First-Order Linear Differential Equations

Can be written in the standard form:

$$\frac{dy}{dx} + P(x)y = Q(x) \quad \text{or} \quad y' + Py = Q$$

Solution: An integrating factor is $u(x) = e^{\int P(x)dx} \quad \text{or} \quad u = e^{\int P(x)dx}$

$$ye^{\int P(x)dx} = \int Q(x)e^{\int P(x)dx} \, dx + C \quad \text{or} \quad y \cdot u = \int Q \cdot u \cdot dx + C$$