6-3. For a free particle, equation (4.29) reduces to

$$\frac{\partial}{\partial t}K_0(b,a) + \frac{i}{\hbar}\left(-\frac{\hbar^2}{2m}\frac{\partial^2}{\partial x_b^2}K_0(b,a)\right) = \delta(t_b - t_a)\delta(x_b - x_a) \tag{6.20}$$

Show, from this result and equation (6.19), that the kernel K_V satisfies the differential equation

$$\begin{aligned}\frac{\partial}{\partial t}K_V(b,a) + \frac{i}{\hbar}\left(-\frac{\hbar^2}{2m}\frac{\partial^2}{\partial x_b^2}K_V(b,a) - V(b)K_V(b,a)\right)& \\ = \delta(t_b - t_a)\delta(x_b - x_a)&\end{aligned} \tag{6.21}$$

This is equation (6.19).

$$K_V(b,a) = K_0(b,a) - \frac{i}{\hbar}\int K_0(b,c)V(c)K_V(c,a)\,d\tau_c \tag{6.19}$$