$$\int \underbrace{x^2}_{f}\underbrace{e^x}_{g'}\,dx = \underbrace{x^2}_{f}\cdot\underbrace{e^x}_{g} - \int \underbrace{2x}_{f'}\cdot\underbrace{e^x}_{g}\,dx$$

$$\int x^2 e^x\,dx = x^2e^x - \int 2xe^x\,dx$$

$$= x^2e^x - 2\int xe^x\,dx$$

$$= x^2e^x - 2\left(xe^x - e^x\right)$$

$$= x^2e^x - 2xe^x + 2e^x$$

$$= \left(x^2 - 2x + 1\right)e^x$$