

$$7) \int (x^2 + 2x) \cos x \quad x^2 + 2x \int \cos x (2x+2)$$

$$u = x^2 + 2x \quad dv = \cos x$$

$$du = 2x + 2 \quad v = \sin x$$

$$2x + 2 (\sin x) - \int 2 \sin x$$

$$x^2 + 2x (\sin x) + (2x + 2) \cos x - 2 \sin x + C$$

$$15) \int (\ln x)^2 dx \quad \ln^2(x) x - \int x \frac{\ln(x^2)}{x} dx \rightarrow \ln^2(x) x - \int 2 \ln(x) dx$$

$$u = \ln^2 x \quad dv = 1$$

$$\ln^2(x) x - 2 \left(\ln(x) x - \int x \frac{1}{x} dx \right)$$

$$\ln^2(x) x - 2 (\ln(x) x - (x + C))$$

$$\ln^2(x) x - 2 (\ln(x) x - x) + C$$

$$19) \int z^3 e^z dz \quad z^3 e^z - \int e^z (3z^2) dz \rightarrow z^3 e^z - \int 3e^z z^2 dz$$

$$u = z^3 \quad dv = e^z$$

$$z^3 e^z - 3 \left(z^2 e^z - \int e^z (2z) dz \right) \rightarrow z^3 e^z - 3 \left(z^2 e^z - \int 2e^z z dz \right)$$

$$u = z \quad dv = e^z \quad z^3 e^z - 3 z^2 e^z + 6 z e^z - 6 e^z + C$$

$$37) \int x^{\sqrt{x}} dx$$

$$u = \sqrt{x} \quad dv = \frac{1}{2x^{1/2}}$$

$$dx = 2x^{1/2} du$$

$$\int 2u e^u du \rightarrow 2 \int u e^u du$$

$$w = u \quad dw = e^u$$

$$2(u e^u - (e^u + C))$$

$$2\sqrt{x} x^{\sqrt{x}} - 2x^{\sqrt{x}} + C$$