Given the lens system shown with a real object 135 cm to the left of lens 1. You supply the signs for the focal lengths.

(a) Calculate the position, right or left of lens 1, and the distance for the image just of lens 1.
(b) Is the image in (a) real or virtual?
(c) Calculate the position, measured from lens 2, distance and right or left, of the final image in this system.
(d) Is the final image erect or inverted, with respect to the original object? Justify your answer.

\[
\frac{1}{f} + \frac{1}{q} = \frac{1}{f} \\
\frac{1}{q} = \frac{1}{f} - \frac{1}{p} \\
q = \frac{386}{cm} \\
q \text{ is positive so image is to the right of lens 1}
\]

b.) real, since it is behind the lens

c.) if lens 1's image is 386 cm to the right, it must be 286 cm to the right of lens 2.
\[
\frac{1}{286} + \frac{1}{q_2} = \frac{1}{-100} \\
f \text{ for lens 2 is negative since it is diverging}
\]
\[
\frac{1}{q_2} = \frac{1}{-100} - \frac{1}{286} \\
q_2 = -154 \text{ cm} \\
\text{So } \frac{154 \text{ cm}}{to \ the \ left \ of \ lens \ 2}
\]

d.) \[
M = \frac{-q_1 \cdot -q_2}{p_1 \cdot p_2} = \frac{-386}{155} \cdot -\frac{-154}{286} = \text{ magnification is positive so image is erect}