

30. The fact that wave W_2 reflects two additional times has no substantive effect on the calculations, since two reflections amount to a $2(\lambda/2) = \lambda$ phase difference, which is effectively not a phase difference at all. The substantive difference between W_2 and W_1 is the extra distance $2L$ traveled by W_2 .
- (a) For wave W_2 to be a half-wavelength “behind” wave W_1 , we require $2L = \lambda/2$, or $L = \lambda/4 = 155 \text{ nm}$ using the wavelength value given in the problem.
- (b) Destructive interference will again appear if W_2 is $\frac{3}{2}\lambda$ “behind” the other wave. In this case, $2L' = 3\lambda/2$, and the difference is

$$L' - L = \frac{3\lambda}{4} - \frac{\lambda}{4} = \frac{\lambda}{2} = 310 \text{ nm} .$$