

77. (a) Following Sample Problem 36-1, we have

$$N_2 - N_1 = \frac{L}{\lambda} (n_2 - n_1) = 1.87$$

which represents a meaningful difference of 0.87 wavelength.

- (b) The result in part (a) is closer to 1 wavelength (constructive interference) than it is to $\frac{1}{2}$ wavelength (destructive interference) so the latter choice applies.
- (c) This would insert a $\pm\frac{1}{2}$ wavelength into the previous result – resulting in a meaningful difference (between the two rays) equal to $0.87 - 0.50 = 0.37$ wavelength, which is closer to the destructive interference condition. Thus, there is intermediate illumination but closer to darkness.