## ëAnswer on Question 48661, Physics, Optics

## **Question:**

An object is placed 8cm in front of a convex lens of focal lenght 6 cm. Find the image location by drawing a ray tracing diagram to scale. Verify your answer using the lens equation.

## Answer:

Let's draw a ray tracing diagram:



Let's the scale will be equals to focal length 6 cm, for convenience. So, we can see from the ray tracing diagram that rays from the object after its passes the lens, intersects and forms a real image. Also, we can see that the distance from the lens to the image  $d_i$  is equals four focal length, that is 24 cm. So let's verify the answer by using the lens equation:

$$\frac{1}{d_o} + \frac{1}{d_i} = \frac{1}{f},$$

where  $d_o$  is the distance from object to the lens,  $d_i$  is the distance from the lens to the image and f is the focal length. Substituting  $d_o$  and f from the condition of the problem we have:

$$\frac{1}{8cm} + \frac{1}{d_i} = \frac{1}{6cm},$$

From this expression we obtain  $d_i = 24cm$ . Distance from the lens to the image is positive, so image is real. Therefore, we find the image location correctly.

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