## ëAnswer on Question 48661, Physics, Optics

## Question:

An object is placed 8 cm 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:

$$
\frac{1}{8 c m}+\frac{1}{d_{i}}=\frac{1}{6 c m}
$$

From this expression we obtain $d_{i}=24 \mathrm{~cm}$. Distance from the lens to the image is positive, so image is real. Therefore, we find the image location correctly.
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