

67. We plug Eq. 39-17 into Eq. 39-16, and note that

$$\frac{d\psi}{dx} = \frac{d}{dx} (Ae^{ikx} + Be^{-ikx}) = ikAe^{ikx} - ikBe^{-ikx}.$$

Also,

$$\frac{d^2\psi}{dx^2} = \frac{d}{dx} (ikAe^{ikx} - ikBe^{-ikx}) = -k^2Ae^{ikx} - k^2Be^{ikx}.$$

Thus,

$$\frac{d^2\psi}{dx^2} + k^2\psi = -k^2Ae^{ikx} - k^2Be^{ikx} + k^2(Ae^{ikx} + Be^{-ikx}) = 0.$$