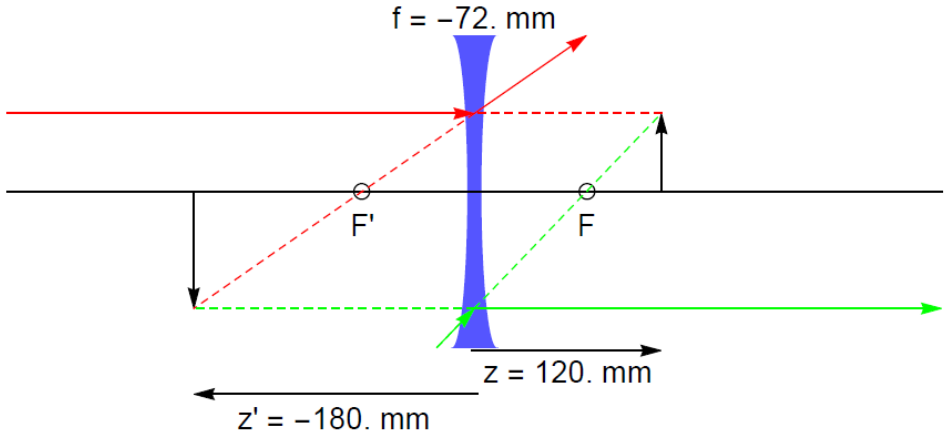
1. Given an object distance z = 120. mm and a magnification = −1.5, what is the focal length f and the image distance z'?

The focal length is given by $f = \frac{mz}{1-m} = -72.$ mm.

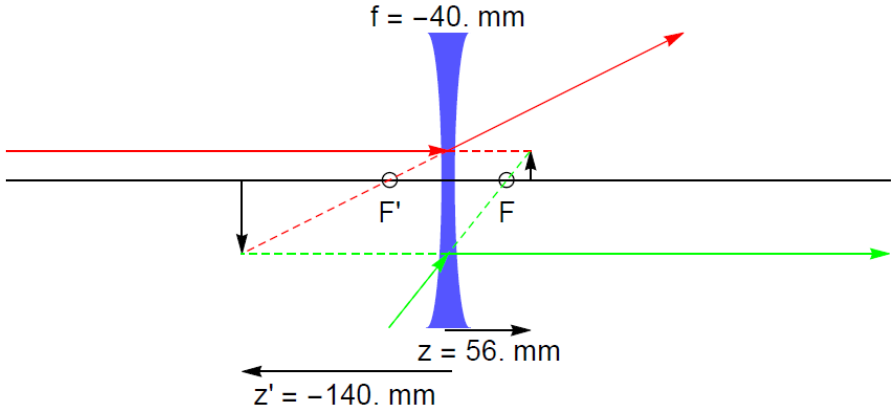
The image distance is given by $z' = mz = -180.$



2. Given an image distance z' = −140. mm and a focal length f = −40. mm, what is the object distance z and the magnification m?

The object distance is given by $z = \frac{1}{\frac{1}{z'}-\frac{1}{f}} = 56.$ mm.

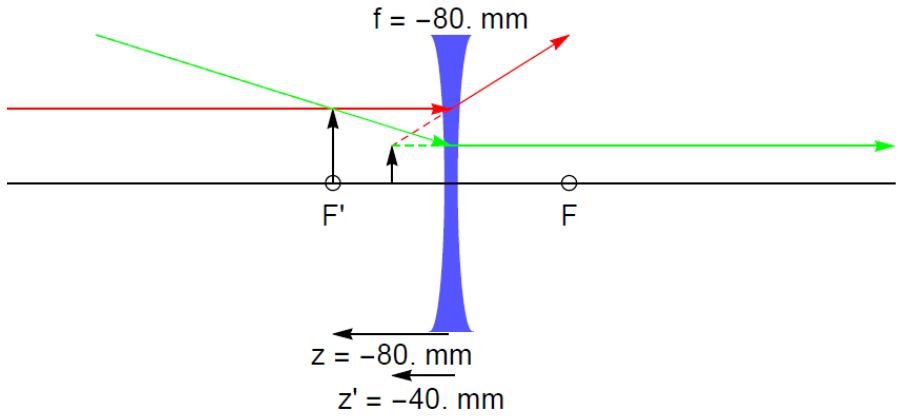
The magnification is given by $m = \frac{z'}{z} = -2.5$



3. Given a focal length f = −80. mm and a magnification m = 0.5, what is the object distance z and the image distance z'?

The object distance is given by $z = f\left(\frac{1}{m} - 1\right) = -80.\ \text{mm}$.

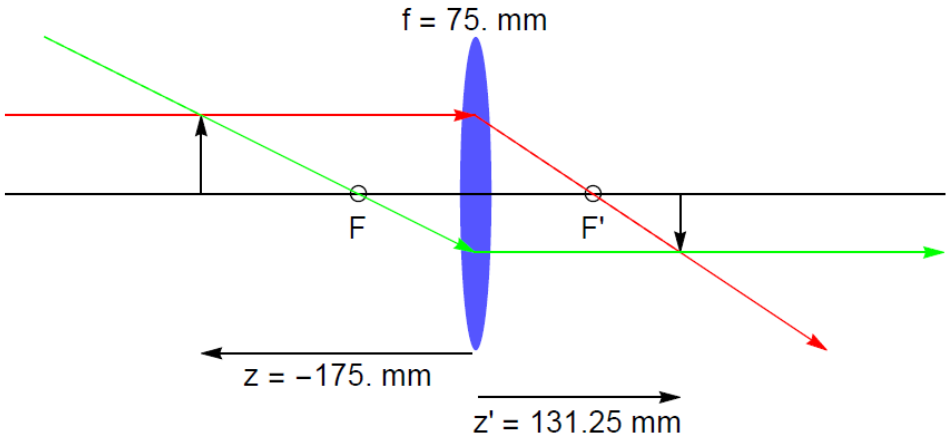
The image distance is given by $z' = mz = -40.\ \text{mm}$.



4. Given a focal length f = 75. mm and a magnification m = −0.75, what is the object distance z and the image distance z'?

The object distance is given by $z = f\left(\frac{1}{m} - 1\right) = -175.\ \text{mm}$.

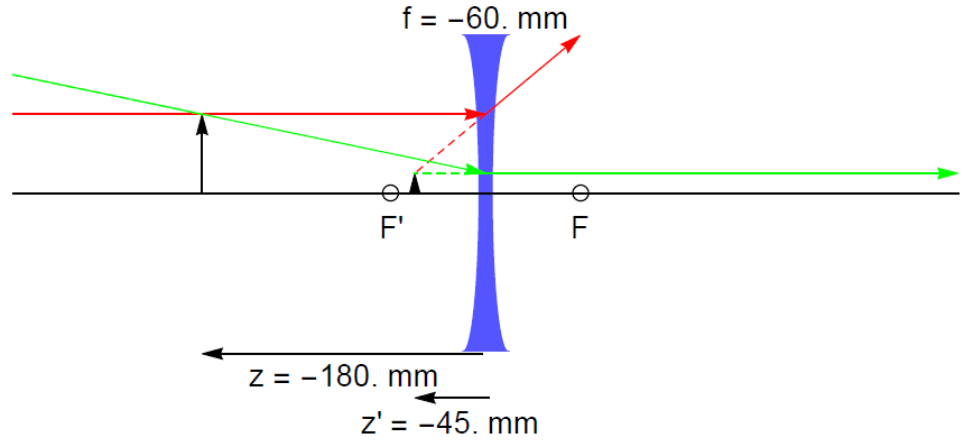
The image distance is given by $z' = mz = 131.25\ \text{mm}$.



5. Given a focal length f = −60. mm and a magnification m = 0.25, what is the object distance z and the image distance z'?

The object distance is given by $z = f\left(\frac{1}{m} - 1\right) = -180.$ mm.

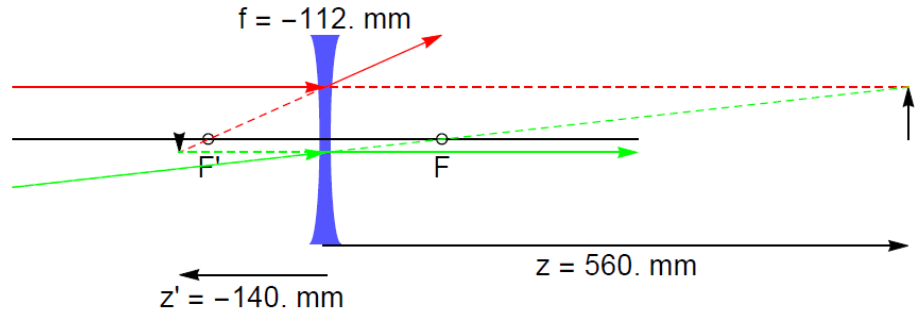
The image distance is given by $z' = mz = -45.$ mm.



6. Given an image distance z' = −140. mm and a magnification m = −0.25, what is the focal length f and the object distance z?

The focal length is given by $f = \frac{z'}{1-m} = -112.$ mm.

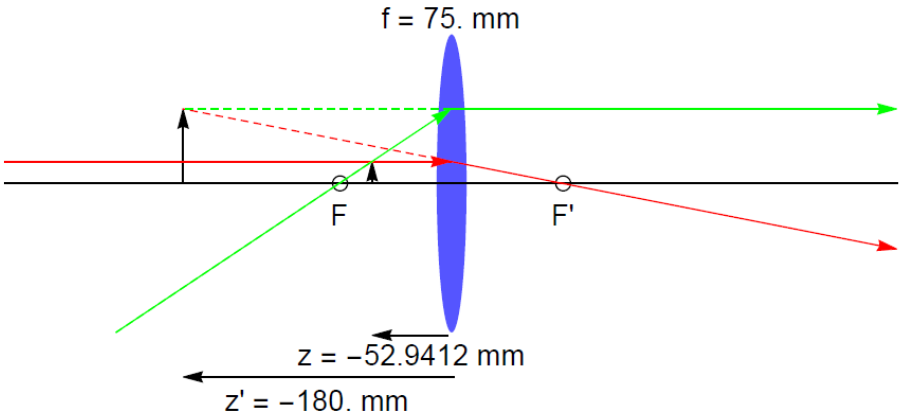
The object distance is given by $z = \frac{z'}{m} = 560.$ mm.



7. Given an image distance z' = −180. mm and a focal length f = 75. mm, what is the object distance z and the magnification m?

The object distance is given by $z = \frac{1}{\frac{1}{z'} - \frac{1}{f}} = -52.9412$ mm.

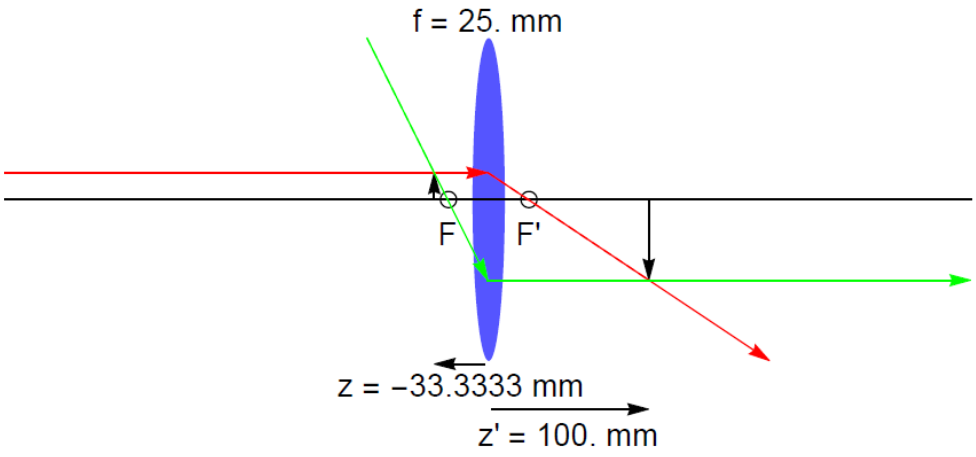
The magnification is given by $m = \frac{z'}{z} = 3.4$



8. Given a focal length f = 25. mm and a magnification m = −3., what is the object distance z and the image distance z'?

The object distance is given by $z = f\left(\frac{1}{m} - 1\right) = -33.3333$ mm.

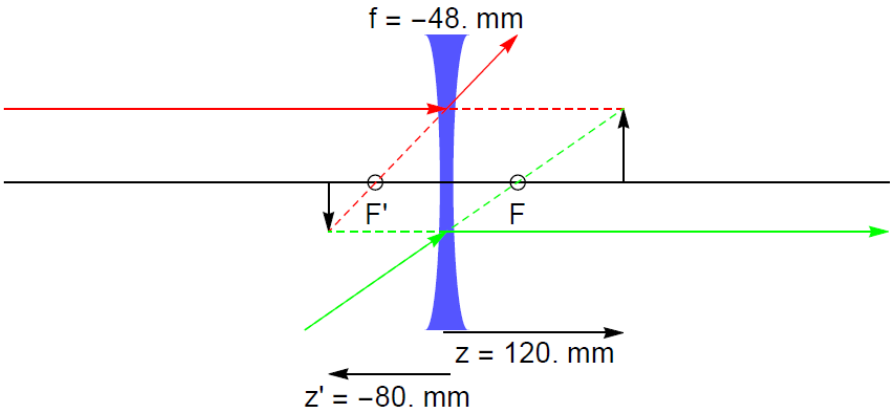
The image distance is given by z' = mz =100. mm.



9. Given an object distance z = 120. mm and an image distance z' = −80. mm, what is the focal length f and the magnification m?

The focal length is given by $f = \frac{1}{\frac{1}{z'} - \frac{1}{z}} = -48.\ \text{mm}$.

The magnification is given by $m = \frac{z'}{z} = -0.666667$



10. Given an object distance z = 120. mm and a focal length f = −80. mm, what is the image distance z'? and the magnification m?

The image distance is given by $z' = \frac{1}{\frac{1}{z} + \frac{1}{f}} = -240.\ \text{mm}$.

The magnification is given by $m = \frac{z'}{z} = -2.$