Quiz 11 Solution (Version B)

1. Evaluate the integral

$$\int_0^{\pi/2} 2\cos x + 3\sin x \; dx$$

$$
\begin{aligned}
\int_0^{\pi/2} 2\cos x + 3\sin x \; dx &= (2\sin x - 3\cos x)]_0^{\pi/2} \\
&= 2 - (-3) = 5.
\end{aligned}
$$

2. Find the derivative of the function

$$f(x) = \int_0^{\sqrt{x}} e^{-t^2} \; dt.$$

Since $f(x) = F(\sqrt{x})$, where $F'(x) = e^{-x^2}$, the chain rule gives

$$f'(x) = \frac{1}{2} x^{-1/2} e^{-(\sqrt{x})^2} = \frac{e^{-x}}{2\sqrt{x}}.$$