Homework 25. *Chapter 15.*

5.1 $g * h(t) = \int_0^t g(t-x)h(x)dx = \int_t^0 g(x)h(t-x)(-dx) = \int_0^t h(t-x)g(x)dx = h * g(t)$.

5.2 $(e^{-at} - e^{-bt})/(b-a)$

5.3 $t \sinh(t)/2$

5.4 $e^{-at}/(b-a)^2 + e^{-bt}(t/(a-b) - 1/(a-b)^2)$

5.21 $f(x) = e^{-x^2/2\sigma^2}$, $g(\alpha) = (1/\sqrt{2\pi})\sigma e^{-\sigma^2\alpha^2/2}$, $\int_{-\infty}^{\infty} |f(x)|^2 dx = \sigma\sqrt{\pi}$, $\int_{-\infty}^{\infty} |g(\alpha)|^2 d\alpha = (1/2\pi)\sigma^2\sqrt{\pi}/\sigma = (1/2\pi)\int_{-\infty}^{\infty} |f(x)|^2 dx$.

6.1 $\cosh(t)\cos(t)$

6.3 $1 + \sin(t) - \cos(t)$

6.6 $t + e^{-t} - 1$

6.8 $1 - 4te^{-t}$.

7.7 $y = (t-t_0)e^{-(t-t_0)}$ for $t \geq t_0$, 0 for $t \leq t_0$.

7.8 $(e^{-(t-t_0)} - e^{-4(t-t_0)})/3$ for $t \geq t_0$, 0 for $t \leq t_0$.