

9. (a) We choose a horizontal x axis with its origin at the left edge of the plastic. Between $x = 0$ and $x = L_2$ the phase difference is that given by Eq. 36-11 (with L in that equation replaced with L_2). Between $x = L_2$ and $x = L_1$ the phase difference is given by an expression similar to Eq. 36-11 but with L replaced with $L_1 - L_2$ and n_2 replaced with 1 (since the top ray in Fig. 36-28 is now traveling through air, which has index of refraction approximately equal to 1). Thus, combining these phase differences and letting all lengths be in μm (so $\lambda = 0.600$), we have

$$\frac{L_2}{\lambda} (n_2 - n_1) + \frac{L_1 - L_2}{\lambda} (1 - n_1) = \frac{3.50}{0.600} (1.60 - 1.40) + \frac{4.00 - 3.50}{0.600} (1 - 1.40) = 0.833 .$$

- (b) Since the answer in part (a) is closer to an integer than to a half-integer, then the interference is more nearly constructive than destructive.