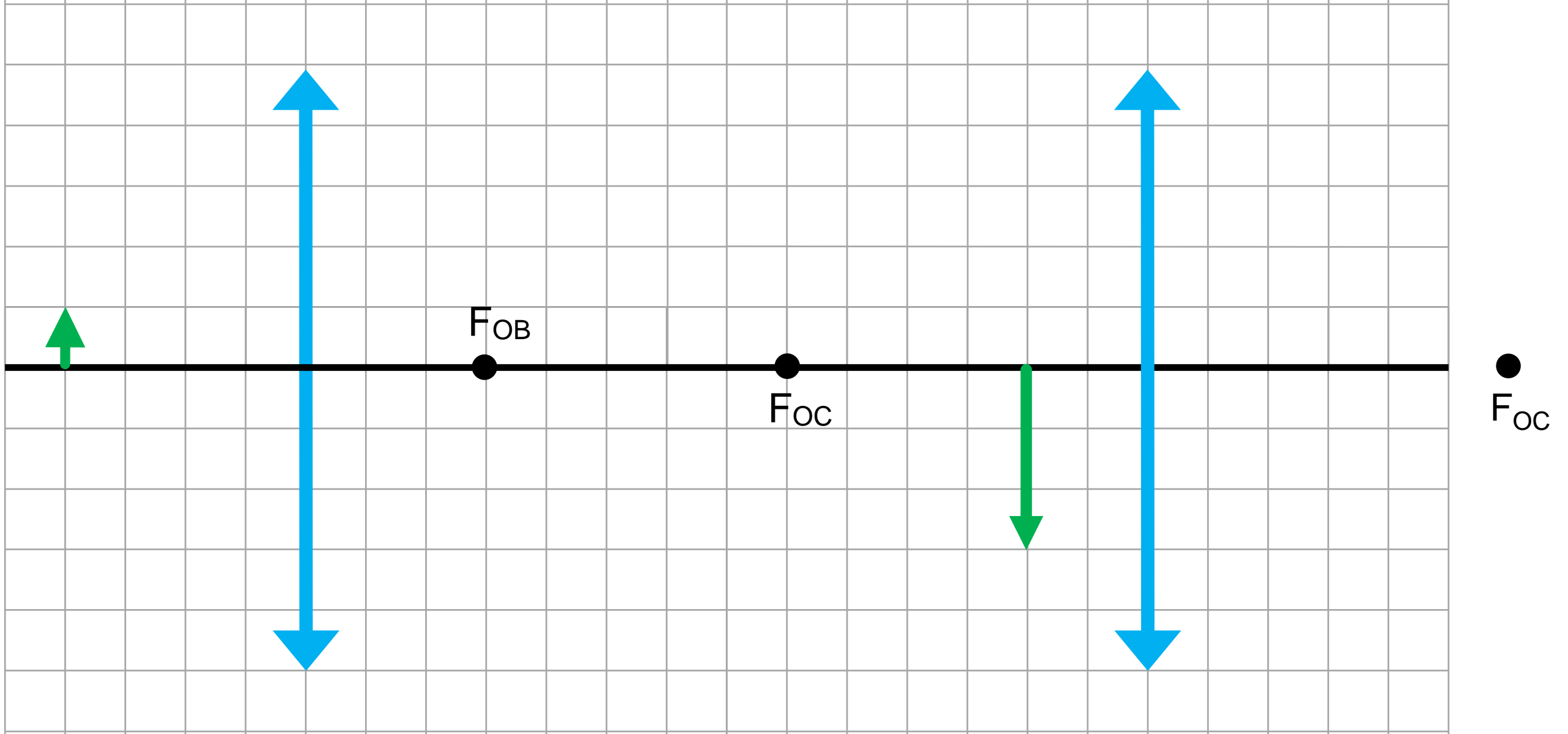


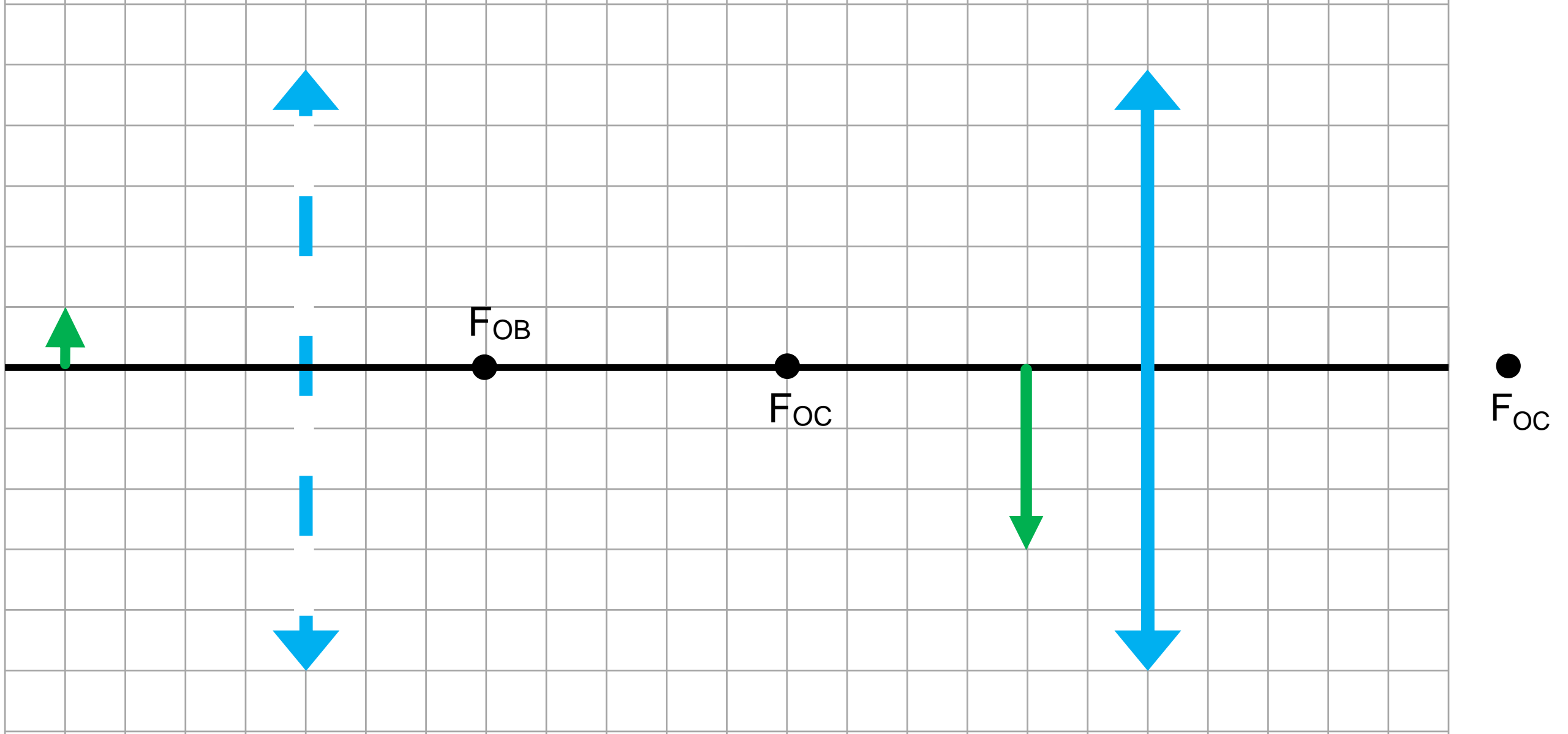


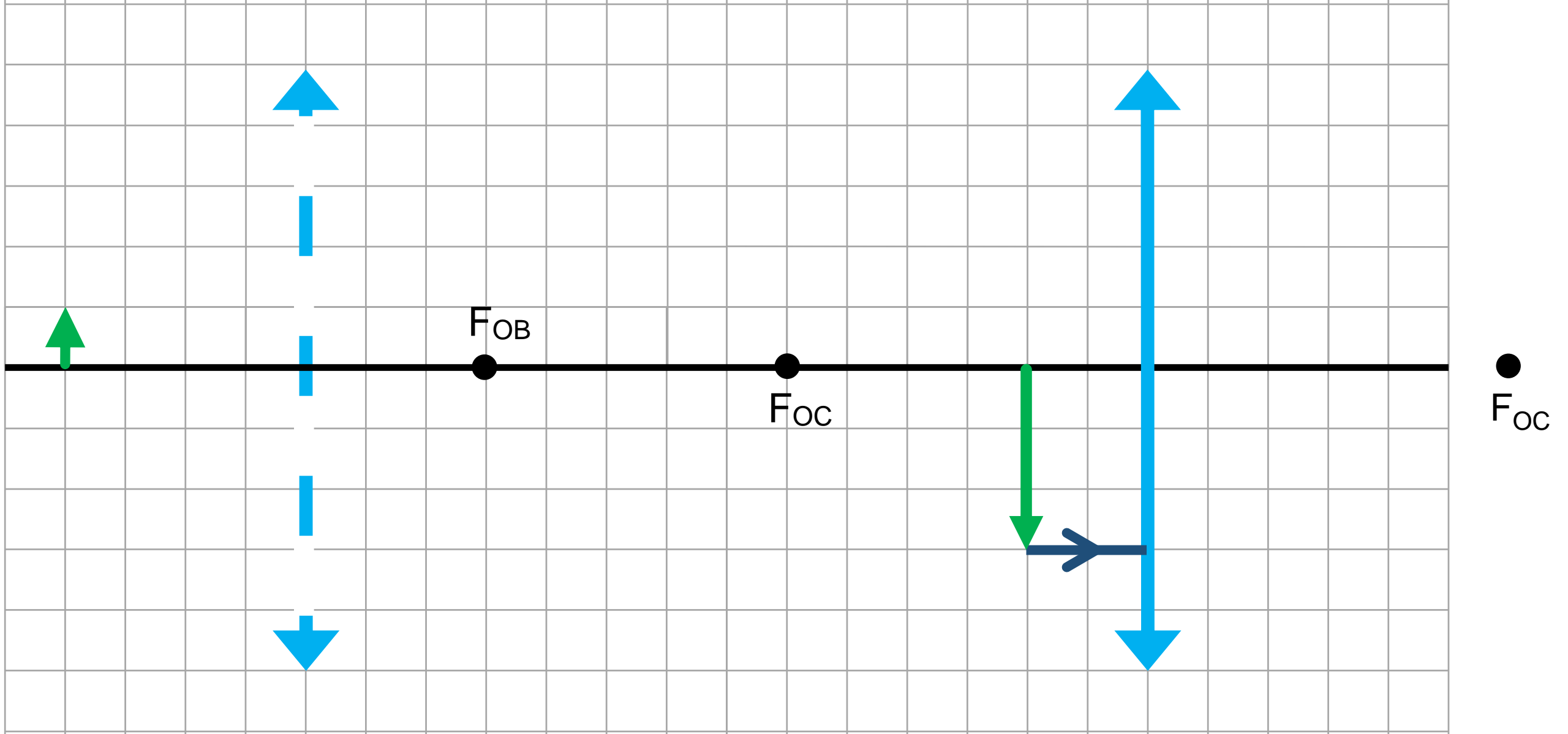
●
 F_{OC}

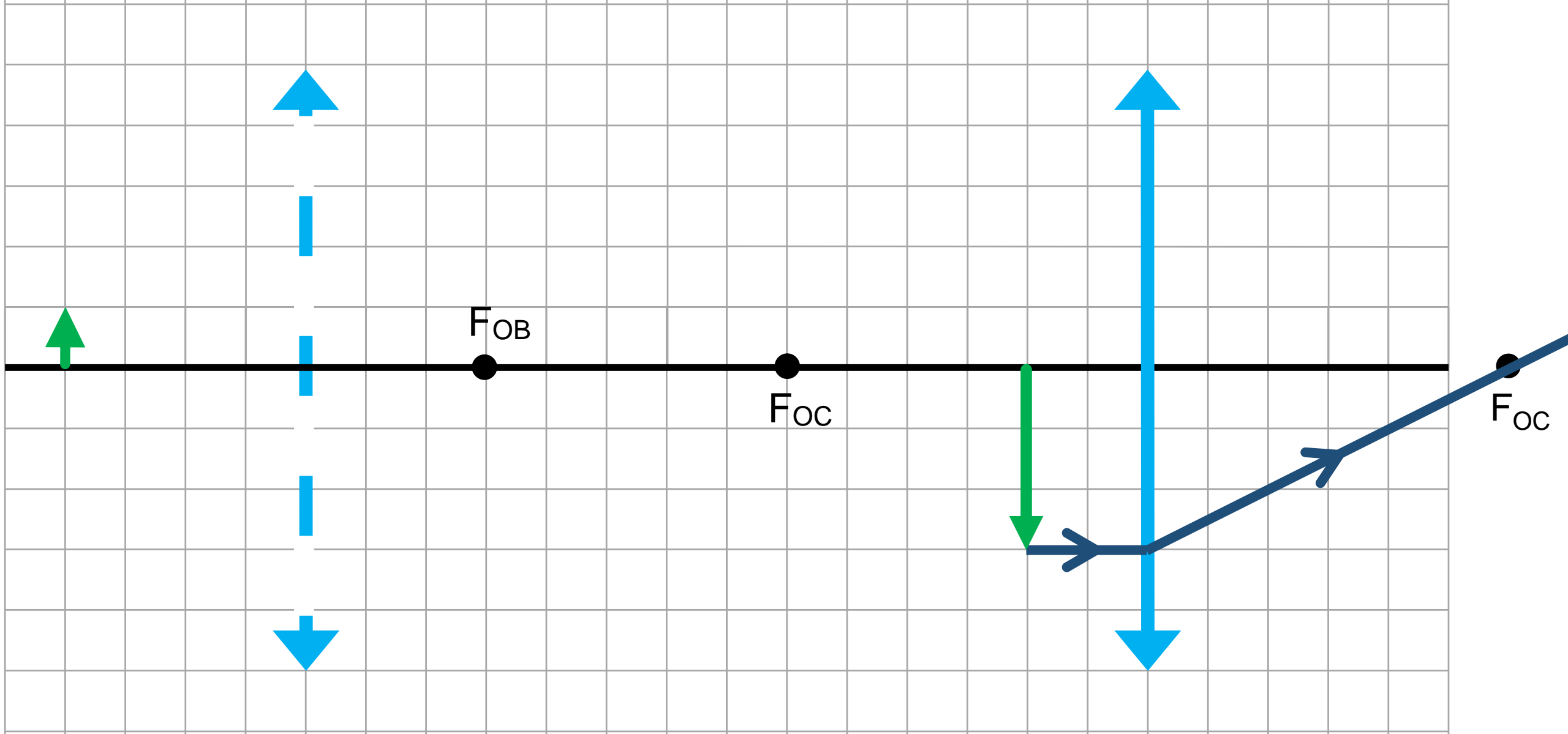


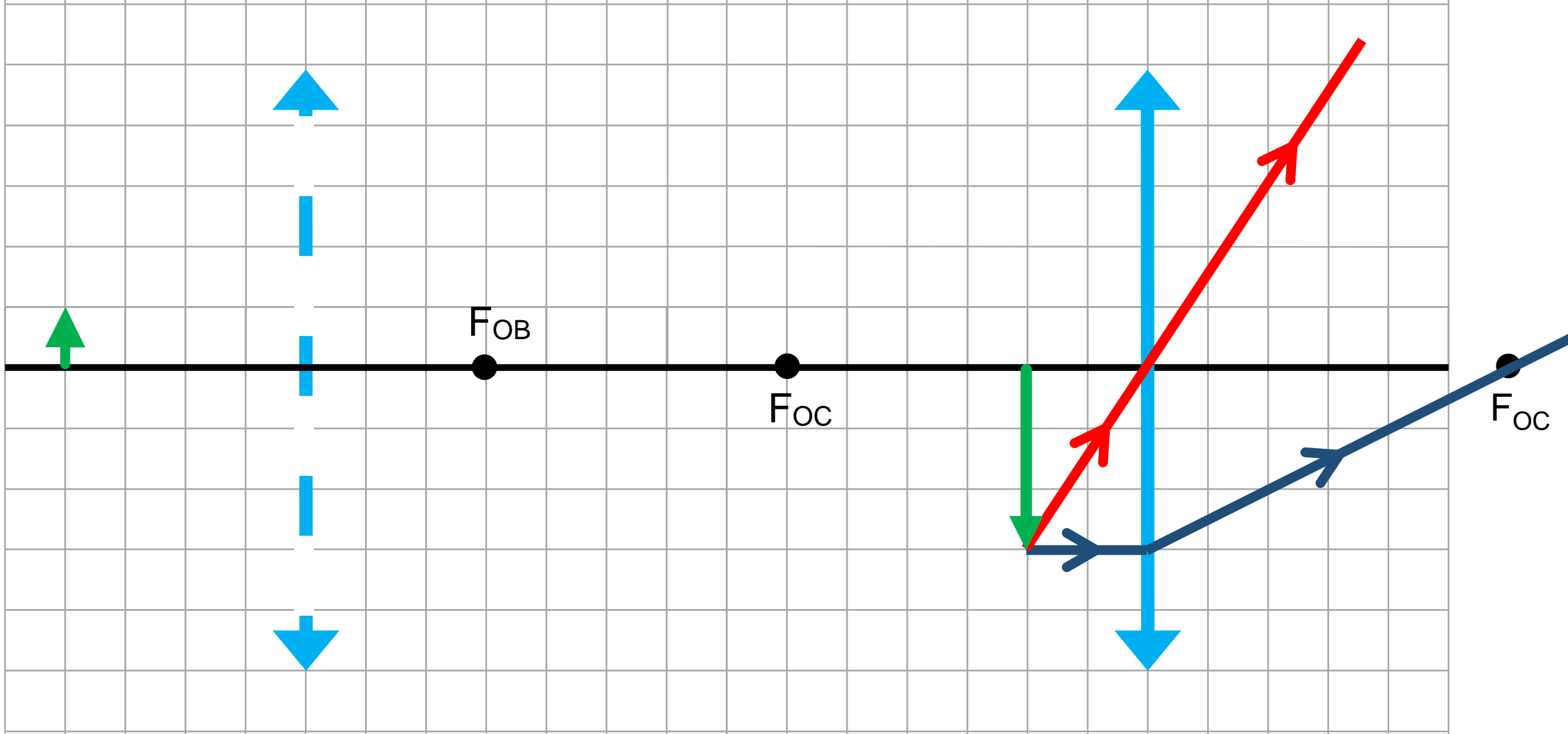


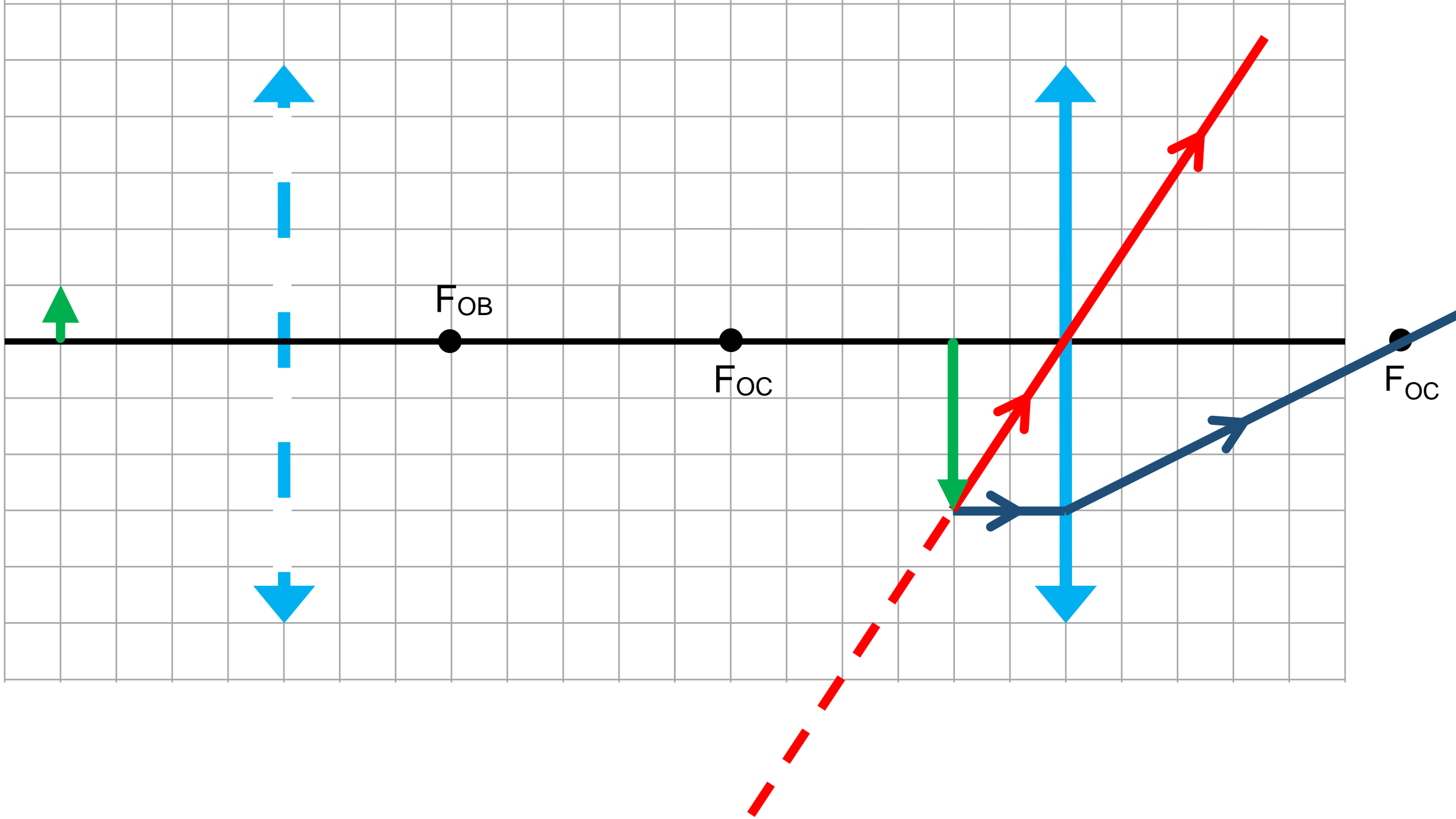


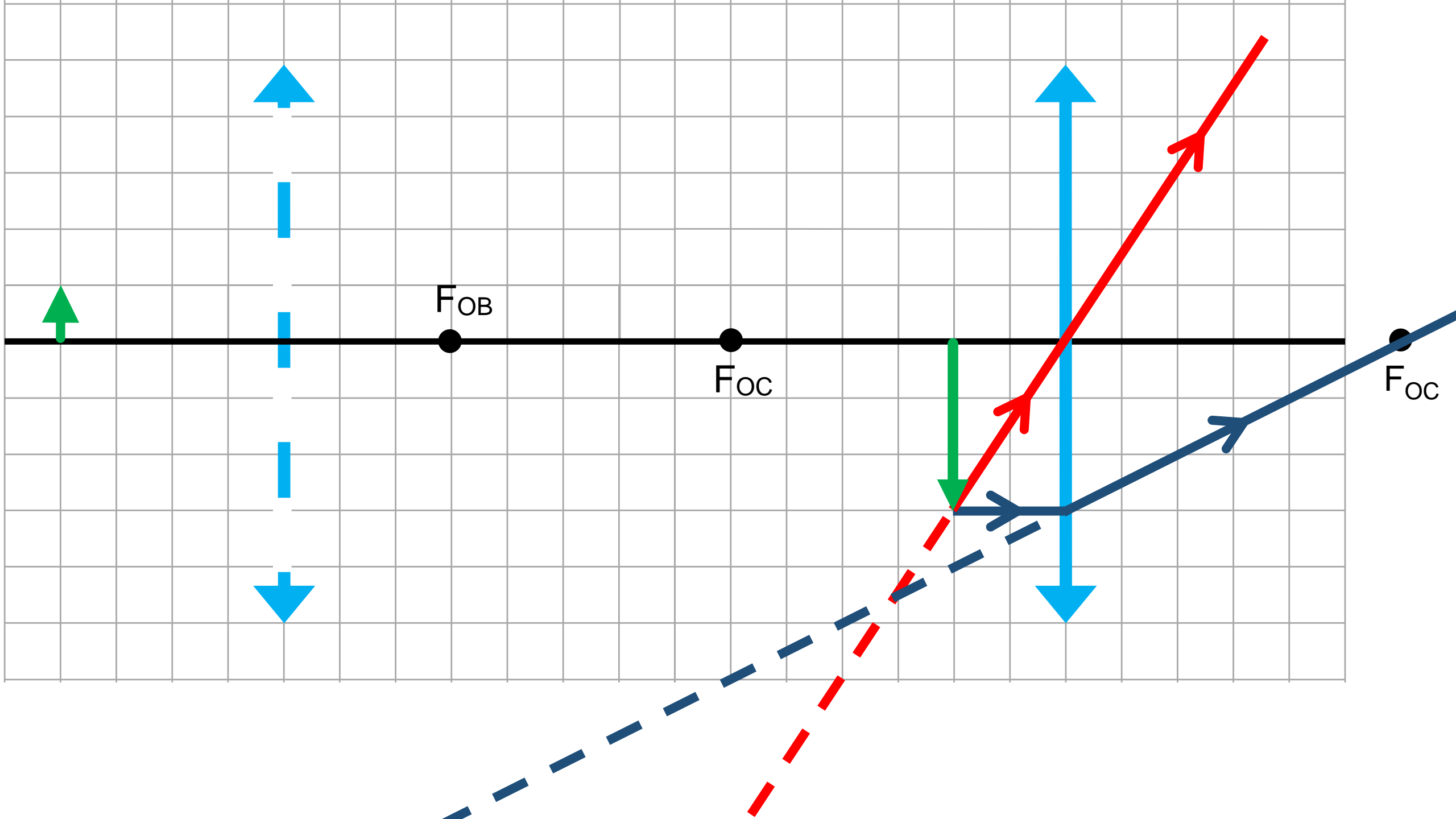


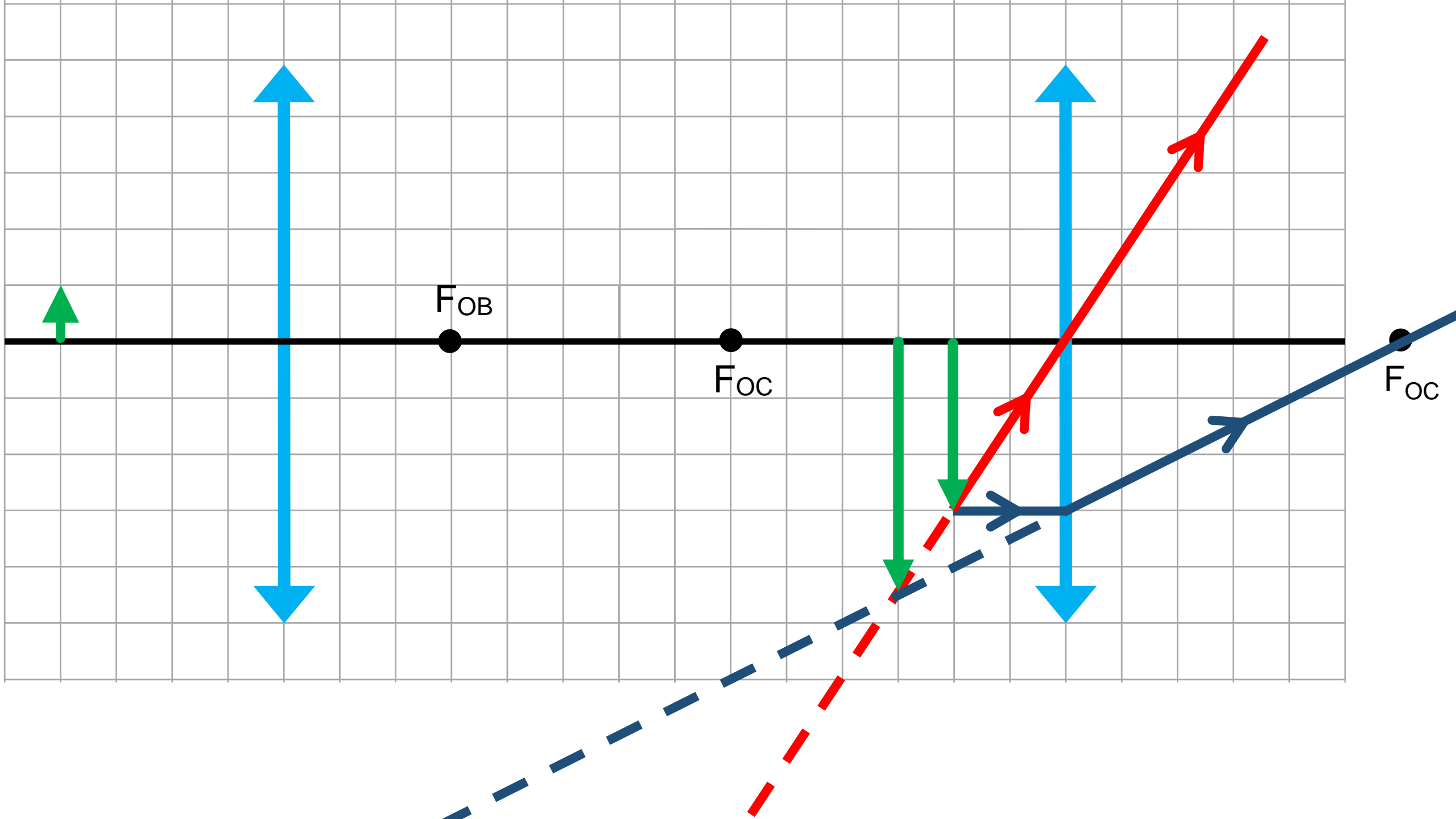


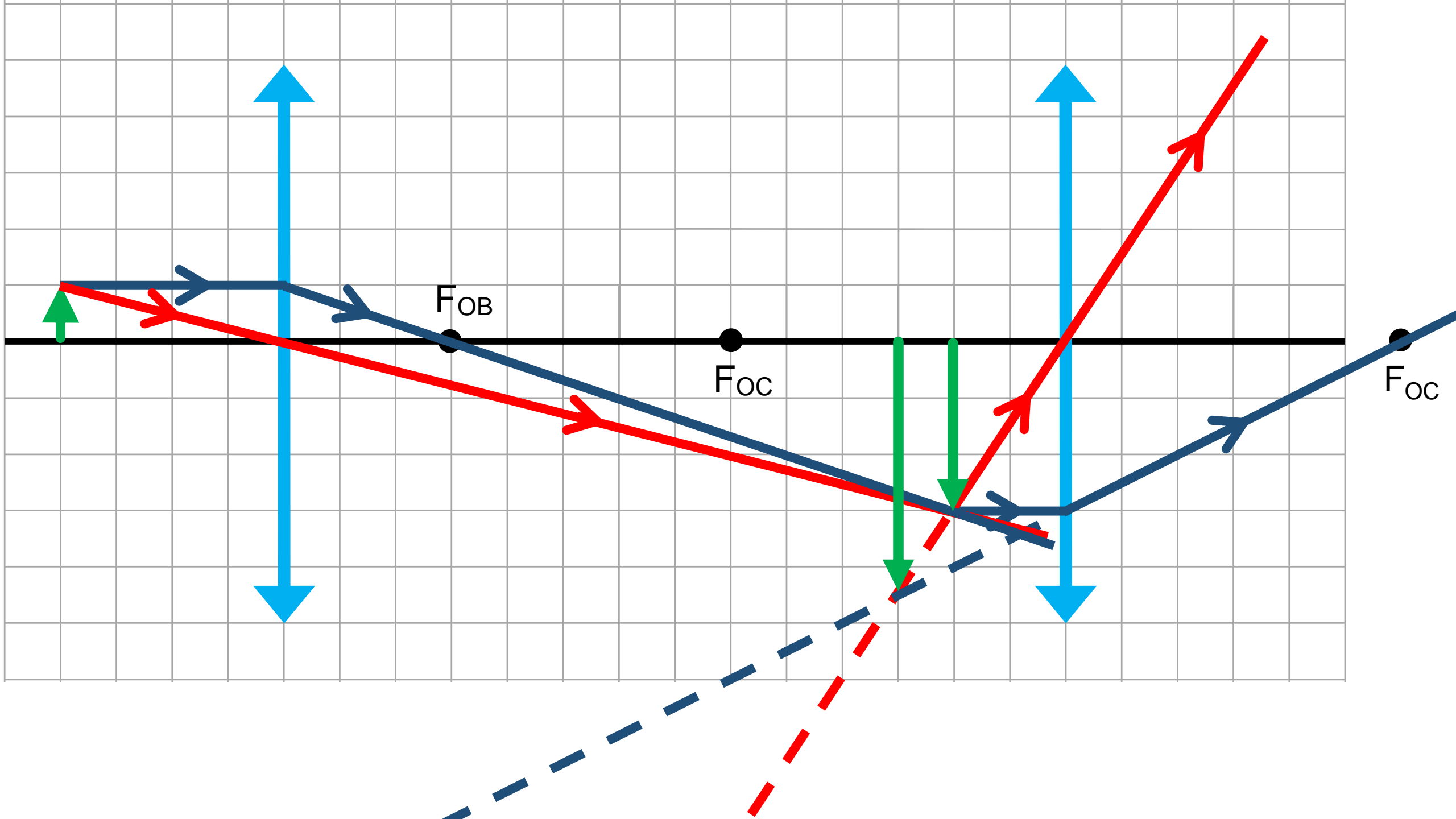












MICROSCÓPIO

MICROSCÓPIO

- IMAGEM:

MICROSCÓPIO

- IMAGEM:
 - VIRTUAL

MICROSCÓPIO

- IMAGEM:
 - VIRTUAL
 - INVERTIDA

MICROSCÓPIO

- IMAGEM:
 - VIRTUAL
 - INVERTIDA
 - MAIOR

MICROSCÓPIO

- IMAGEM:
 - VIRTUAL
 - INVERTIDA
 - MAIOR
 - AUMENTO:

MICROSCÓPIO

- IMAGEM:

- VIRTUAL

- INVERTIDA

- MAIOR

- AUMENTO: $A = A_{OB} \cdot A_{OC}$

ANO INTERNACIONAL DA LUZ - 2015

ANO INTERNACIONAL DA LUZ - 2015

- TENDÊNCIA DO VESTIBULAR:

ANO INTERNACIONAL DA LUZ - 2015

- TENDÊNCIA DO VESTIBULAR:
 - 2009 – Ano internacional da Astronomia

ANO INTERNACIONAL DA LUZ - 2015

- TENDÊNCIA DO VESTIBULAR:
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 - Caiu Luneta de Galileu

ANO INTERNACIONAL DA LUZ - 2015

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 - Caiu Luneta de Galileu
 - Eventos na USP e SBF (Sociedade Brasileira de Física) sobre a Luz

ANO INTERNACIONAL DA LUZ - 2015

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 - Eventos na USP e SBF (Sociedade Brasileira de Física) sobre a Luz
 - Vai cair

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ANO INTERNACIONAL DA LUZ - 2015

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 - Eventos na USP e SBF (Sociedade Brasileira de Física) sobre a Luz
 - Vai cair???

ANO INTERNACIONAL DA LUZ - 2015

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 - 2009 – Ano internacional da Astronomia
 - Caiu Luneta de Galileu
 - Eventos na USP e SBF (Sociedade Brasileira de Física) sobre a Luz
 - Vai cair???
 - Em abril de 2015: 25 anos do lançamento do Hubble

ANO INTERNACIONAL DA LUZ - 2015

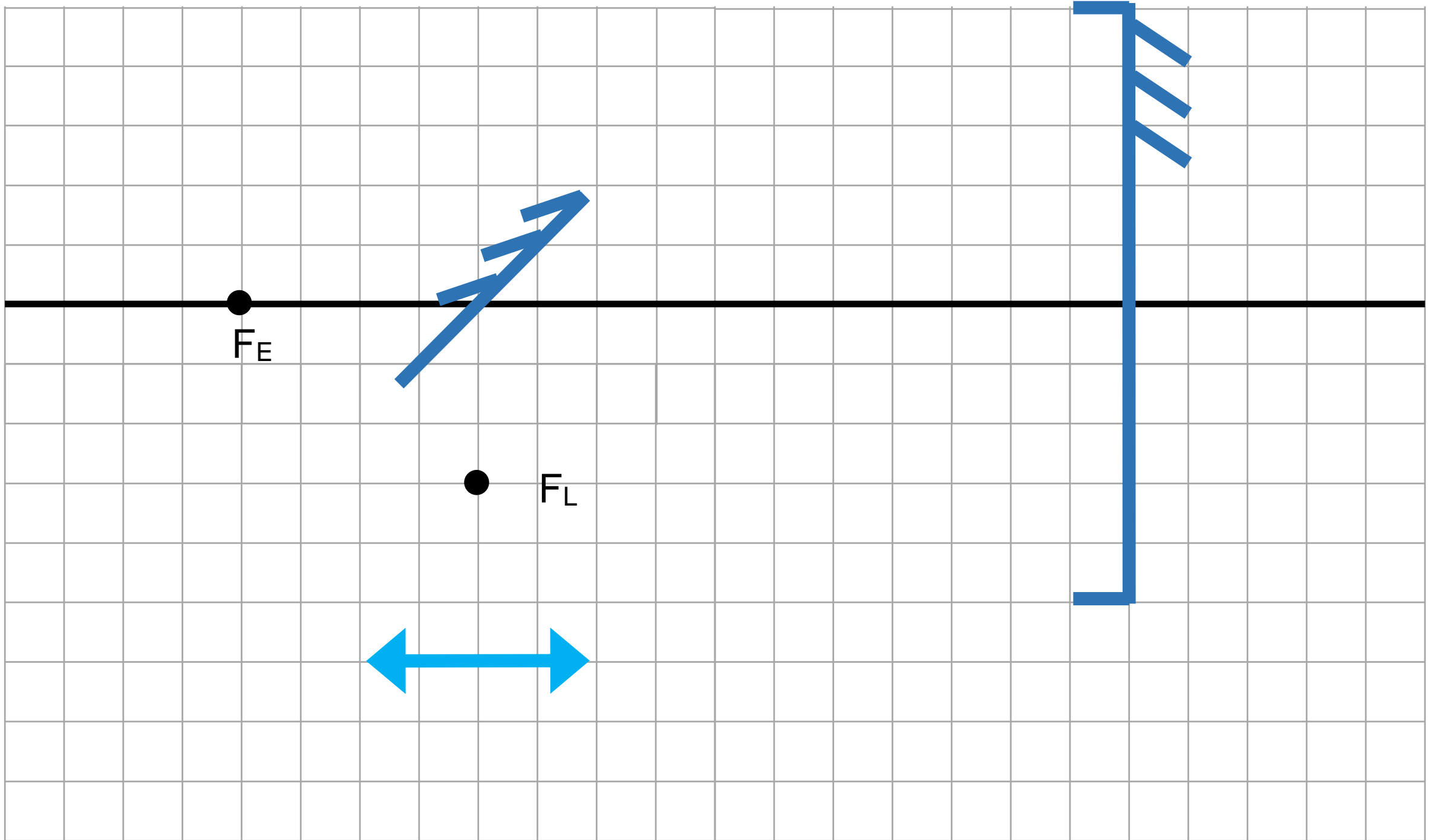
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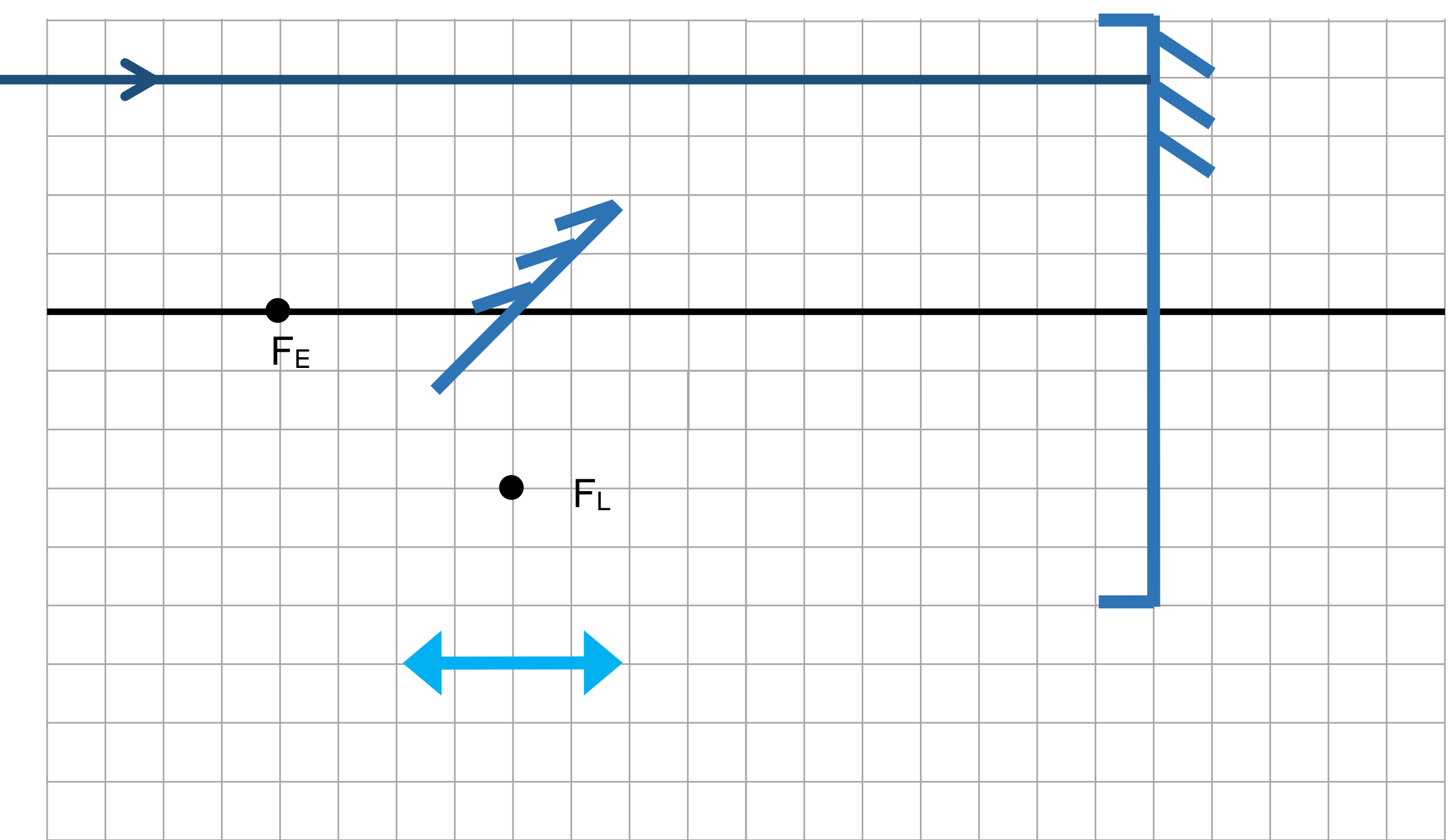
- 2009 – Ano internacional da Astronomia
 - Caiu Luneta de Galileu
- Eventos na USP e SBF (Sociedade Brasileira de Física) sobre a Luz
 - Vai cair???
- Em abril de 2015: 25 anos do lançamento do Hubble
 - Telescópio Refletor

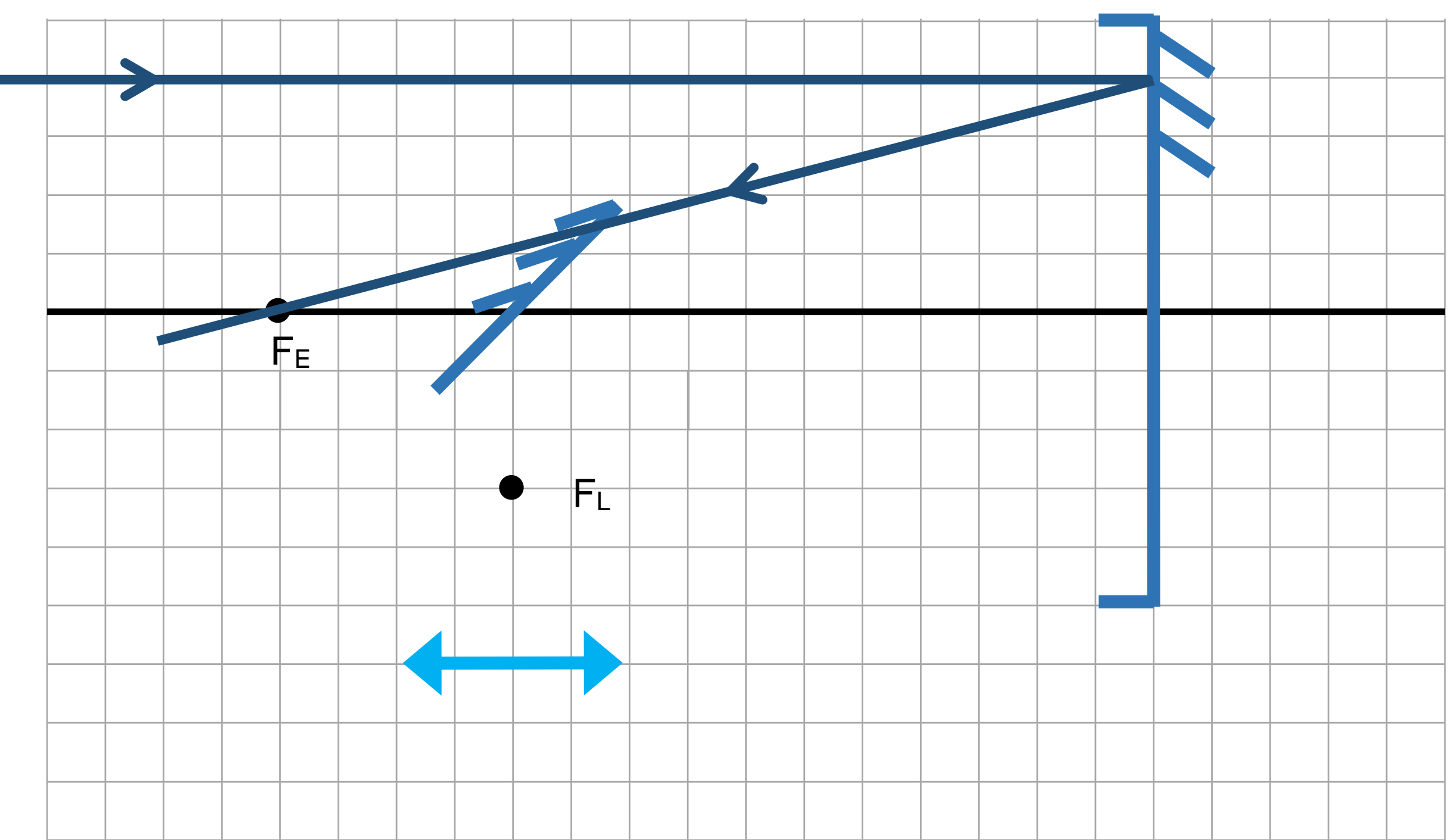
ANO INTERNACIONAL DA LUZ - 2015

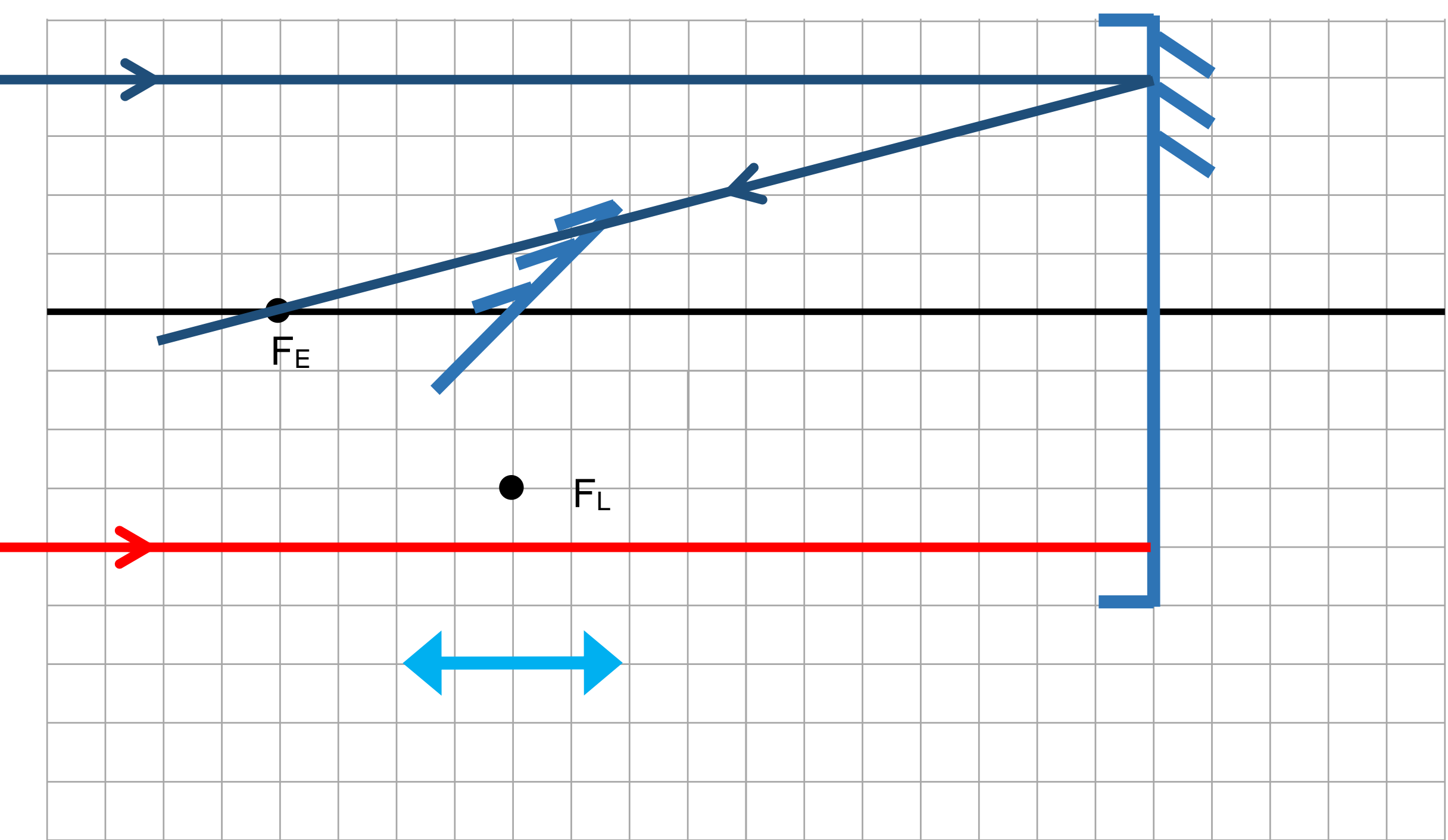
- **TENDÊNCIA** DO VESTIBULAR:
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 - Caiu Luneta de Galileu
 - Eventos na USP e SBF (Sociedade Brasileira de Física) sobre a Luz
 - Vai cair???
 - Em abril de 2015: 25 anos do lançamento do Hubble
 - Telescópio Refletor
 - VAMOS VER COMO É O TELESCÓPIO REFLETOR?

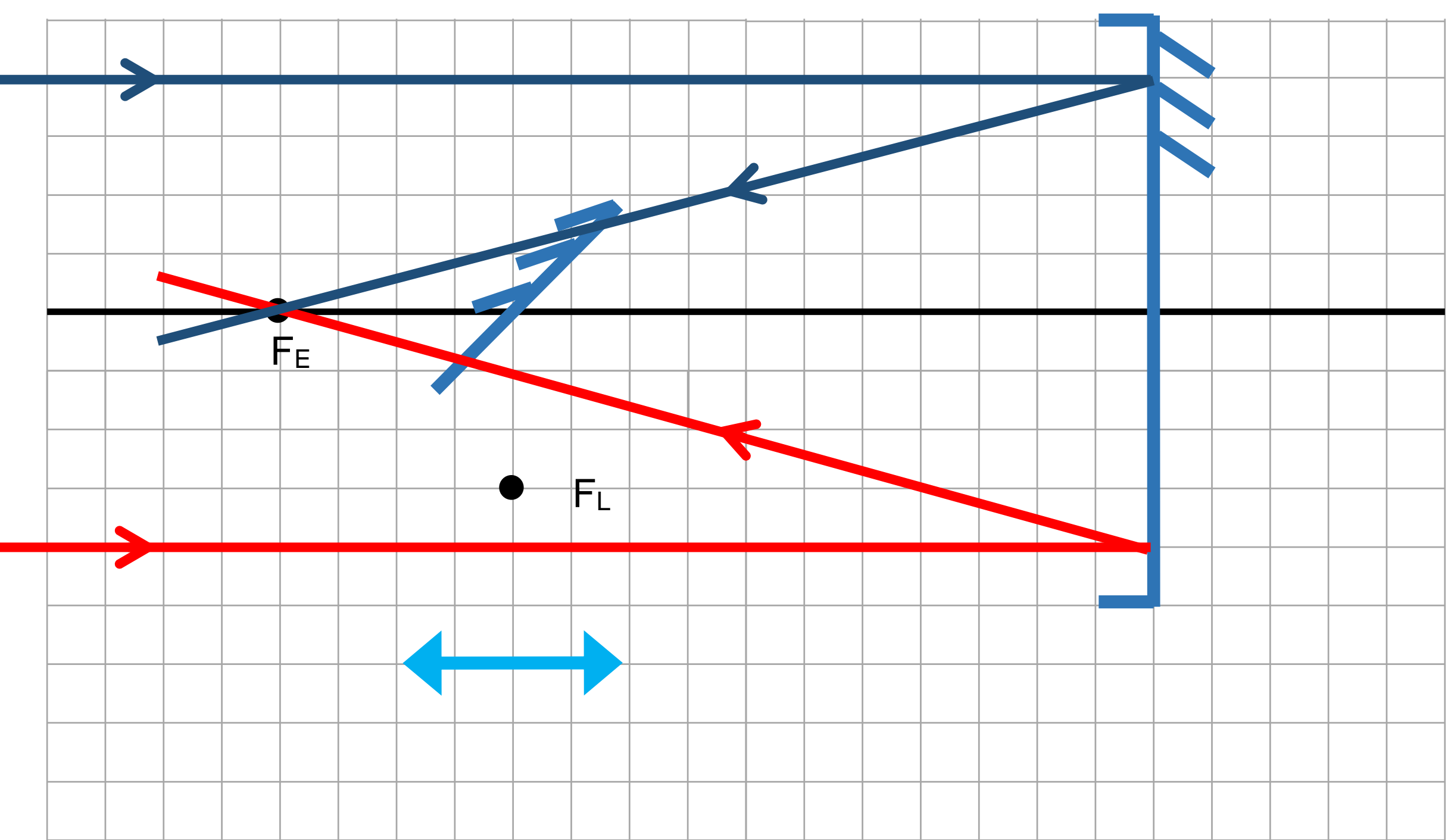
TELESCÓPIO NEWTONIANO

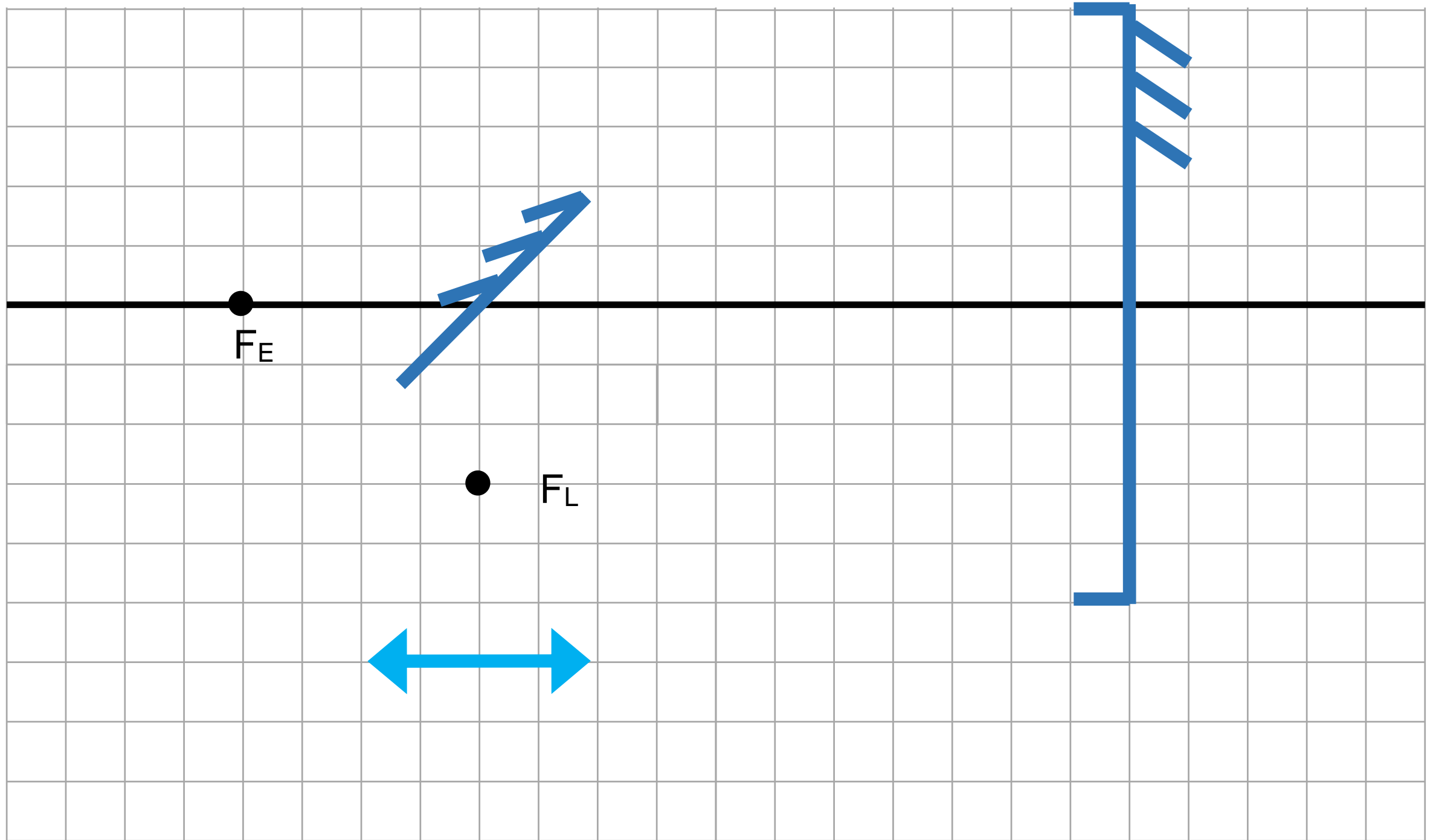


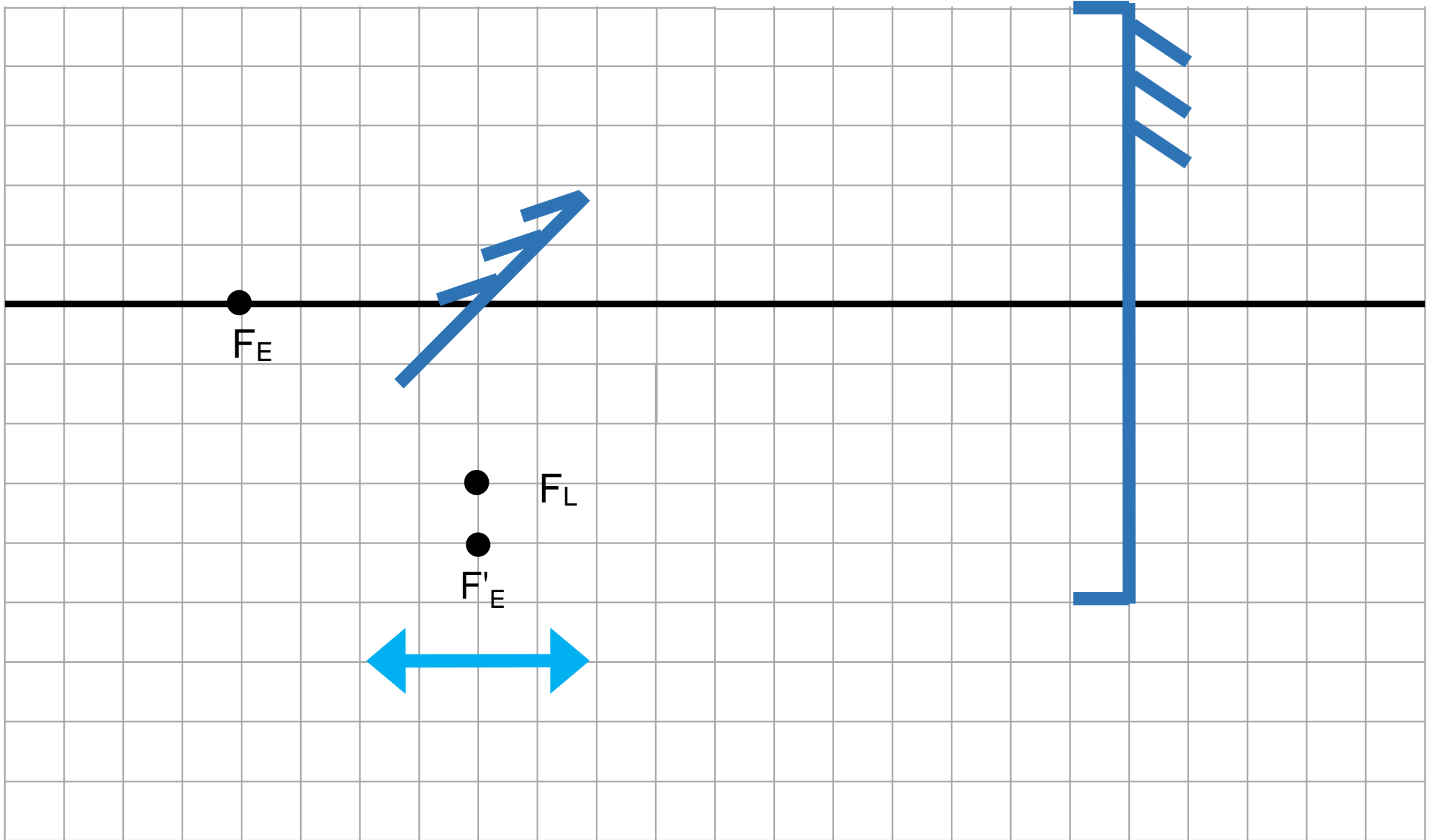


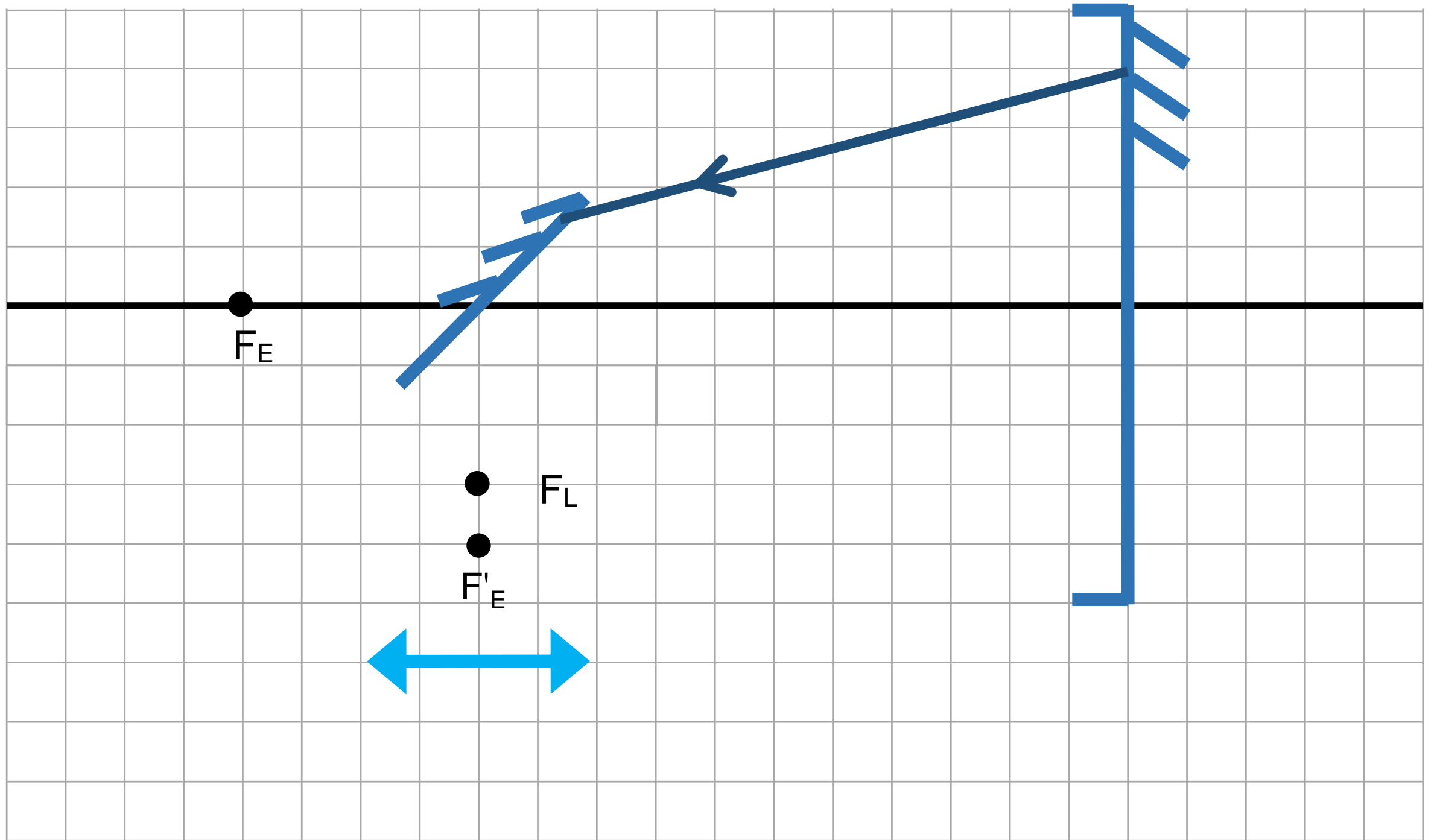


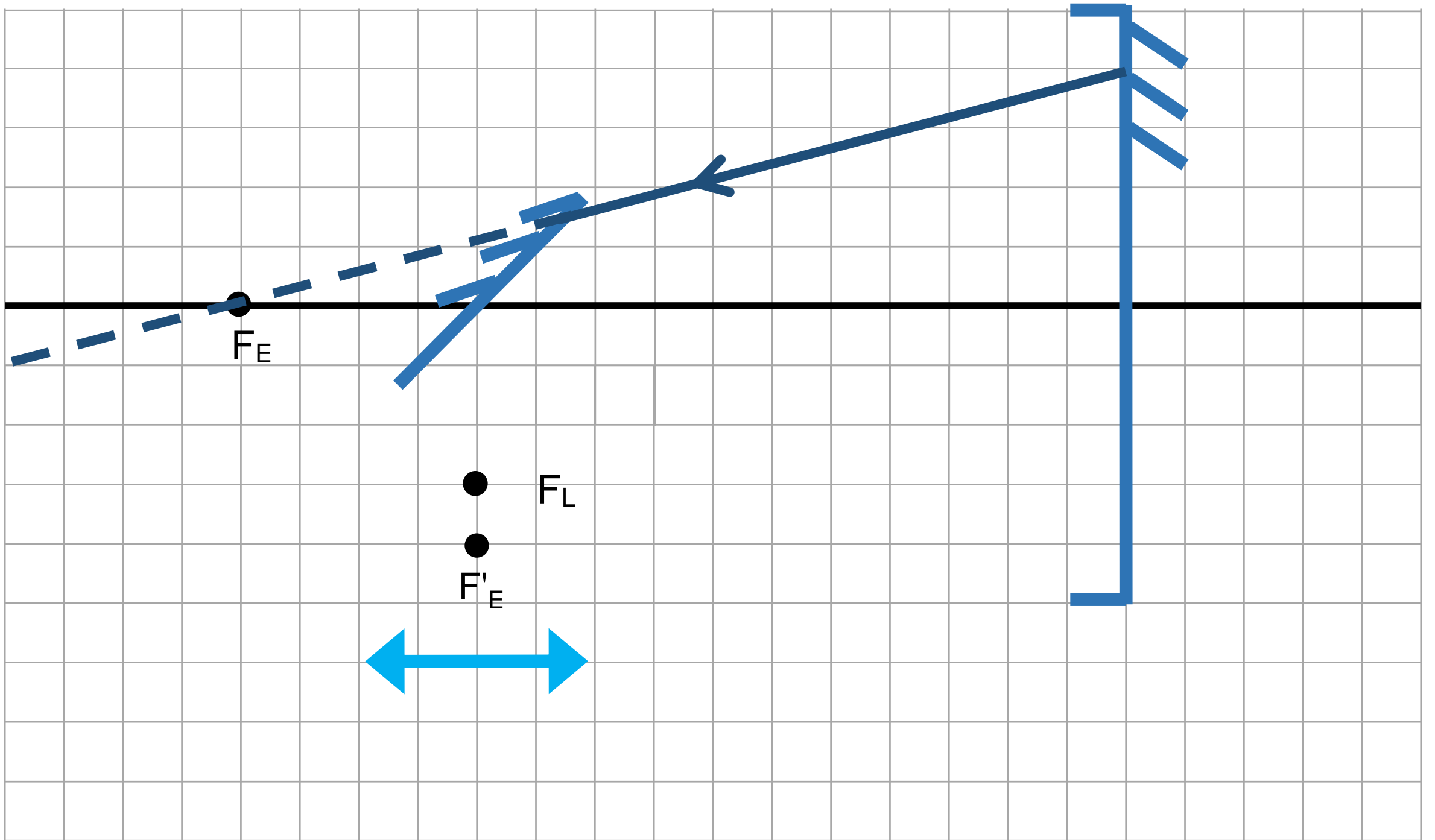


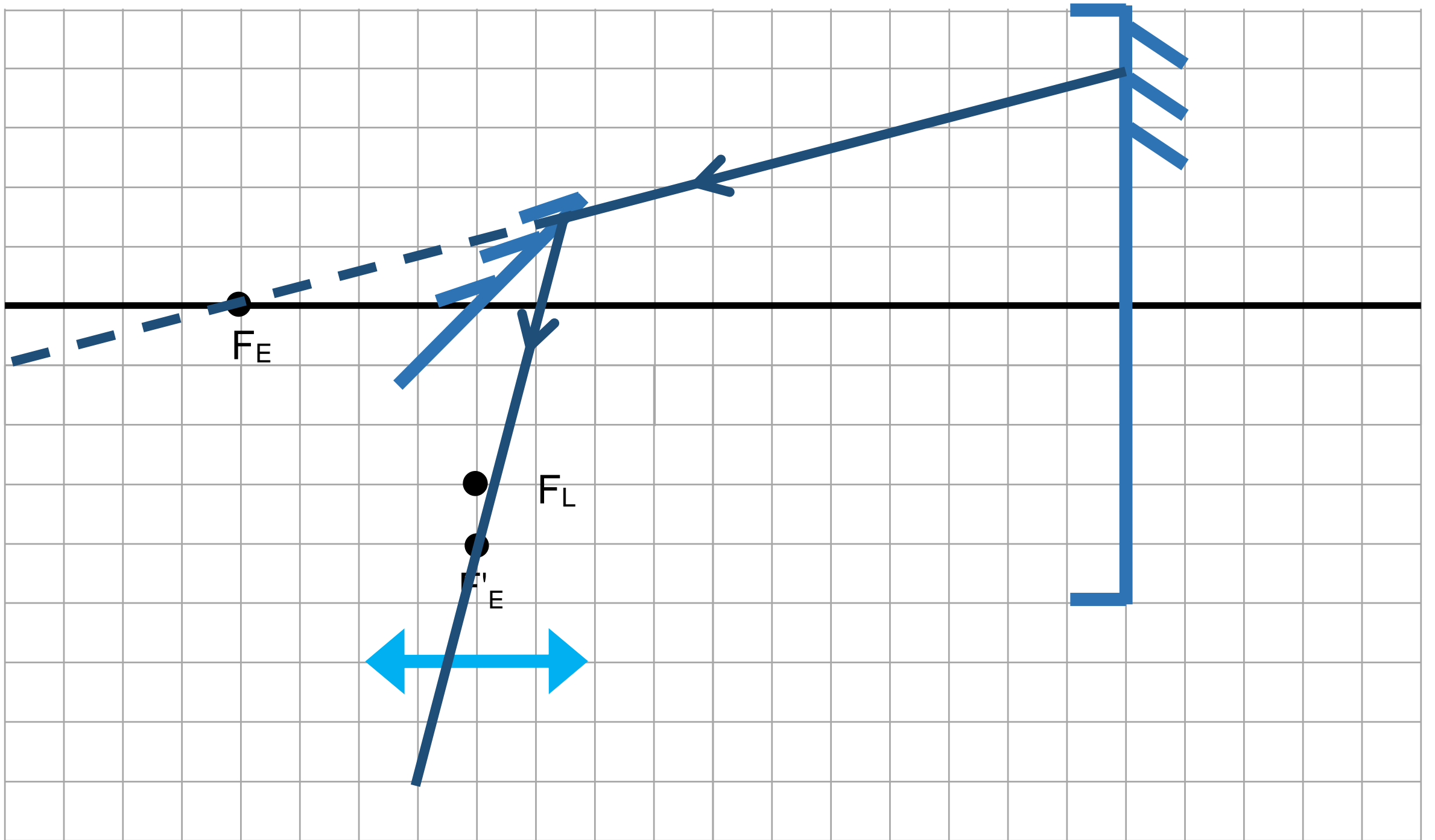


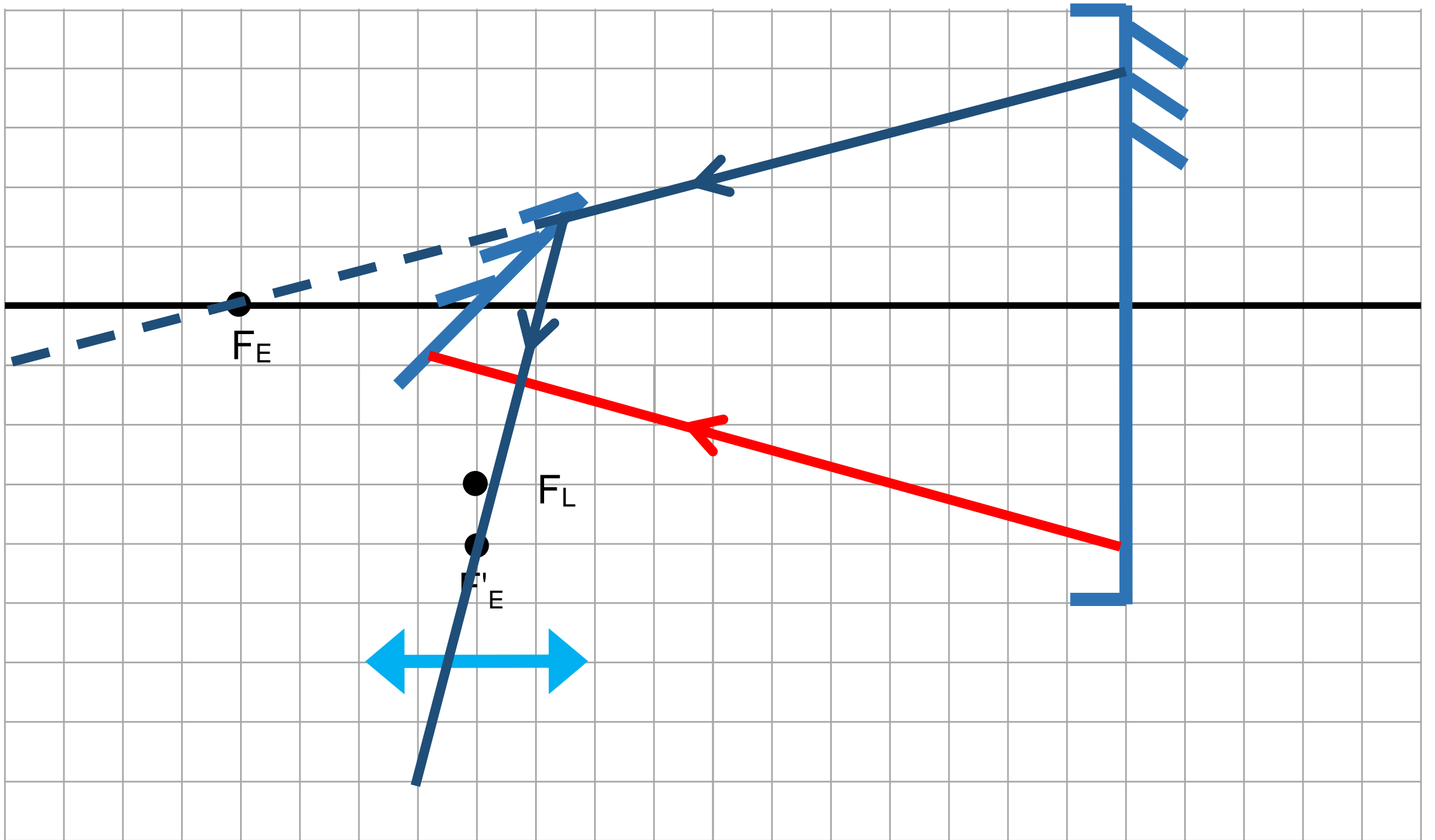


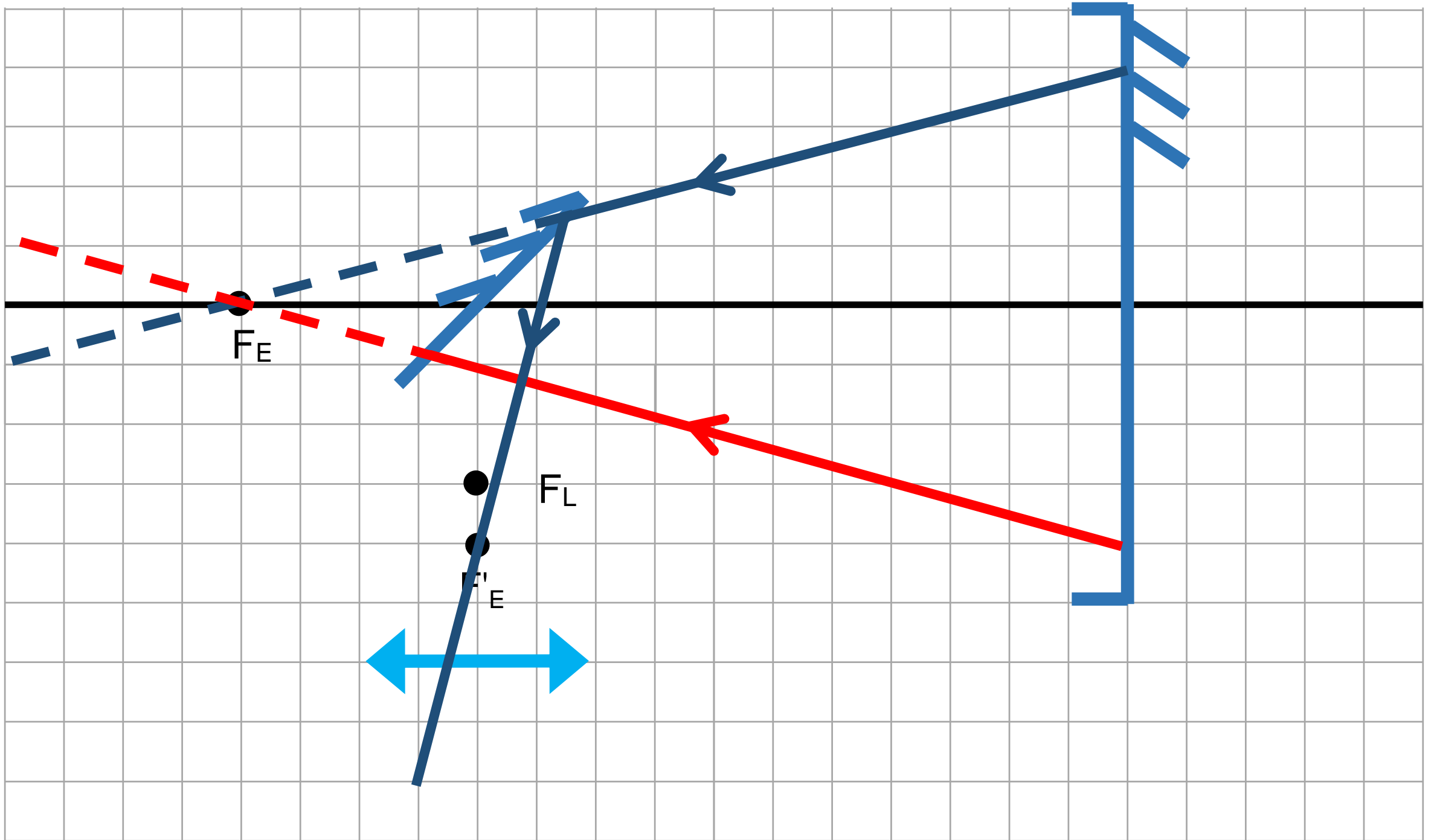


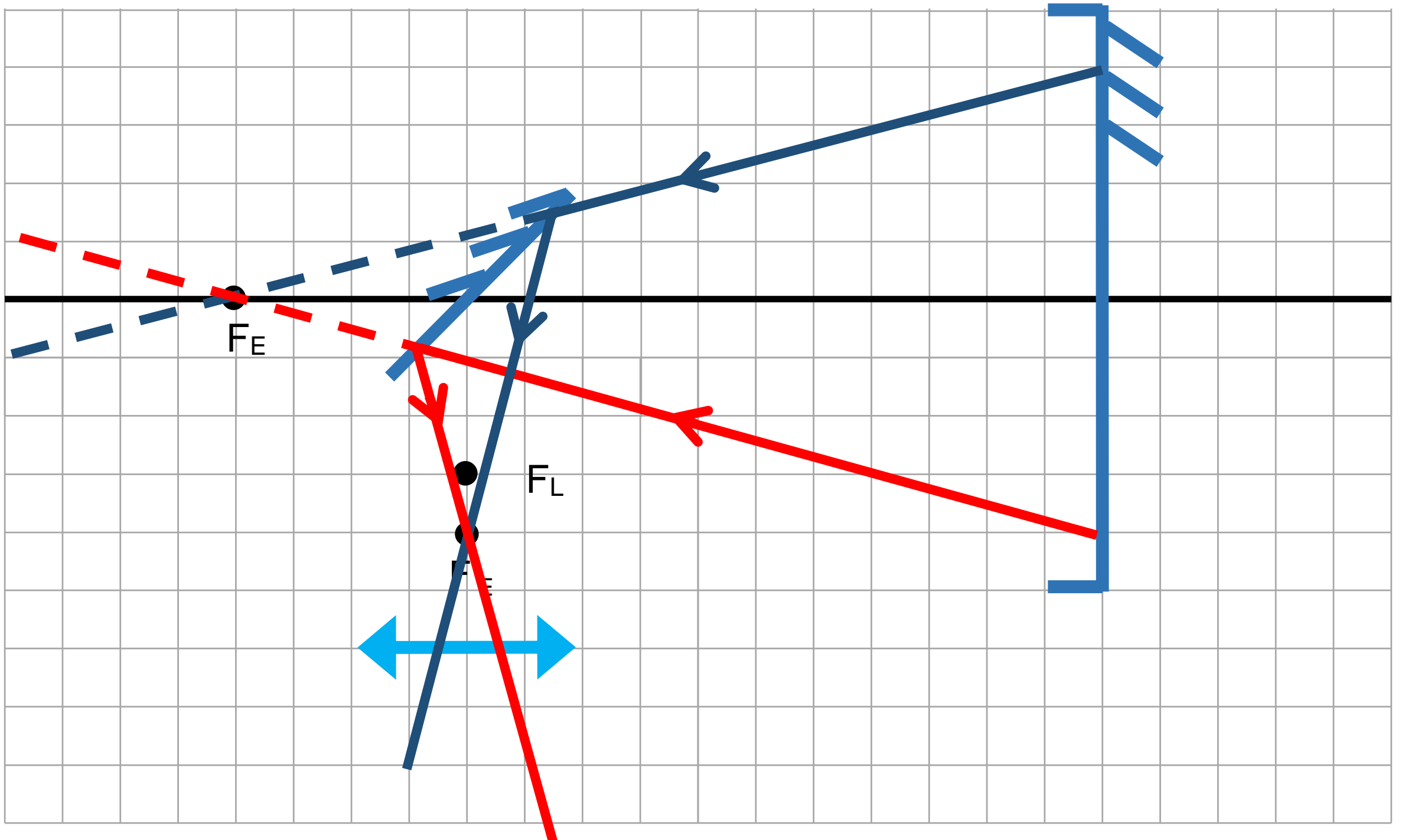


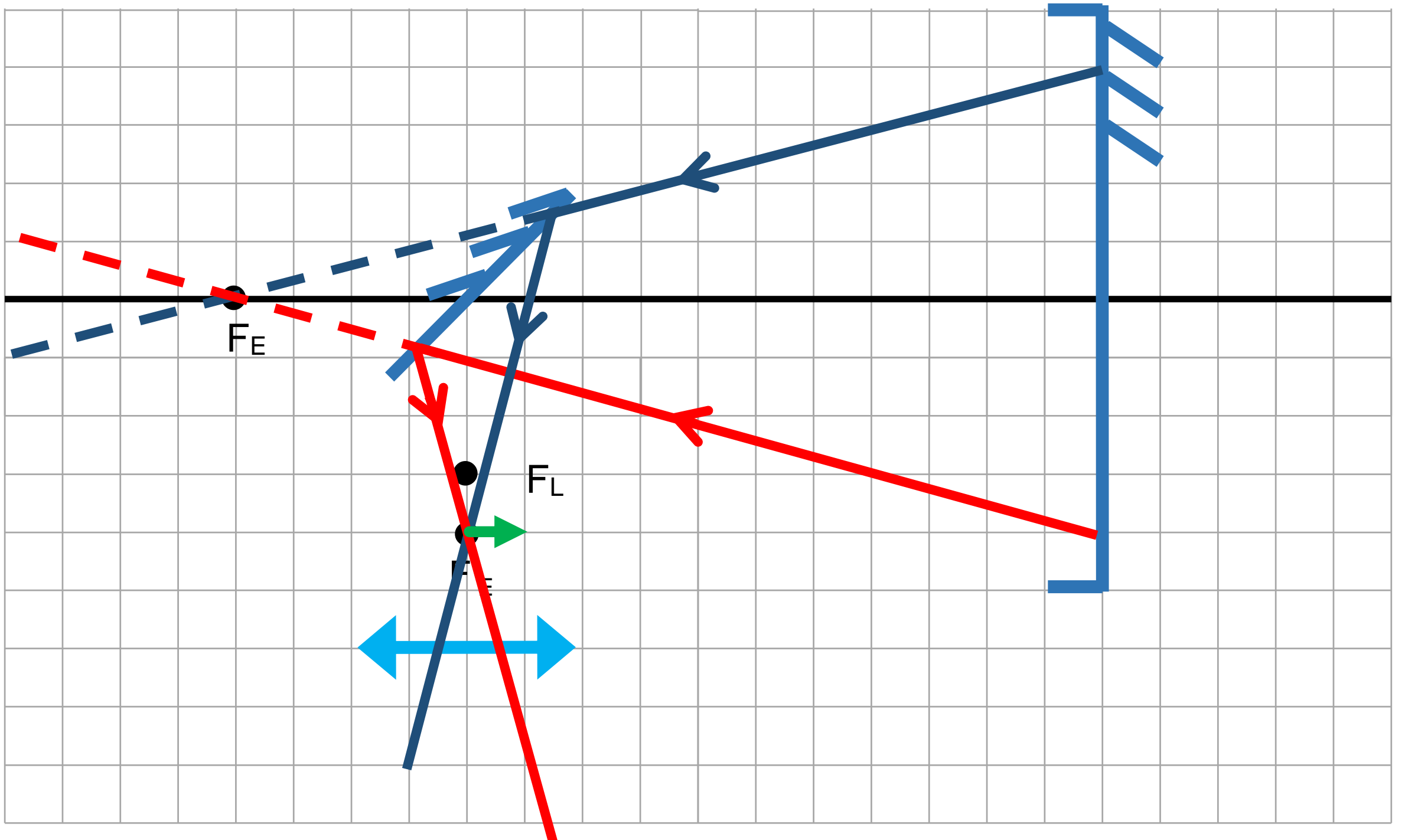


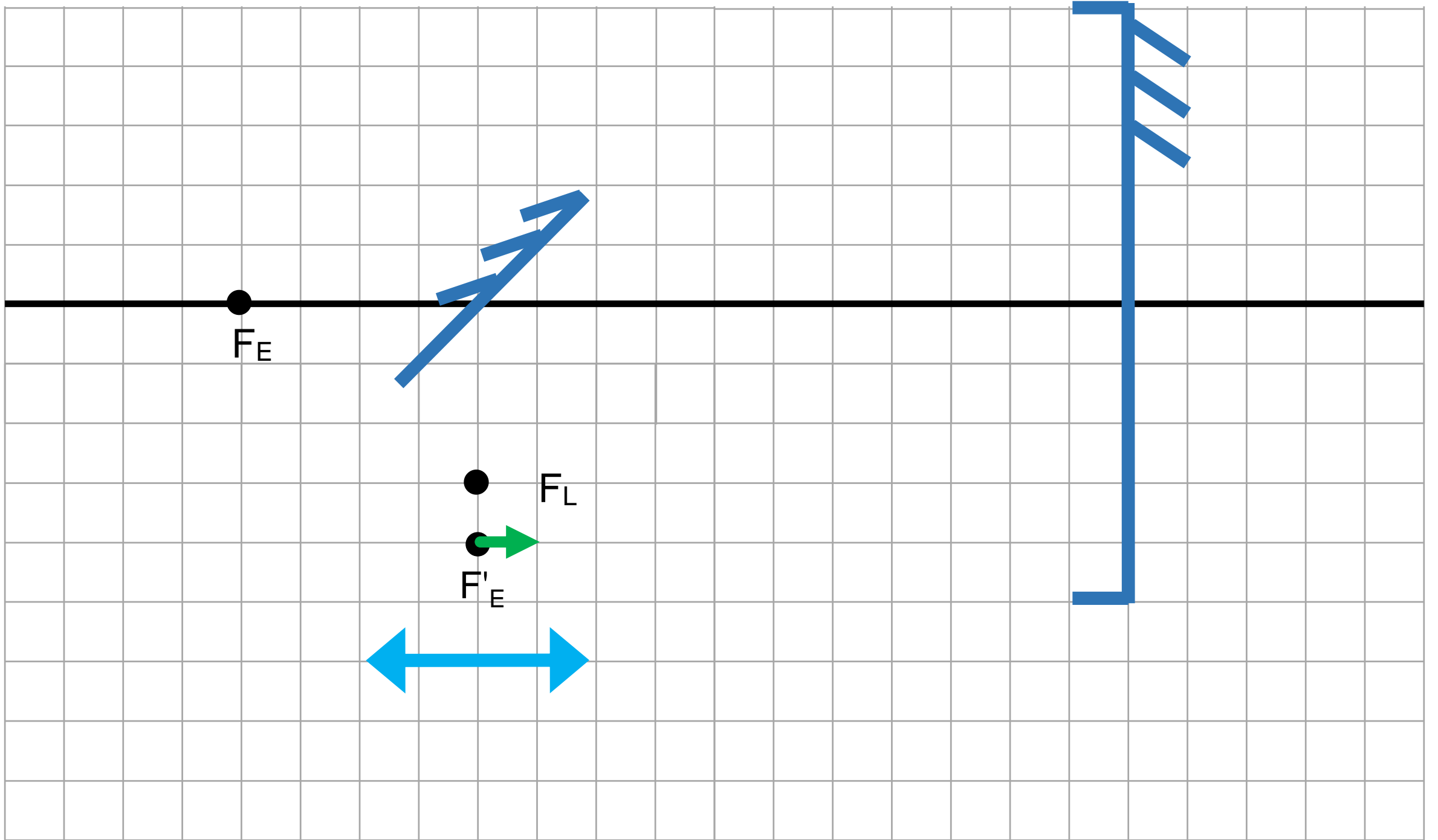


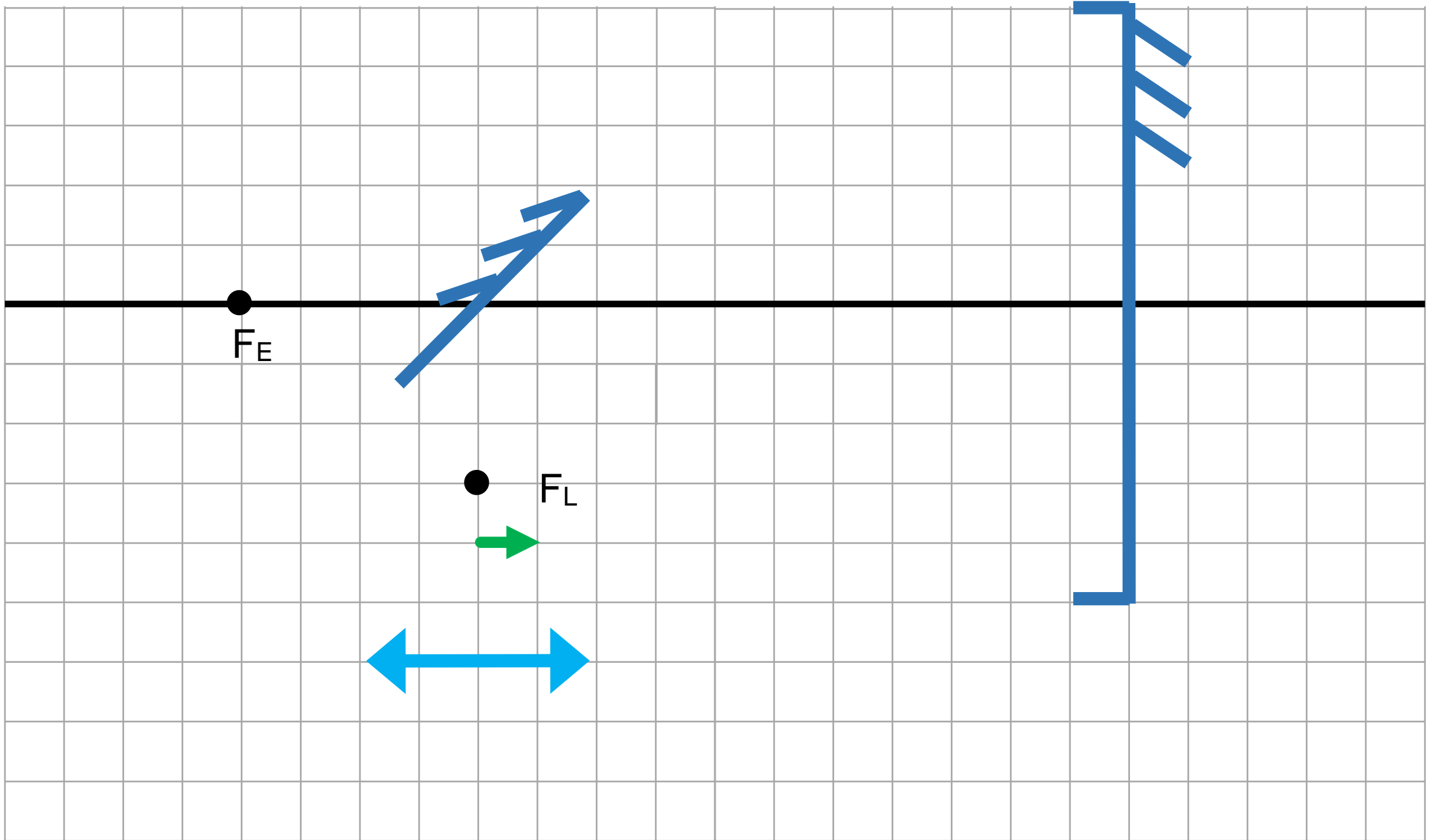


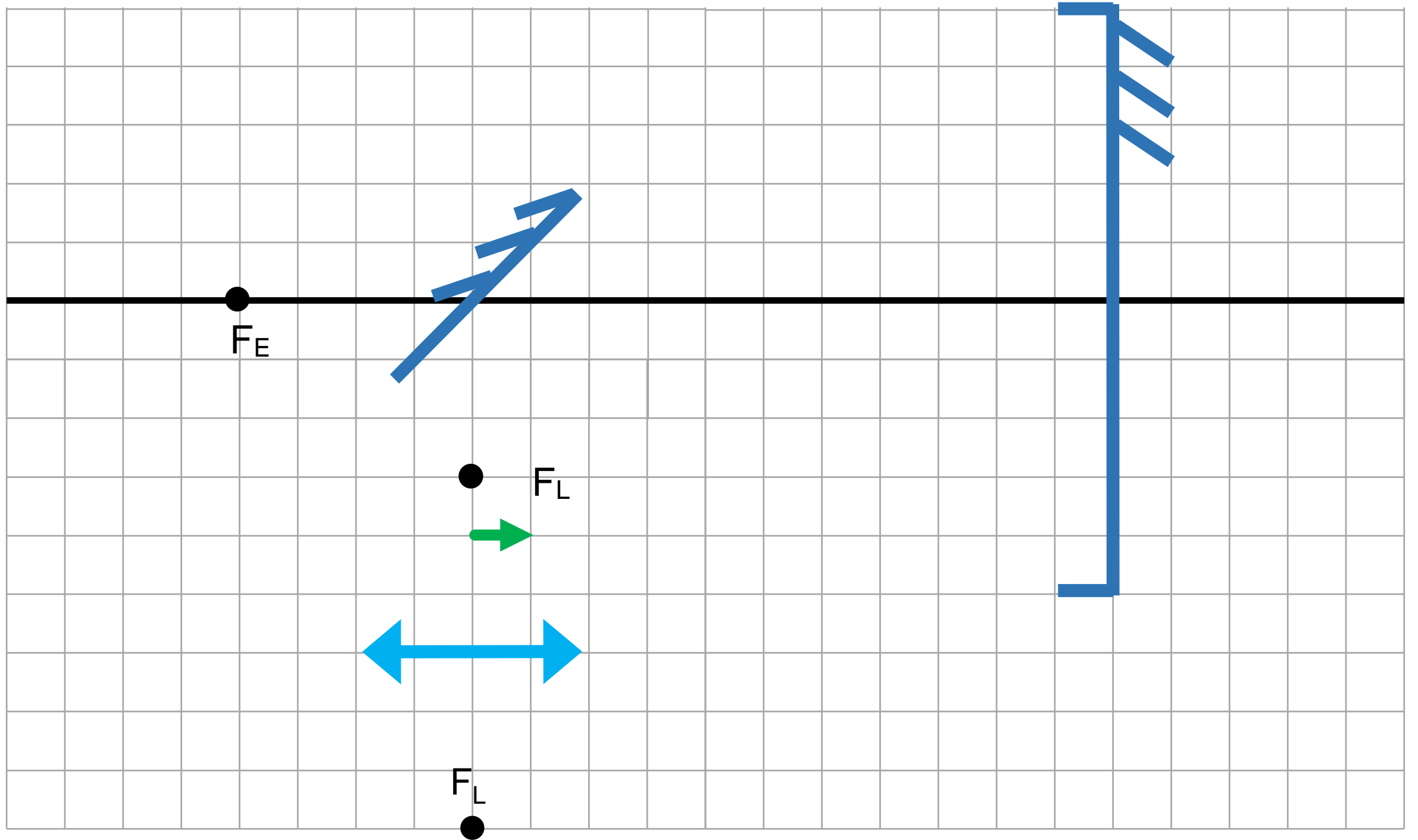


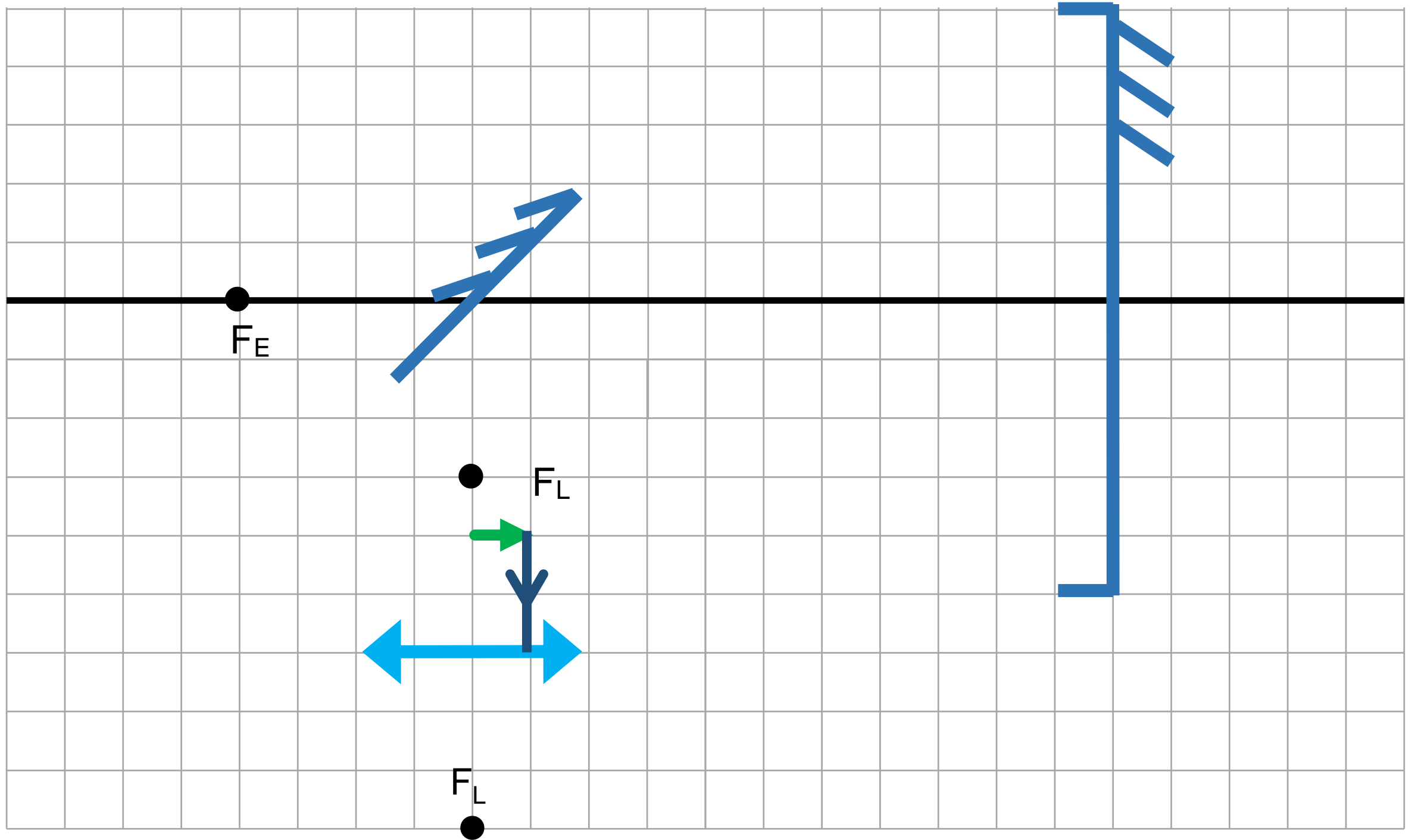


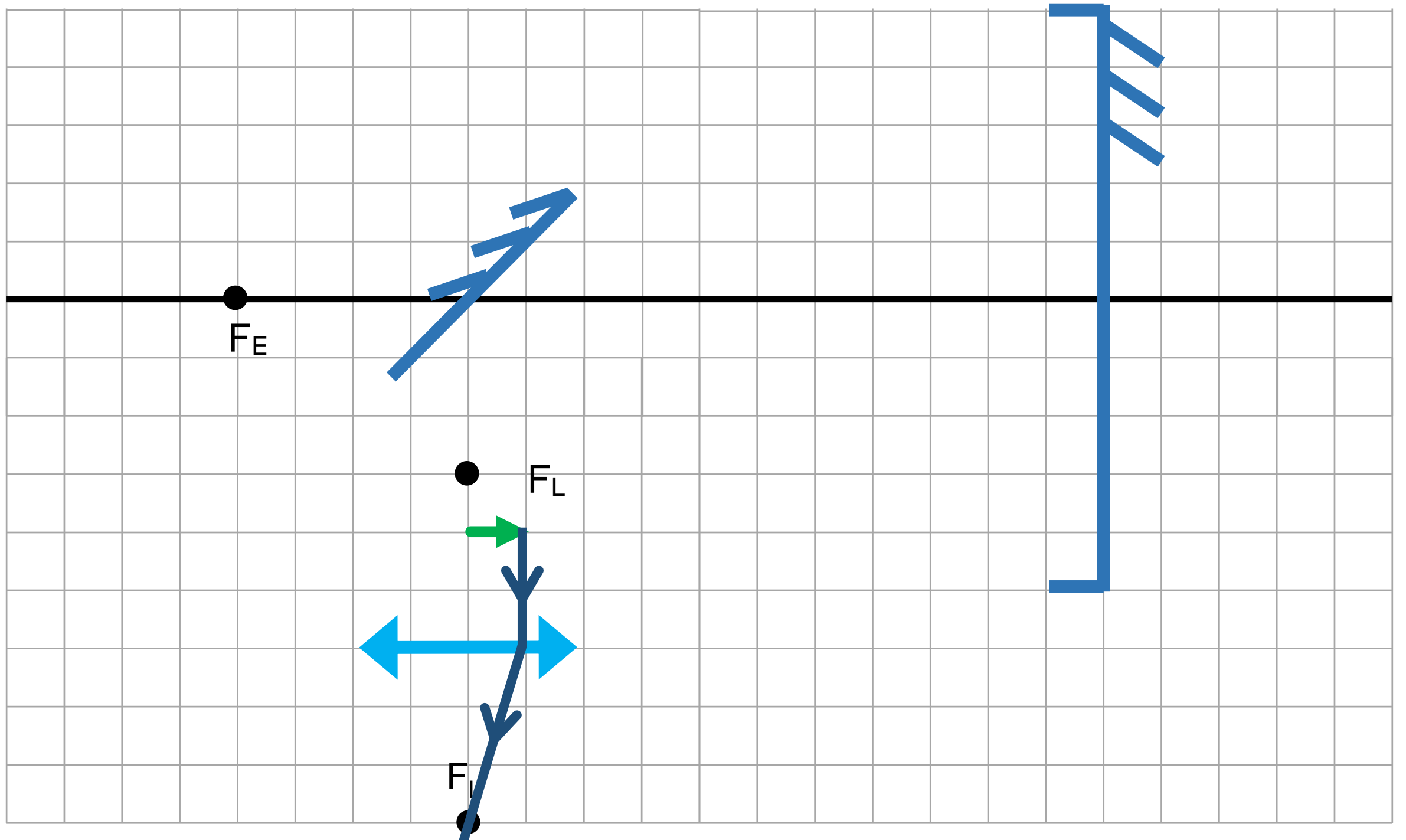


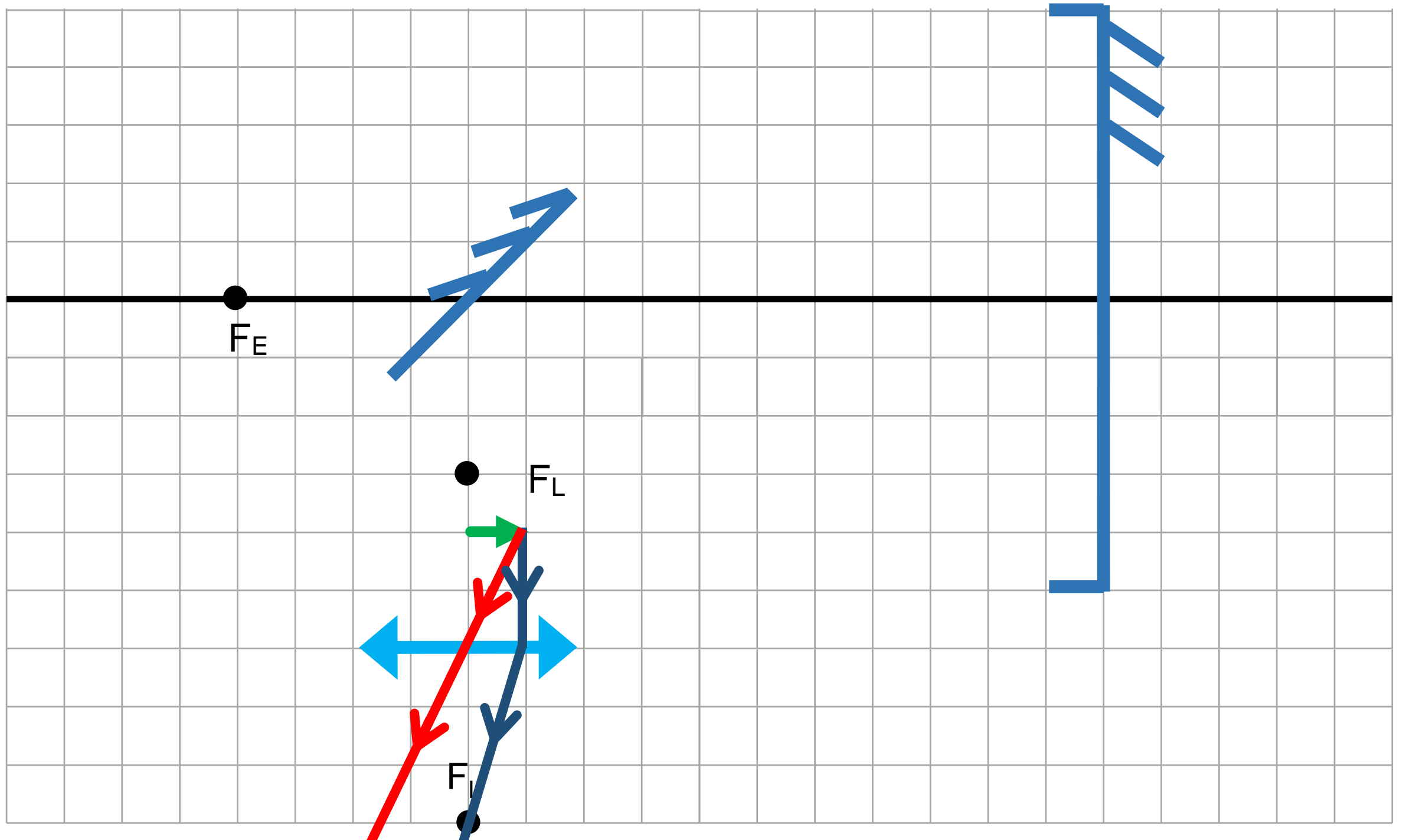


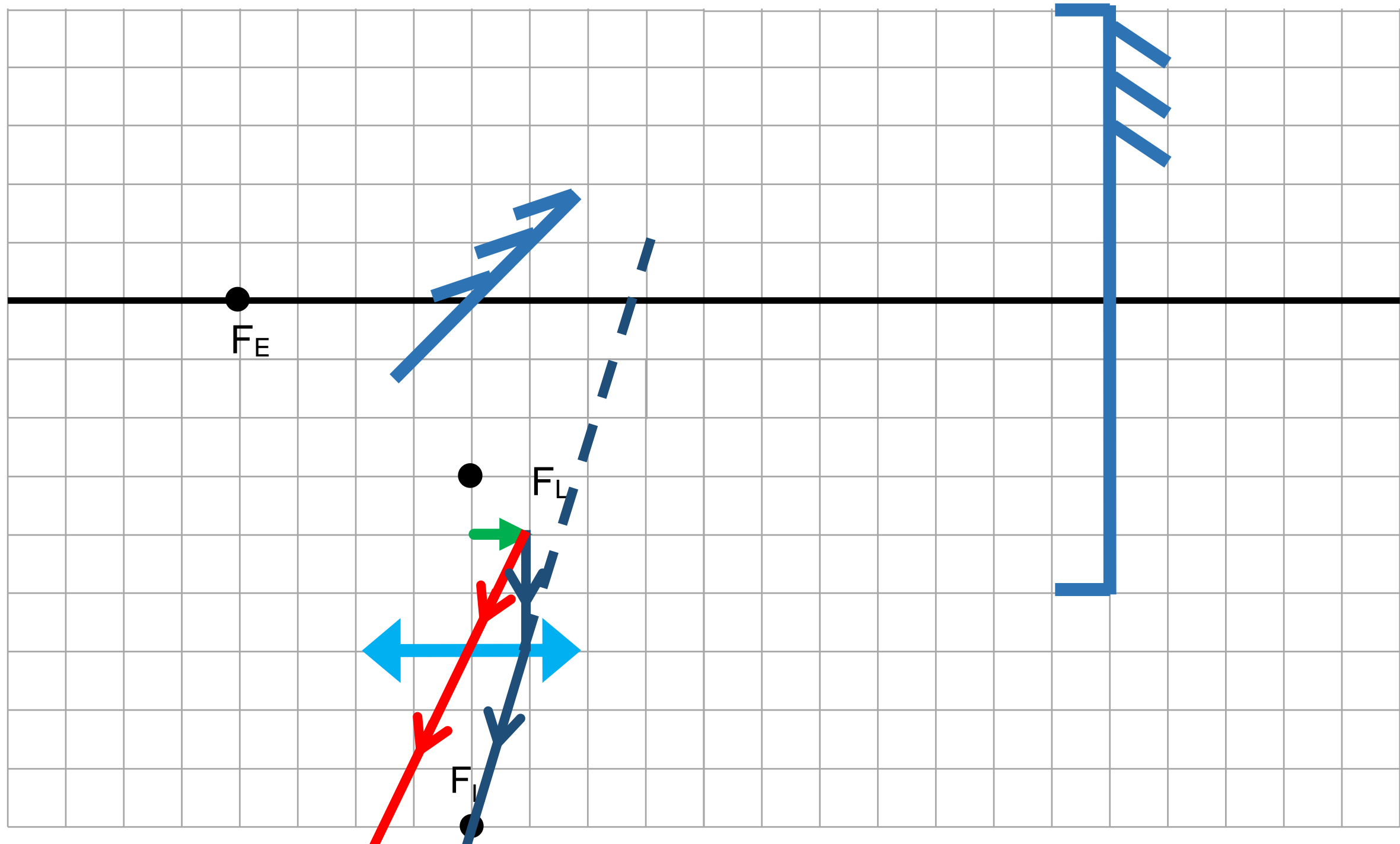


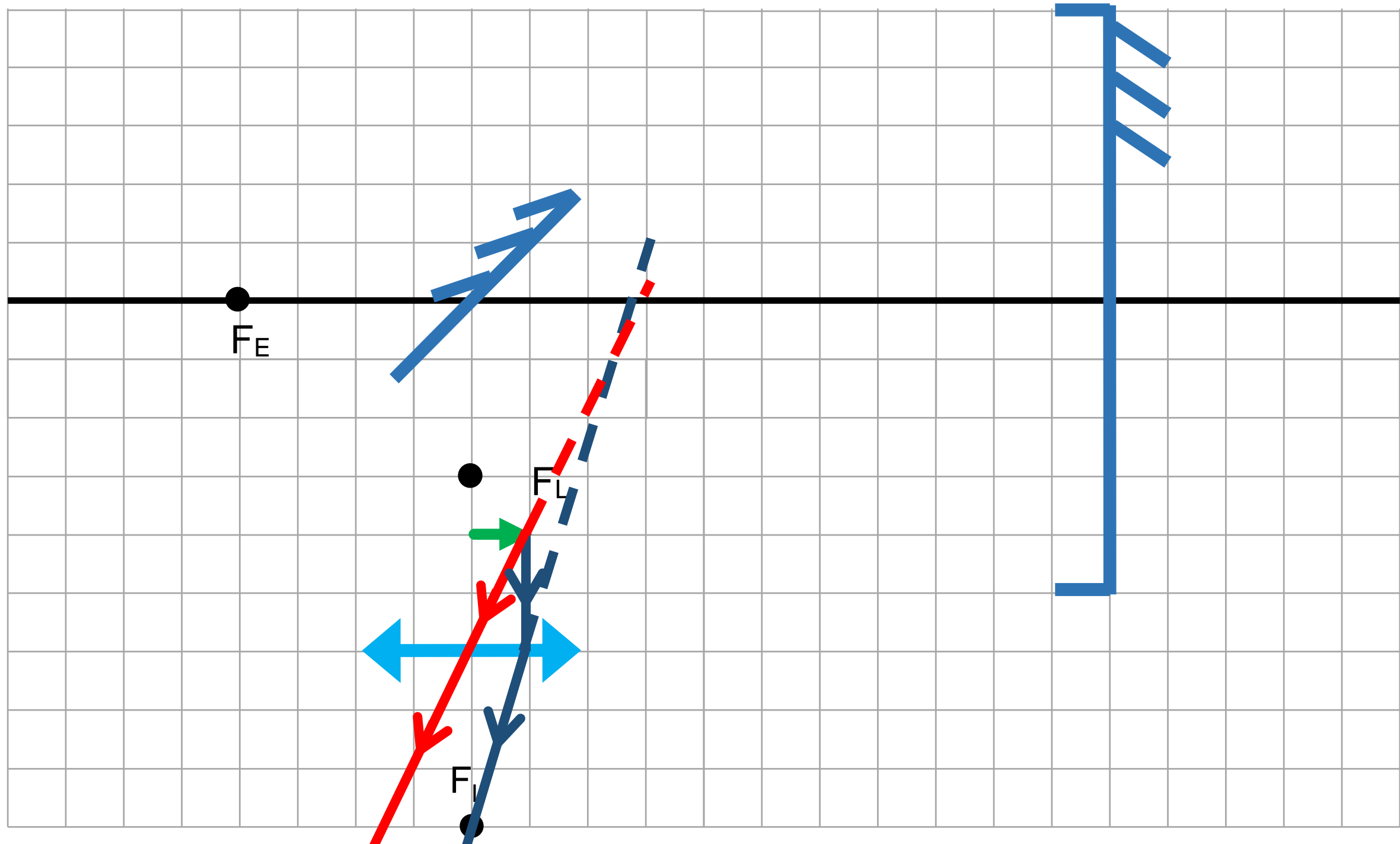


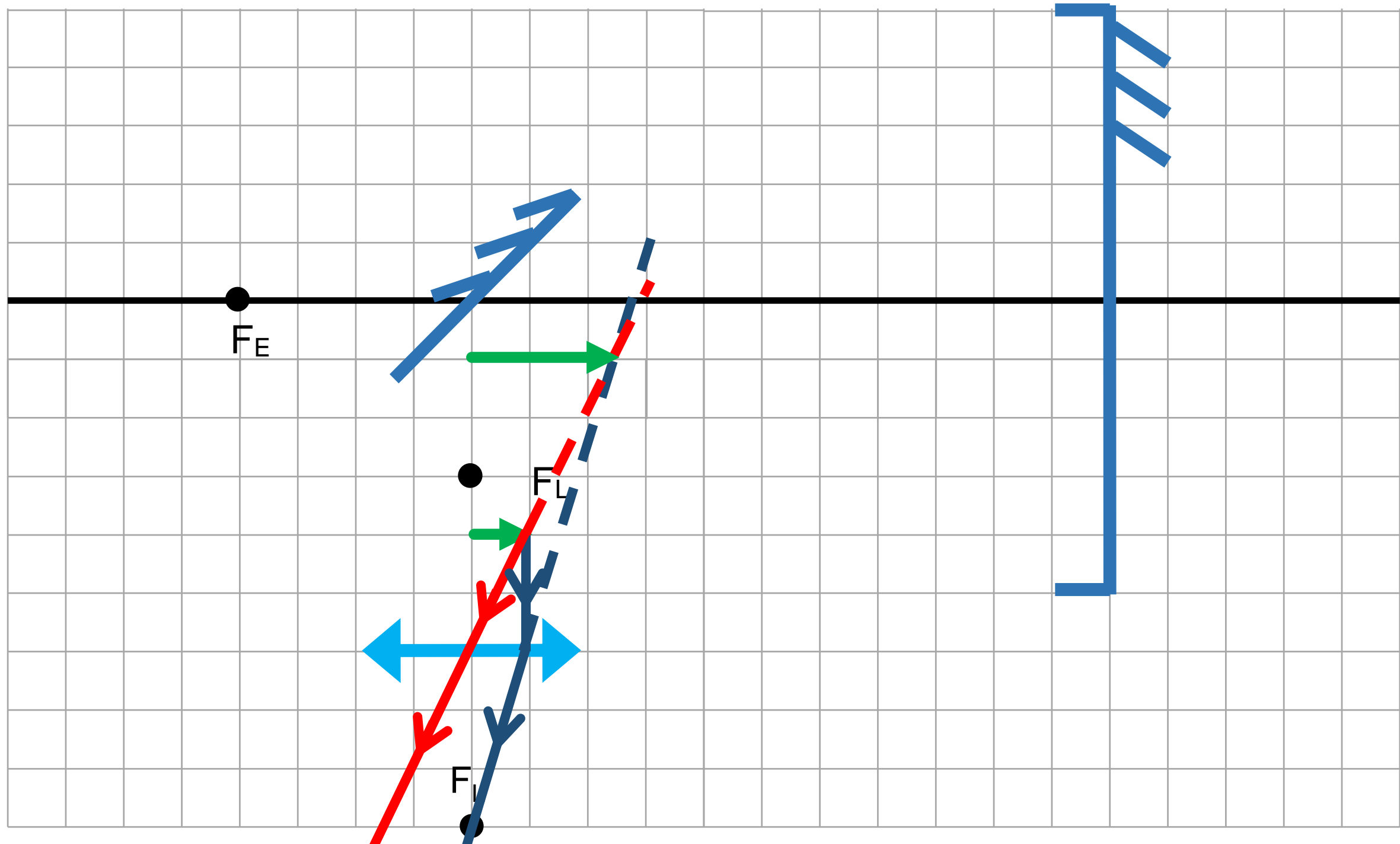


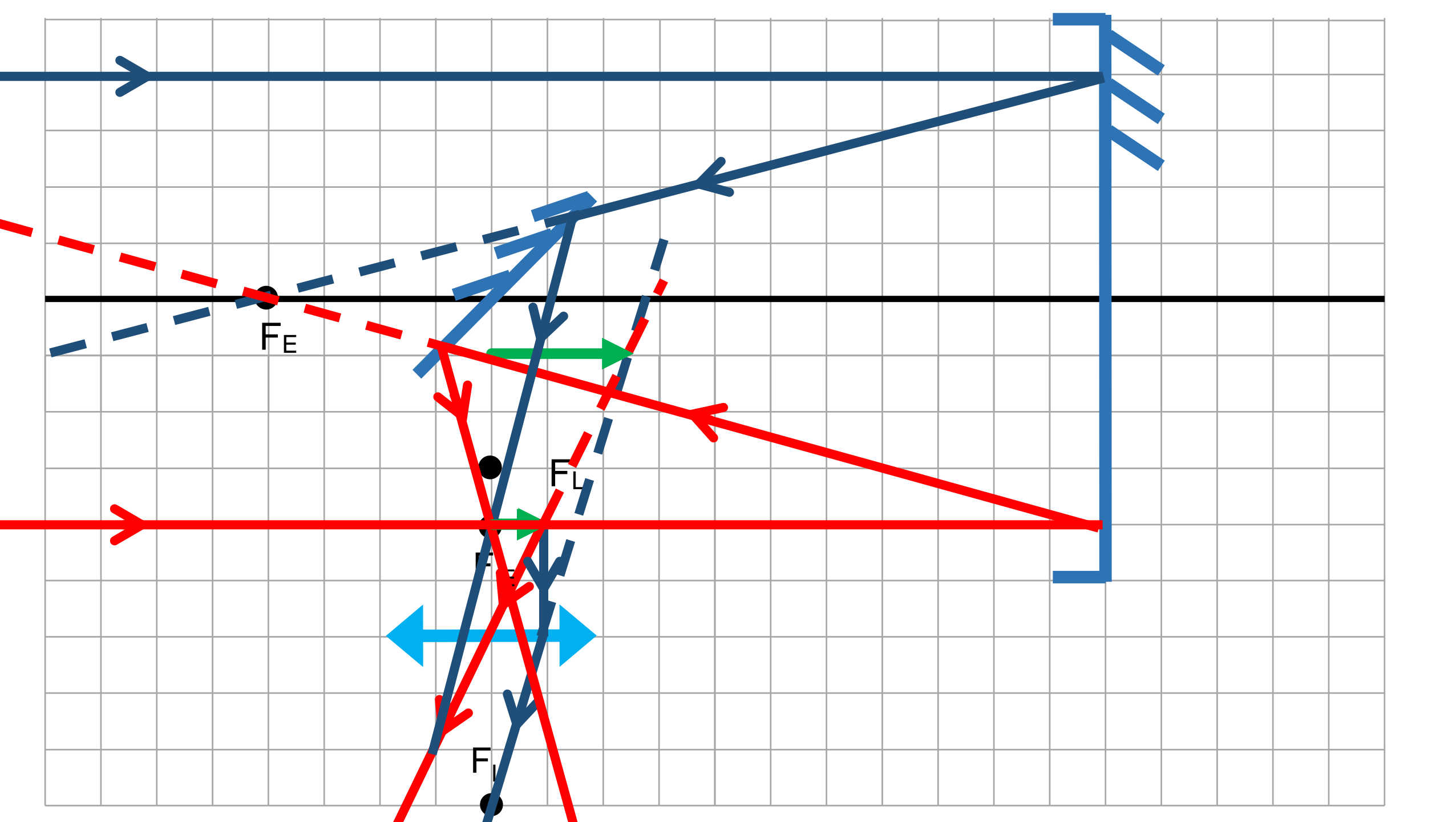




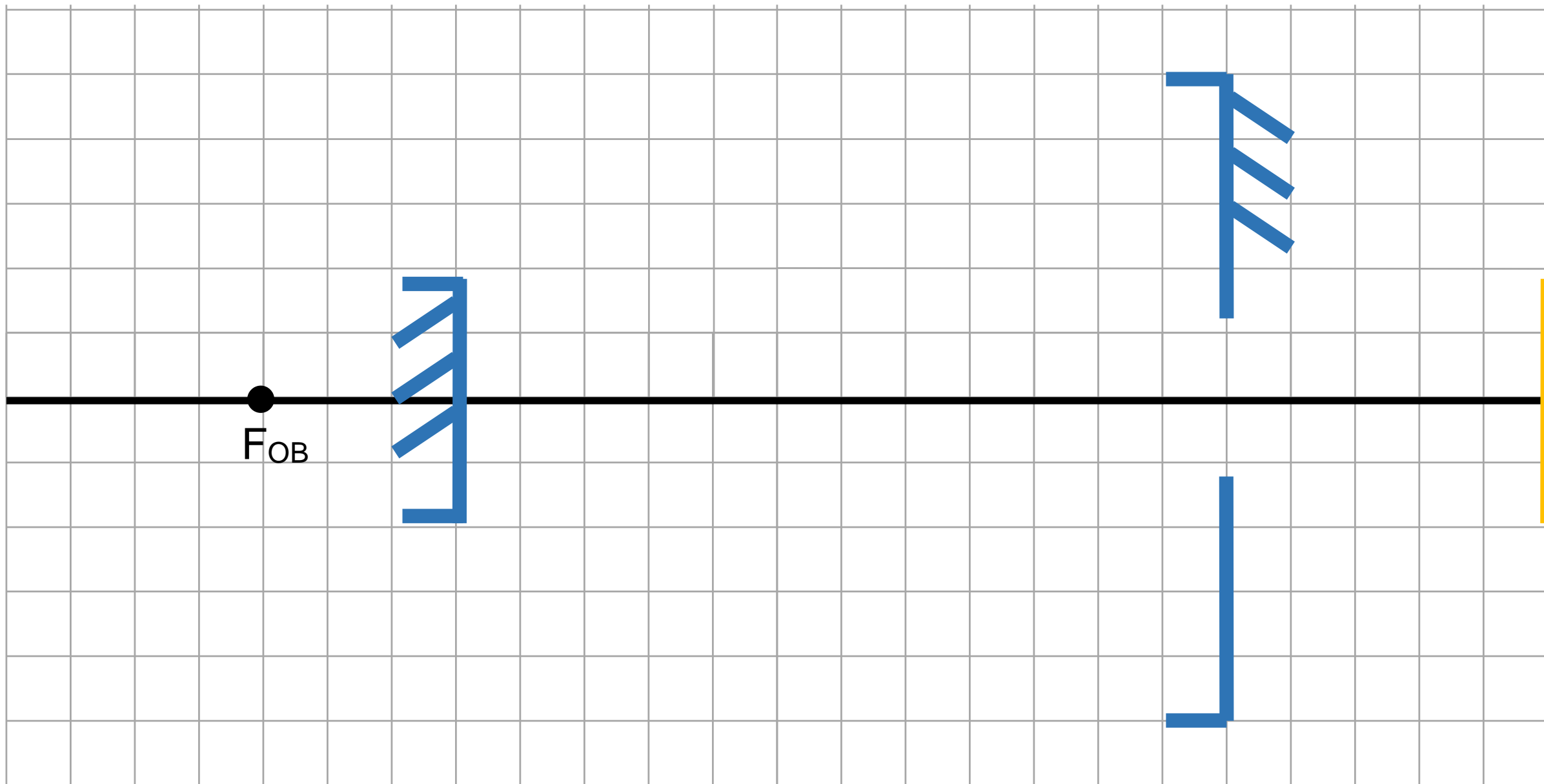


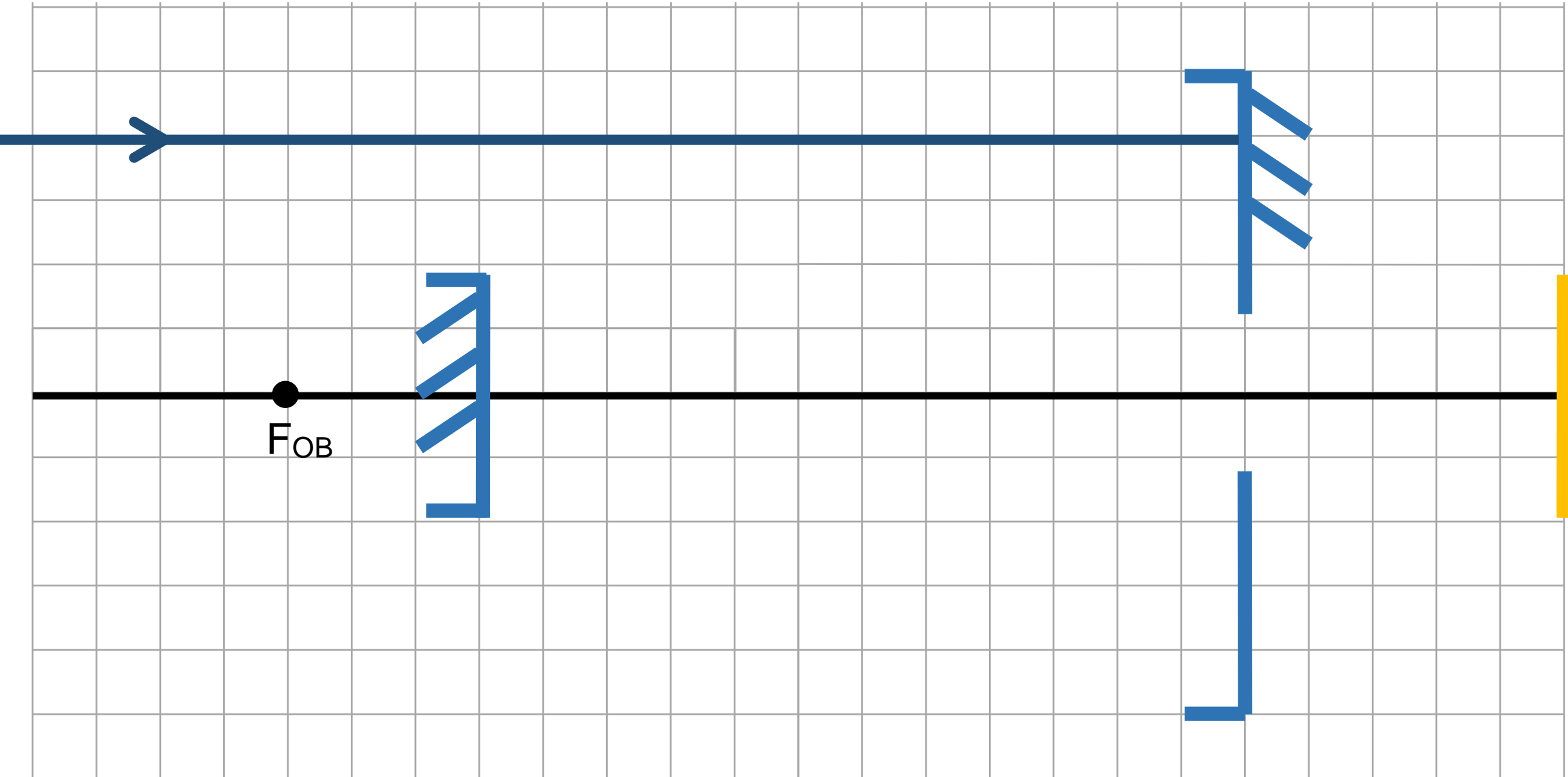


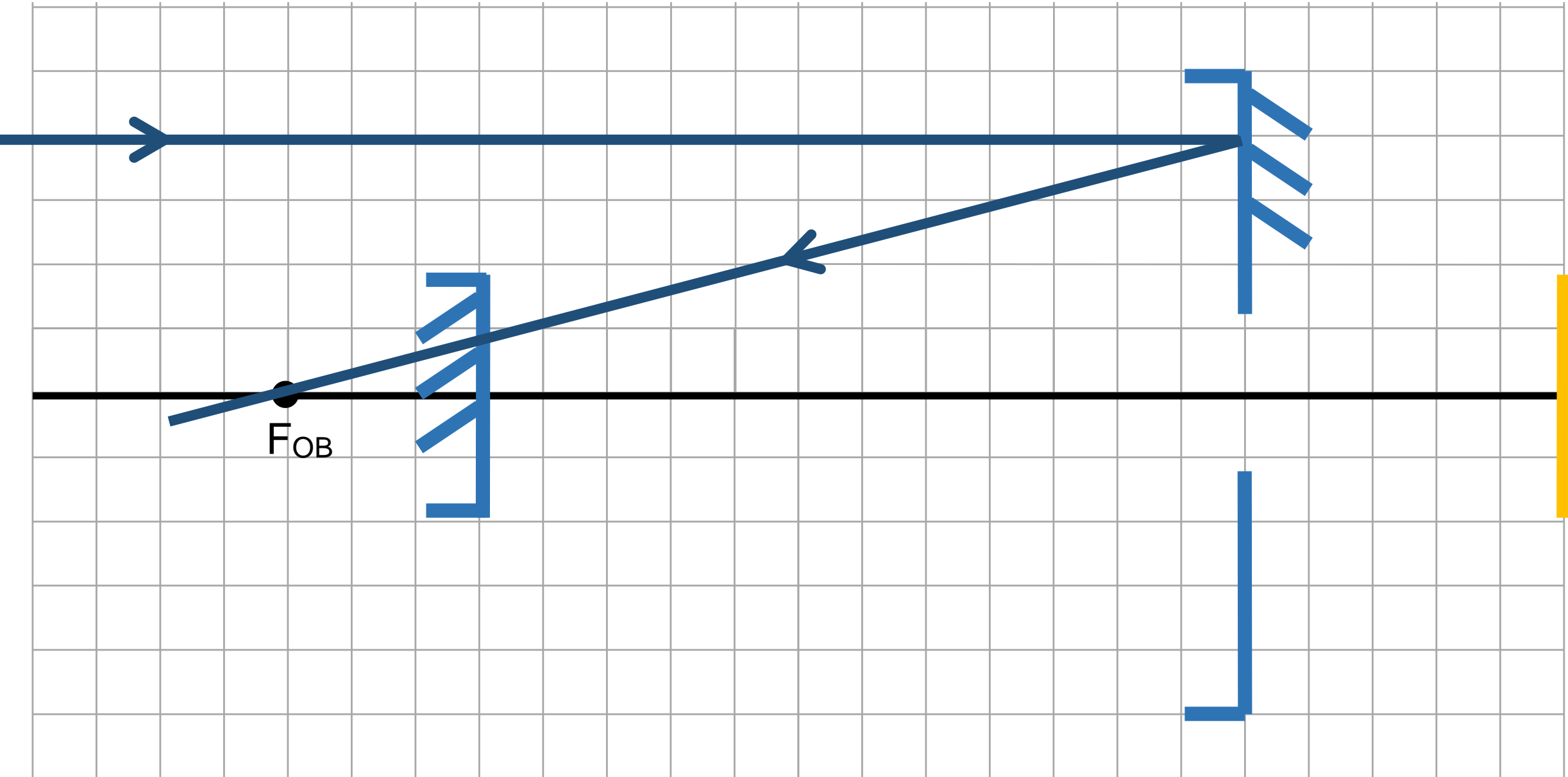




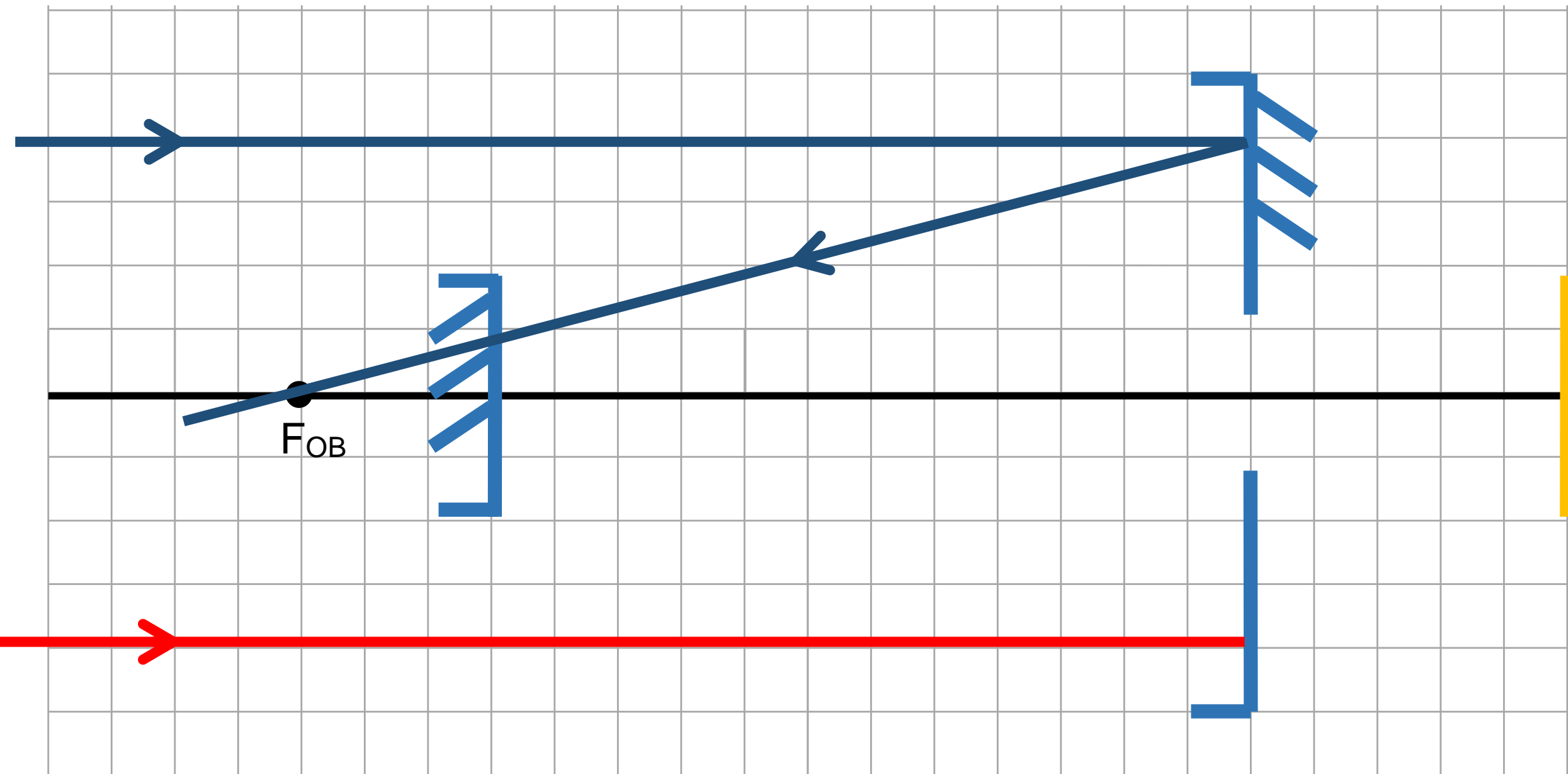
TELESCÓPIO CASSEGRAIN (MODELO DO HUBBLE)

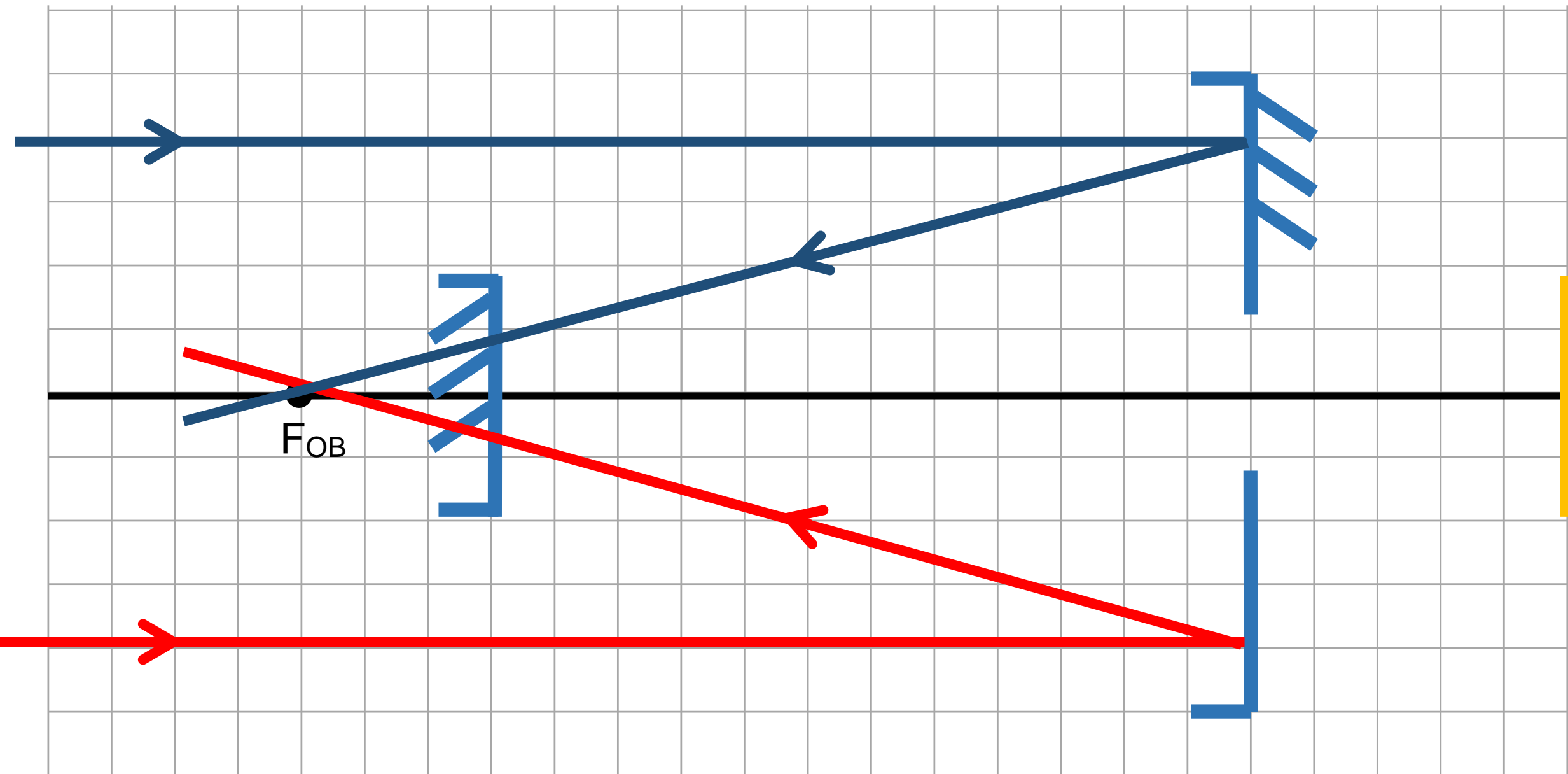


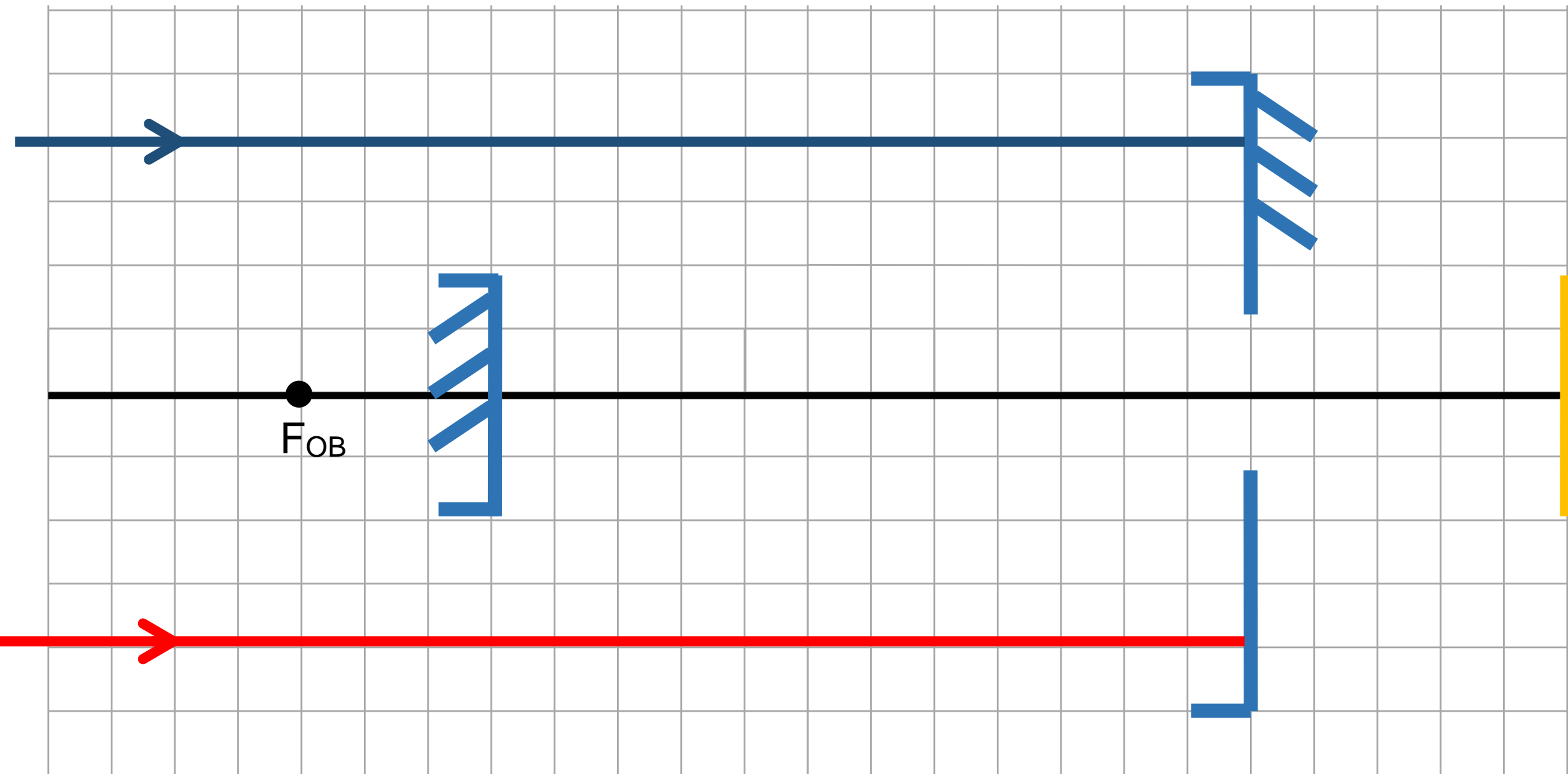


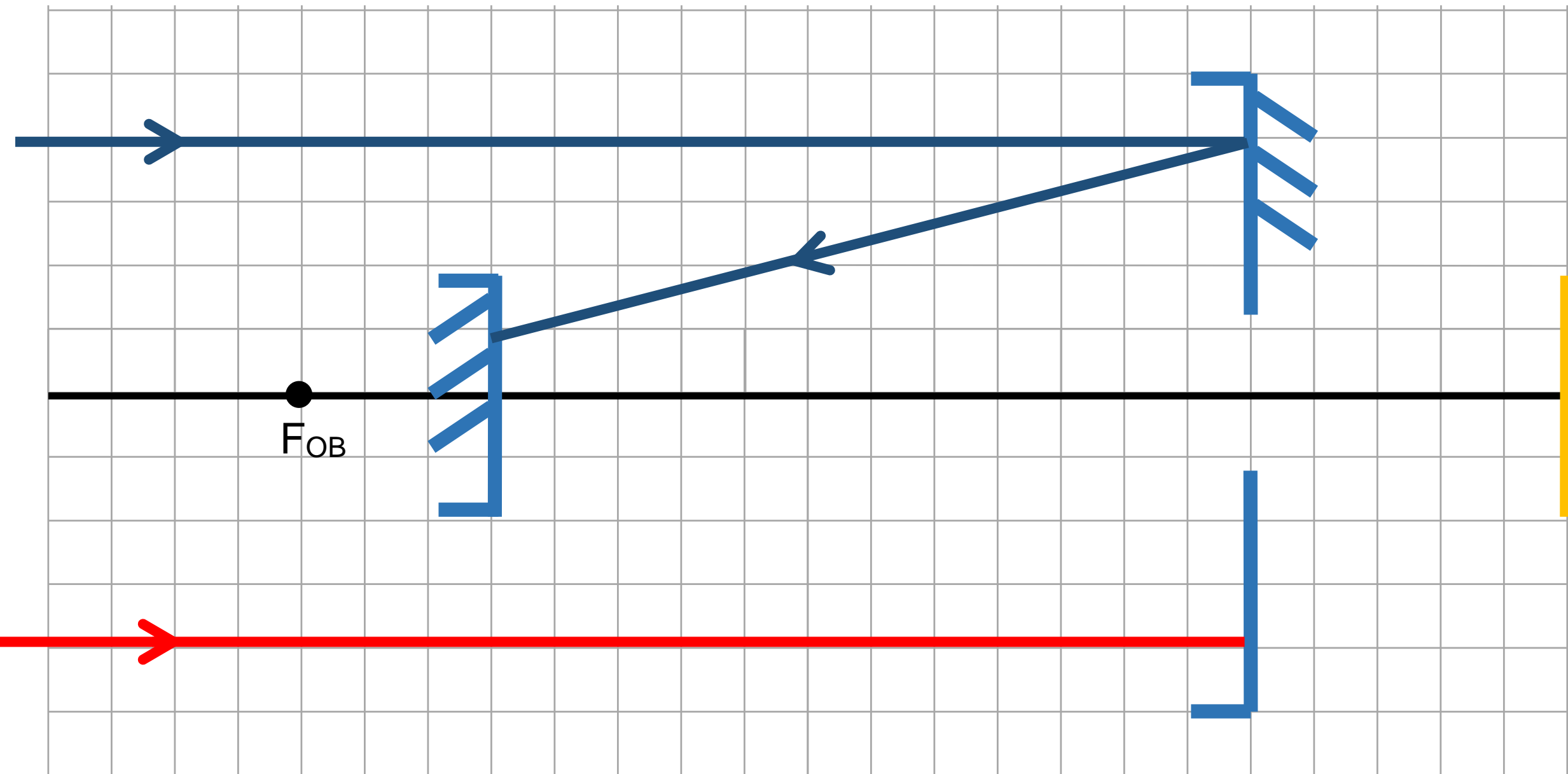


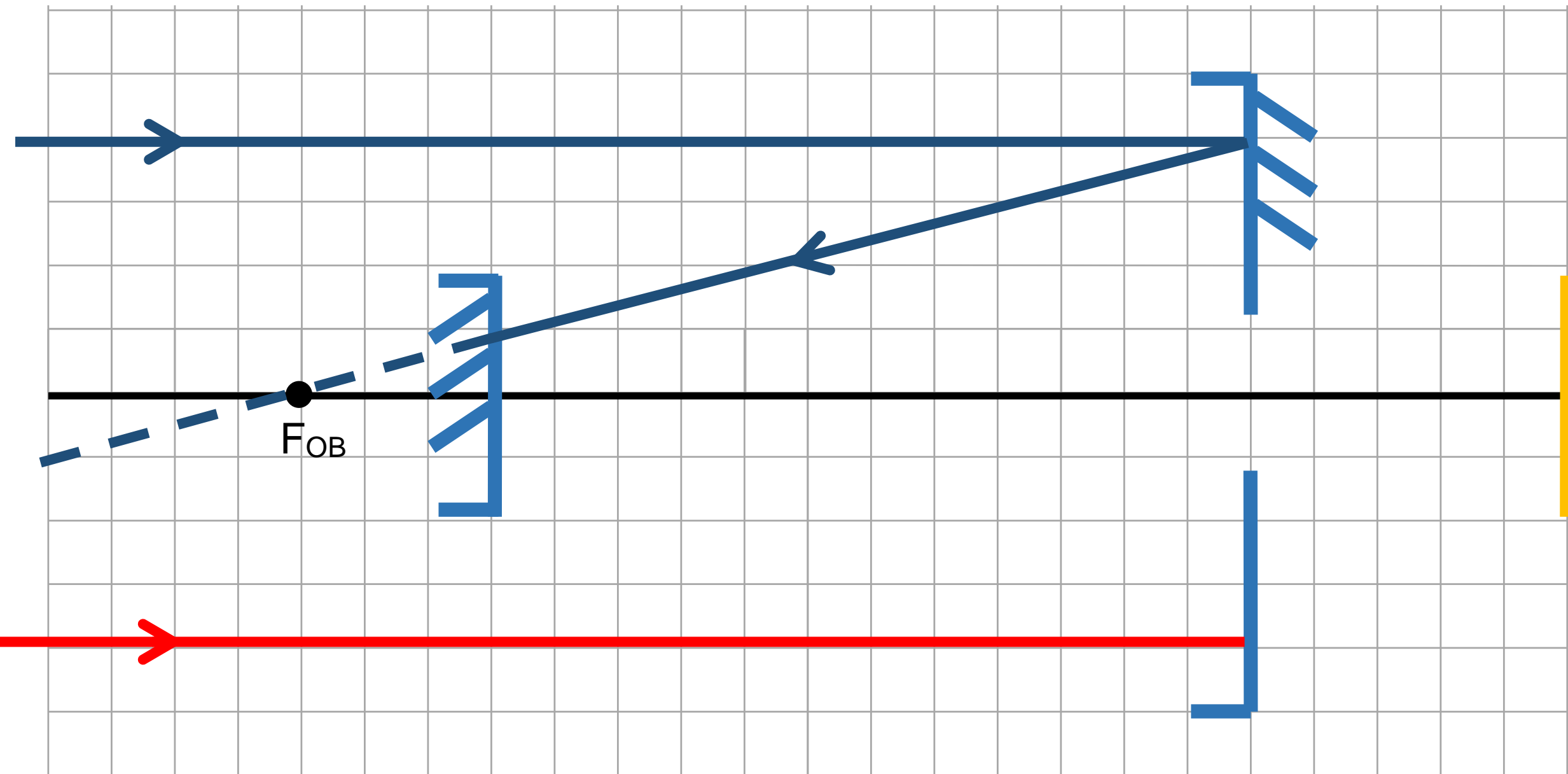
F_{OB}

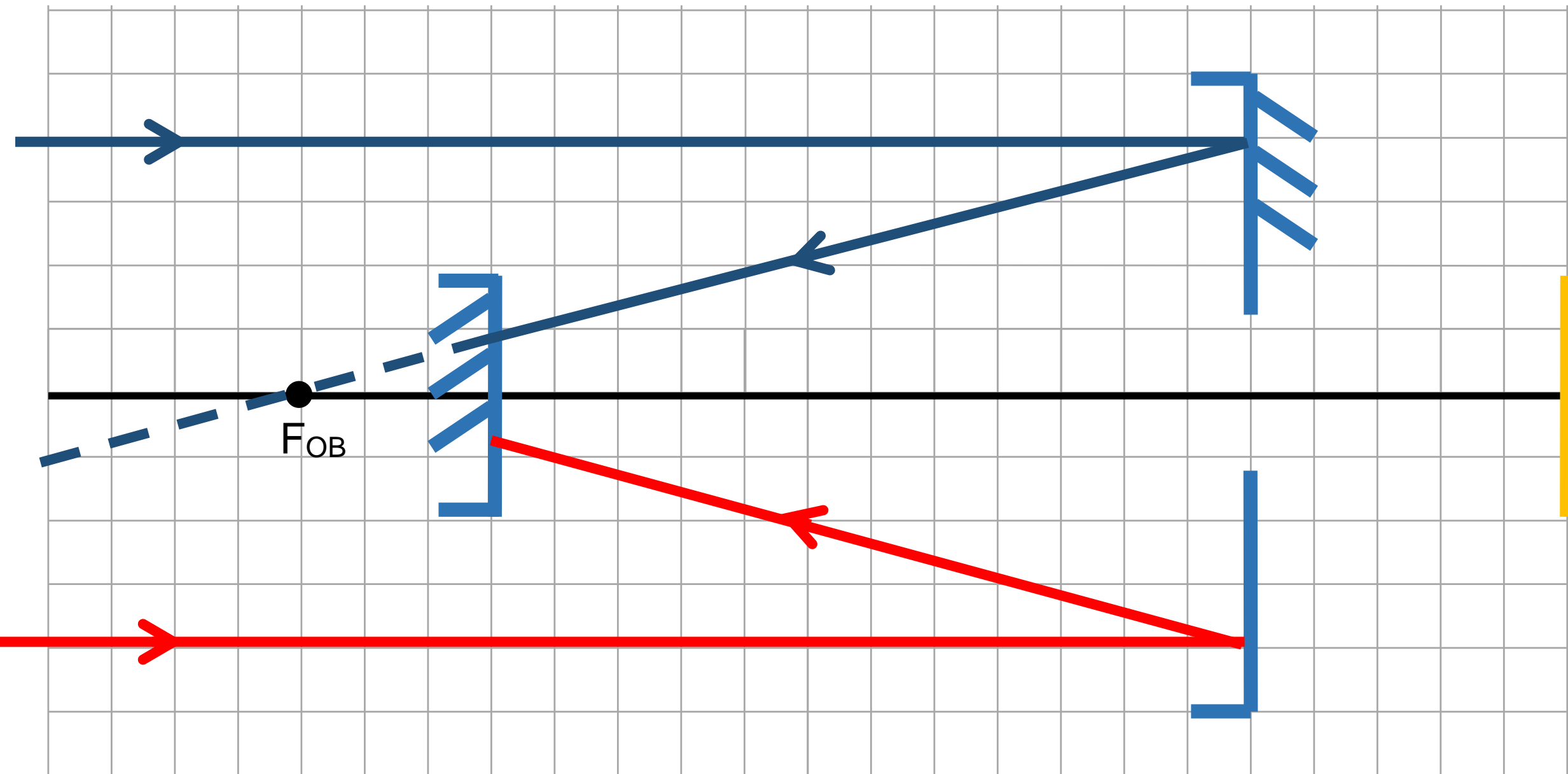


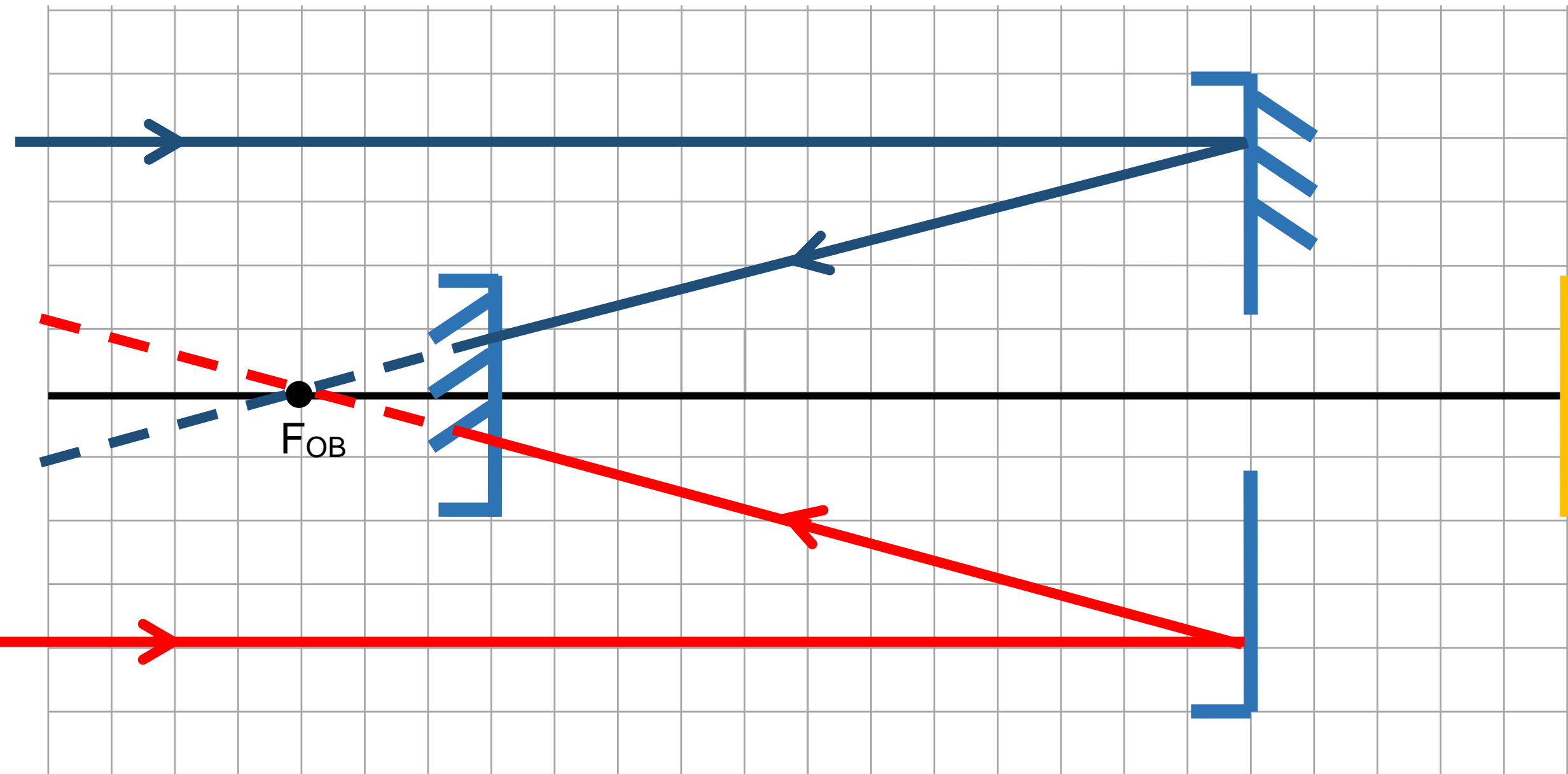












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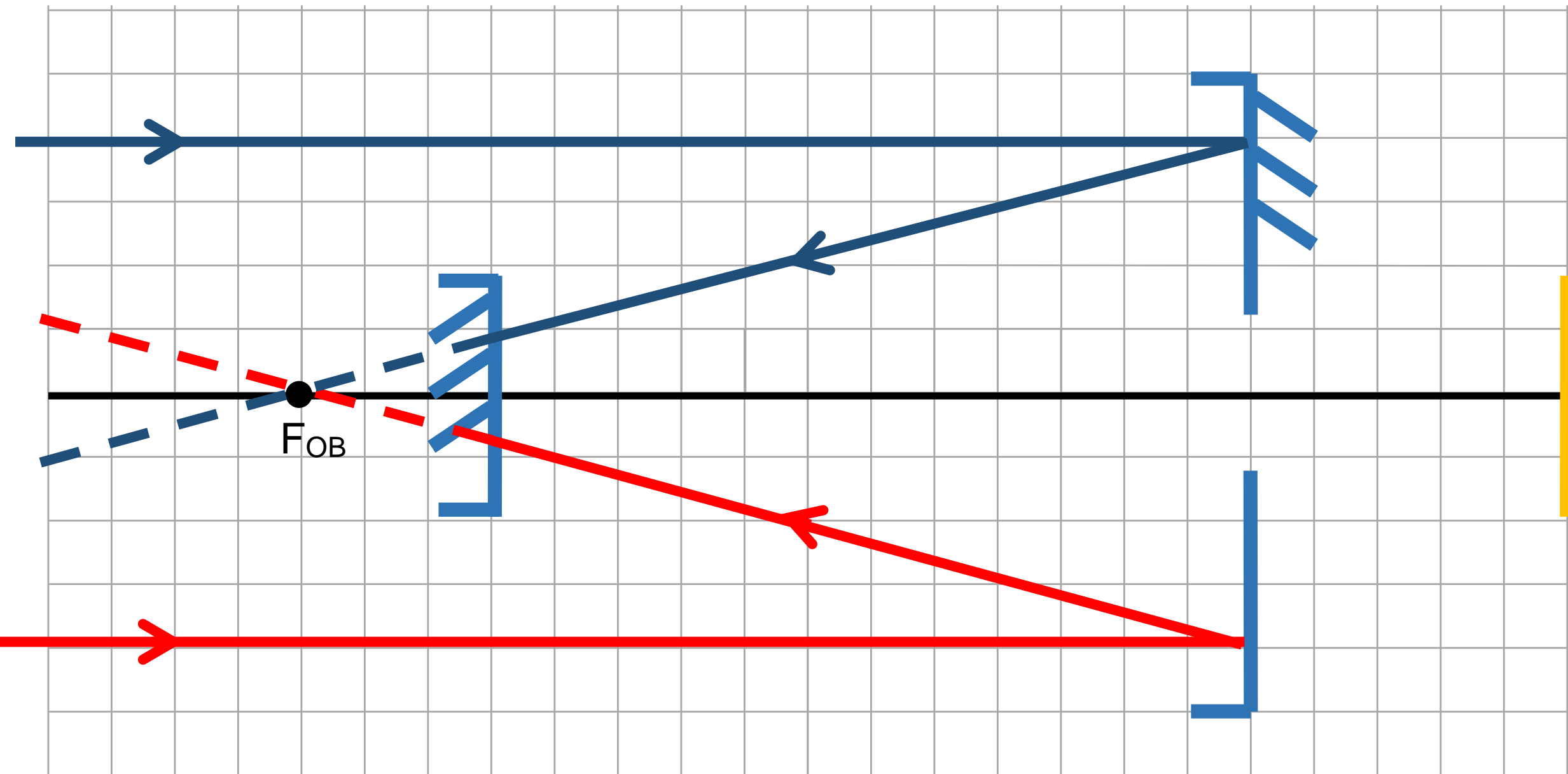
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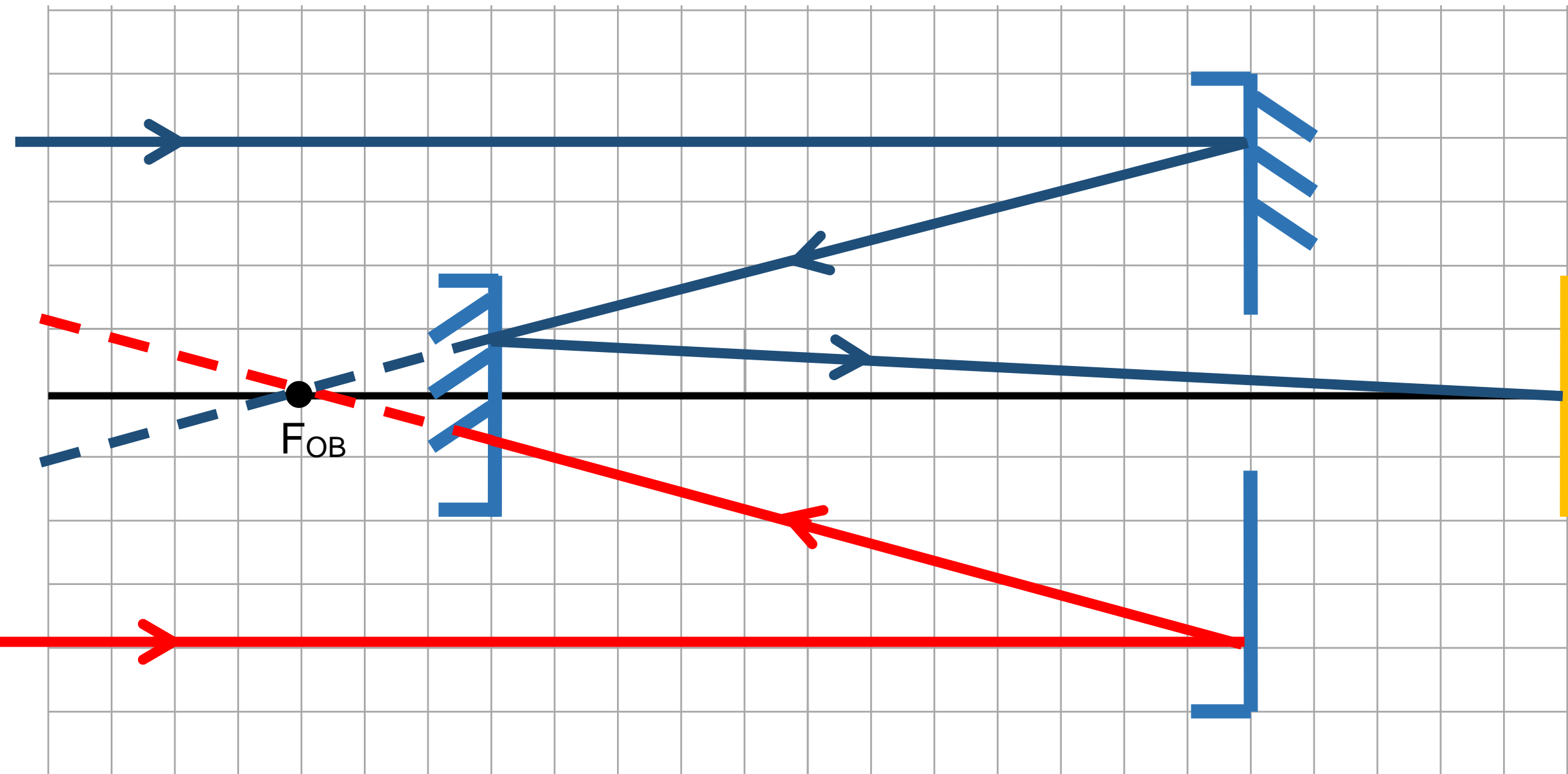
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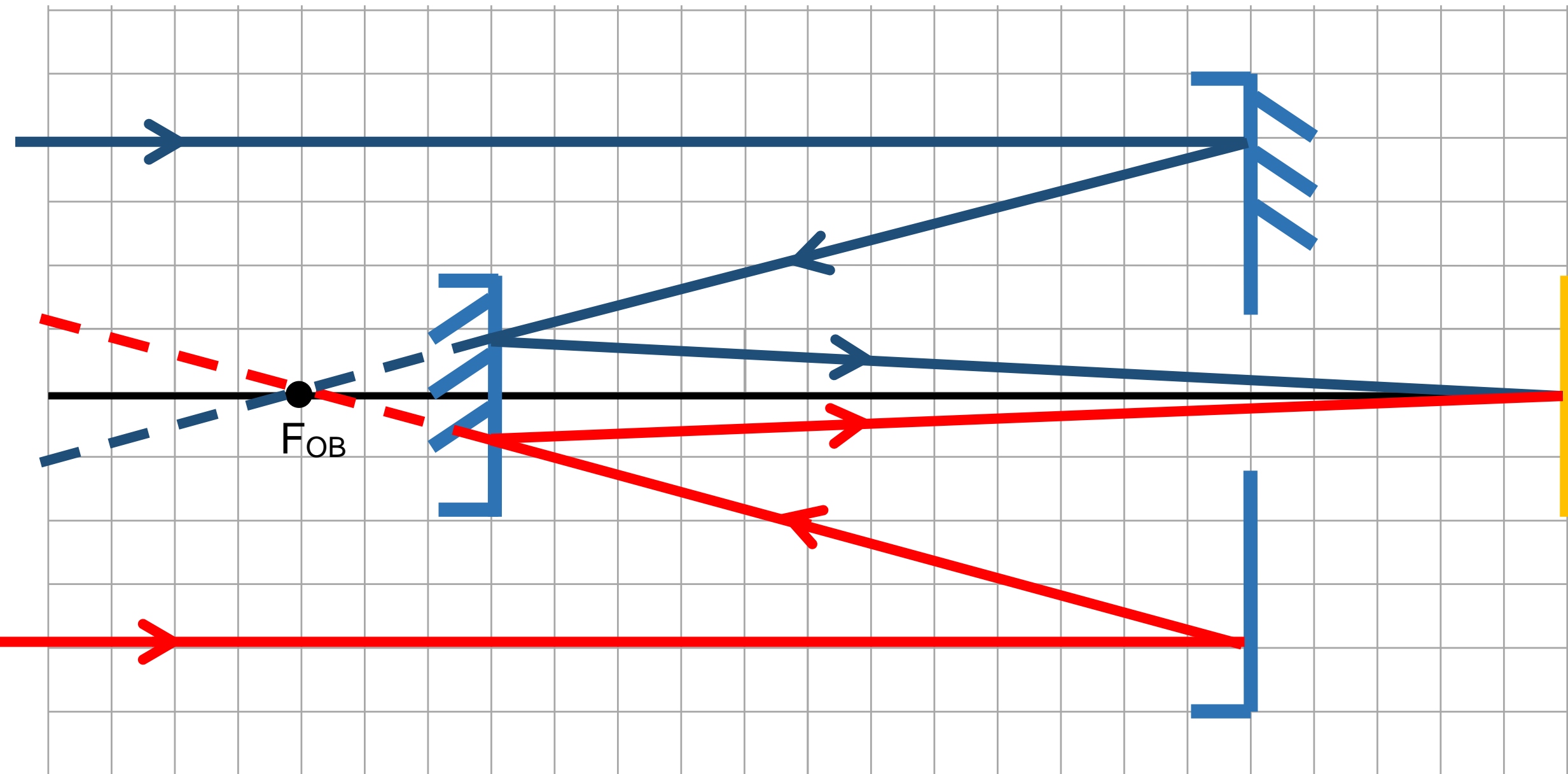
$$\frac{1}{p'} = \frac{0,64}{10,92} \Rightarrow$$

$$p' = \frac{10,92}{0,64} \Rightarrow$$

$$p' = 17 \text{ cm}$$







FIM