

ID: 110074574

$$(2) (1+x) \frac{dy}{dx} + (x+2) \cdot y = 2xe^{-x}$$

$$\frac{dy}{dx} + \frac{(x+2)}{(x+1)} y = \frac{2xe^{-x}}{(x+1)}$$

Comparing with $\frac{dy}{dx} + P(x)y = Q(x)$

$$P(x) = \frac{x+2}{x+1} \quad \text{and} \quad Q(x) = \left[\frac{2x}{x+1} \right] e^{-x}$$

Integrating factor = $e^{\int P(x) dx}$

$$\Rightarrow e^{\int \frac{(x+2)}{(x+1)} dx}$$

$$= e^{\int \frac{(x+1+1)}{(x+1)} dx}$$

$$= e^{\int \left[\frac{x+1}{x+1} + \frac{1}{x+1} \right] dx}$$

$$= e^{\int \left(1 + \frac{1}{x+1} \right) dx}$$

$$= e^{[x + \ln(x+1)]}$$

$$= (x+1)e^x$$

$$\therefore y = \frac{1}{g(x)} \int Q(x) g(x) dx$$

$$y = \frac{1}{e^x \cdot (x+1)} \int \frac{2x \cdot e^{-x}}{(x+1)} \cdot e^x (x+1) dx$$

~~$$y = \frac{1}{e^x \cdot (x+1)} \int 2x dx$$~~

$$y = \frac{1}{e^x \cdot (x+1)} \cdot xx^2 + C$$

$$y = \frac{x^2}{e^x (x+1)} + C$$