Uncorrected near point: 5 cm
Uncorrected far point: 15 cm
Eye-lens distance: 2 cm

Before beginning the calculations, the diagram can already be mostly drawn:

\[
\begin{align*}
\text{eye} & \quad \text{lens} & \quad \text{NP} & \quad \text{NP}' \\
\downarrow & \quad \downarrow & \quad \downarrow & \quad \downarrow \\
2 \text{ cm} & \quad 3 \text{ cm} & \quad 10 \text{ cm} & \quad ?
\end{align*}
\]

(diverging)

Add these after calculations

To correct nearsightedness, we create a virtual image of the desired far point (\(\infty\)) at the location of the patient's far point.

\[
\frac{1}{f} = \frac{1}{d_0} + \frac{1}{d_i} = \frac{1}{\infty} + \frac{1}{-13 \text{ cm}}
\]

Power = \[
\frac{1}{f} \text{ (in meters)} = \frac{1}{-0.13 \text{ m}} = -7.69 \text{ D}
\]

The patient's new near point is the object whose image is located at the patient's near point:

\[
\frac{1}{-0.13 \text{ m}} = \frac{1}{d_0} + \frac{1}{-0.03 \text{ m}} \quad d_0 = 3.9 \text{ cm} \quad \Rightarrow NP'
\]
First image is created by the converging lens:
\[
\frac{1}{10} = \frac{1}{15} + \frac{1}{d_i} \quad d_i = 30 \text{ cm}
\]

Second image is created by the diverging lens:
\[
\frac{1}{-15} = \frac{1}{5} + \frac{1}{d_i} \quad d_i = -3.75 \text{ cm}
\]

3] The problem specifies an approximate magnification, so we can use
\[
M = \frac{Nl}{f_0 f_e} = 300 = \frac{(25 \text{ cm})(25 \text{ cm})}{(5 \text{ cm}) f_e}
\]
\[
f_e = 0.417 \text{ cm}
\]

\[
\frac{1}{f_0} = \frac{1}{d_0} + \frac{1}{d - f_e} \quad \frac{1}{5} = \frac{1}{d_0} + \frac{1}{25 - 0.417}
\]
\[
d_0 = 6.28 \text{ cm}
\]