MATH 113 Solutions for Quiz 5

10 December 2003 Wednesday

Question: Evaluate $\int e^x \sin x \, dx$.

Solution: Using integration by parts with $du = e^x$ and $dv = \sin x \, dx$ we get

$$\int e^x \sin x \, dx = -e^x \cos x + \int e^x \cos x \, dx.$$

Using integration by parts with the second integral with $du = e^x$ and $dv = \cos x \, dx$ we get

$$\int e^x \sin x \, dx = -e^x \cos x + \left(e^x \sin x - \int e^x \sin x \, dx \right).$$

Simplifying this we get

$$\int e^x \sin x \, dx = \frac{1}{2} (\sin x - \cos x) e^x + C.$$