An extremely thin film reflects white light and so is a reflective maxima with $m=0$. Thus $2nt=m\lambda$ which is the case when there is a 180° phase change for reflection at both interfaces. So $n_{\text{air}} < n_{\text{oil}} < n_{\text{water}}$.

Find $m_3$ from $m_1\lambda_1 = m_2\lambda_2 = m_3\lambda_3$

\[
\frac{\lambda_1}{\lambda_2} = \frac{m_1}{m_2} = \frac{800}{480} = \frac{5}{3}, \quad \frac{\lambda_1}{\lambda_3} = \frac{m_2}{m_3} = \frac{800}{300} = \frac{8}{3}
\]

\[
\frac{\lambda_2}{\lambda_3} = \frac{m_3}{m_2} = \frac{480}{300} = \frac{8}{5}
\]

Thus $m_1 = 3$, $m_2 = 5$, $m_3 = 8$ works.

\[
N = \frac{m_1\lambda_1}{2t} = \boxed{1.143}
\]

Multiples of the $m$s do not give an $m$ between 1 and 1.33.