

1. Evaluate $\int x^5 e^{4x} dx$

2. Evaluate $\int \cos 2x e^{3x} dx$

3. Evaluate $\int x^6 \cos 4x dx$

4. Evaluate $\int \cos(\ln x) dx$

5. Evaluate $\int_0^{\pi} e^{\cos t} \sin 2t dt$

1. $e^{4x} \left(\frac{1}{4} x^5 - \frac{5}{16} x^4 + \frac{5}{16} x^3 - \frac{15}{64} x^2 + \frac{15}{128} x - \frac{15}{512} \right)$

2. $\frac{4}{13} e^{3x} \left(\frac{1}{2} \sin 2x + \frac{3}{4} \cos 2x \right) + C$

3. $\left(\frac{1}{4} x^6 - \frac{15}{32} x^4 + \frac{45}{128} x^2 - \frac{45}{1,024} \right) \sin 4x + \left(\frac{3}{8} x^5 - \frac{15}{32} x^3 + \frac{45}{256} x \right) \cos 4x + C$

4. $\frac{1}{2} x (\cos(\ln x) + \sin(\ln x)) + C$

5. $\frac{4}{e}$