Exercise 9.3. Show that the right-hand side of Eq. 9.17 simplifies to the right-hand side of Eq. 9.16. *Hint:* First expand the second term by taking the derivative of the product. Then look for cancellations.

We are given

$$[\mathbf{V}(x), \mathbf{P}] = i\hbar \frac{dV(x)}{dx} \tag{9.16}$$

$$[\mathbf{V}(x), \mathbf{P}]\psi(x) = V(x)\left(-i\hbar \frac{d}{dx}\right)\psi(x) - \left(-i\hbar \frac{d}{dx}\right)V(x)\psi(x) \tag{9.17}$$

Expand the derivative of the product in (9.17) to obtain

$$[\mathbf{V}(x), \mathbf{P}]\psi(x) = \boxed{V(x)\left(-i\hbar \frac{d}{dx}\right)\psi(x)} + i\hbar \frac{dV(x)}{dx}\psi(x) + \boxed{i\hbar V(x)\frac{d\psi(x)}{dx}}$$

The boxed terms cancel leaving

$$[\mathbf{V}(x), \mathbf{P}]\psi(x) = i\hbar \frac{dV(x)}{dx}\psi(x)$$