11. (25 points) An object is 20 cm to the left of a lens of focal length $+10$ cm. A second lens, of focal length $+12.5$ cm, is 30 cm to the right of the first lens. The distance between the original object and the final image is:

a. 28 cm  

b. 50 cm  

c. 100 cm  

d. zero  

e. infinity

\[
\frac{1}{o_1} + \frac{1}{i_1} = \frac{1}{f_1} \quad \frac{1}{i_1} = \frac{1}{100 \text{ cm}} - \frac{1}{20 \text{ cm}} = \frac{1}{20 \text{ cm}}
\]

\[
o_2 = 30 \text{ cm} - 20 \text{ cm} = +10 \text{ cm}
\]

\[
\frac{1}{i_2} = \frac{1}{f_2} - \frac{1}{o_2} = \frac{1}{+12.5 \text{ cm}} - \frac{1}{10 \text{ cm}} = 0.08 \text{ cm}^{-1} - 0.10 \text{ cm}^{-1} = -0.02 \text{ cm}^{-1}
\]

\[
i_2 = -50 \text{ cm}
\]

so image as where the original object was

so the answer is 0