Financial Mathematics
Problems in integration

0044-1. Compute $\int (x^4 + 2x^2)e^{-x^2/2}\,dx$.

0044-2. Compute $\int_4^\infty e^{-x^2/2}\,dx$.

0044-3. Compute $\int_9^\infty e^{8x}e^{-x^2/2}\,dx$.

0044-4. Compute $\int_4^\infty (3e^{8x} - 3e^8)e^{-x^2/2}\,dx$.

0044-5. Compute $\int_{-\infty}^\infty (3e^{8x} - 3e^8)_+ e^{-x^2/2}\,dx$.

0044-6. Compute $\int_{-\infty}^\infty (3e^{4x} - 7)_+ e^{-x^2/2}\,dx$.

0044-7. Compute

$$\int_{-\infty}^{\infty} x^6 e^{-x^2/2} dx \text{ and } \int_{-\infty}^{\infty} x^7 e^{-x^2/2} dx.$$

0044-8.a. Compute $\int_{-\infty}^{\infty} (3x^3 + 2x^2)e^{-x^2/2} dx.$

b. Compute $\int_{-9}^{2} x^4 e^{-x^2/2} dx.$

c. Compute $\int_{-\infty}^{\infty} (2x^7 - 4x^3)e^{-x^2/2} dx.$

d. Compute $\int_{-\infty}^{\infty} (7x^4 + 4x + 6)e^{-x^2/2} dx.$

0044-9.

a. Compute $\dfrac{1}{\sqrt{2\pi}} \displaystyle\int_{-\infty}^{\infty} e^{-3x+5} e^{-x^2/2}\, dx.$

b. Compute $\dfrac{1}{\sqrt{2\pi}} \displaystyle\int_{-2}^{7} e^{-3x+5} e^{-x^2/2}\, dx.$

c. Compute $\dfrac{1}{\sqrt{2\pi}} \displaystyle\int_{-\infty}^{\infty} (e^{-3x+5} - 1) e^{-x^2/2}\, dx.$

d. Compute $\dfrac{1}{\sqrt{2\pi}} \displaystyle\int_{-\infty}^{\infty} (e^{-3x+5} - 1)_{+} e^{-x^2/2}\, dx.$