

Pg 429

$$5) (2+x) \frac{dy}{dx} = 3y$$

$$\frac{1}{3} \cdot \frac{1}{y} dy = \frac{1}{2+x} dx$$

$$\frac{1}{3} \int \frac{1}{y} dy = \int \frac{1}{2+x} dx$$

$$\frac{1}{3} \ln|y| = \ln|2+x| + C$$

$$\ln|y| = 3 \ln|2+x| + 3C$$

$$e^{\ln|y|} = e^{\ln(2+x)^3 + 3C}$$

$$y = e^{\ln(2+x)^3 + 3C}$$

$$y = e^{\ln(2+x)^3} \cdot e^{3C}$$

$$y = C e^{\ln(2+x)^3}$$

$$y = C (2+x)^3$$

$$11) y \ln x - x \frac{dy}{dx} = 0$$

$$\int \frac{1}{x} \ln x dx = \int \frac{1}{y} dy$$

$$u = \ln x \\ du = \frac{1}{x} dx$$

$$\int u du = \ln|y| + C$$

$$\frac{(\ln x)^2}{2} = \ln|y| + C$$

$$\frac{(\ln x)^2}{2} + C = \ln|y|$$

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

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

$$15) y(x+1) + \frac{dy}{dx} = 0$$

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

$$\int (x+1) dx = \int -\frac{1}{y} dy$$

$$\frac{x^2}{2} + x = -\ln|y| + C$$

$$\frac{(-2)^2}{2} + -2 = -\ln|1| + C$$

$$2 - 2 = -\ln|1| + C$$

$$0 = 0 + C$$

$$C = 0$$

$$\frac{x^2}{2} + x = -\ln|y| + C^0$$

$$\frac{x^2}{2} + x + C^0 = -\ln|y|$$

$$-\frac{x^2}{2} - x - C^0 = \ln|y|$$

$$y = e^{-x^2/2 - x}$$

$$47) \frac{dy}{dx} = 4 - y$$

$$\int \frac{1}{4-y} dy = \int dx$$

$$u = 4 - y$$

$$du = -dy$$

$$-du = dx$$

$$-\int \frac{1}{u} du = \int dx$$

$$-\ln|4-y| = x + C$$

$$\ln|4-y| = -x - C$$

$$e^{-x-C} = 4 - y - |y|$$

$$Ce^{-x} = 4 - y$$

$$Ce^{-x} - 4 = -y$$

$$y = 4 - Ce^{-x}$$