

$$\frac{dy}{dx} + y \tanh n = 2 \sinh n$$

$$\frac{dy}{dx} + yP = Q$$

$$IF = e^{\int P dx}$$

$$\int P dx = \int \tanh n dx$$

$$= \ln(\cosh n)$$

$$IF = \cosh n$$

$$y = Q \cdot IF dx$$

$$y = 2 \sinh n \cdot \cosh n dx$$

Knowing

$$UV - \int V du$$

$$\frac{du}{dx} = U = 2 \sinh n$$

$$\frac{du}{dx} = 2 \cosh n$$

$$du = 2 \cosh n$$

Question (3)

$$\frac{dy}{dx} = x + 2 - \frac{3}{x} + \text{constant}$$

$$\int dy = (x + 2 - \frac{3}{x}) dx$$

$$y = \frac{x^2}{2} + 2x - 3\ln x + C$$

Question (4)

$$\frac{dy}{dx} + \frac{y}{x} = y^3$$

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

$$z = y^{-2}$$

$$\frac{dz}{dx} = -2y^{-3} \frac{dy}{dx}$$

$$-2y^{-3} \frac{dy}{dx} - 2y^{-2} x = -2$$

$$\frac{dz}{dx} - 2xz = -2$$

$$I.F = e^{\int p dx}$$

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

$$y = -2 \cdot e^{-x^2} dx$$

$$\frac{dy}{dx} = \frac{2y^3V}{(x^3 + y^2)} = \frac{2}{(1-V)} + \frac{8}{(1+V)} - \frac{A}{V}$$

Solution

where $\frac{dy}{dx} = V + \frac{x \frac{dv}{dx}}{1-V}$ and $V = u$

$$1 + V = 1 + u + (0)g + (0)A$$

$$V + \frac{x \frac{dv}{dx}}{1-V} = \frac{2(V^3 x)^3}{(x^3 + V^2 x^3)g + (0)A}$$

$$1 = g$$

$$V + \frac{x \frac{dv}{dx}}{1-V} = \frac{2\sqrt{3}(x^3)}{2\sqrt{3}(1+V^2)V A}$$

$$1 + u = u + \frac{x \frac{dv}{dx}}{1-V} - V$$

$$\frac{x \frac{dv}{dx}}{1-V} = \frac{2\sqrt{3}}{1+V^2} - V$$

$$\frac{x \frac{dv}{dx}}{1-V} = \frac{2\sqrt{3}-V(1+V^2)}{V(1+V^2)}$$

$$= 2\sqrt{3} - \sqrt{3} - V$$

$$and \quad = (1-V)u + (1+V)u + \frac{V}{1+V^2} - \frac{\sqrt{3}}{1+V^2} - V$$

$$u + v = \frac{(1-V)(1+V)}{V} u + \frac{x \frac{dv}{dx}}{1-V} = \frac{V(V^2-1)}{V^2+1}$$

$$u + v = \frac{(V^2-1)}{V^2+1} \frac{dV}{dx} = \frac{1}{n} \frac{dn}{V(V^2-1)}$$

$$\frac{A}{\sqrt{v}} + \frac{B}{(v+1)} + \frac{C}{(v-1)} = \frac{\sqrt{v^2+1}}{(sv)(\sqrt{v^2-1})} = \frac{\text{[do]}}{\text{into}}$$

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$$A(v^2-1) + B(v^2-v) + C(v^2+v) = v^2+1$$

when $v=1$ [do]

$$A(0) + B(0) + 2C = 1 + 1$$

$$A(v) + Cv = v$$

$$A(0) + B(2) + C(0) = 2$$

$$B = 1$$

$$(v^2)^{1/2} = \text{[do]} + v$$

$$A(v^2) - A + BV^2 - BV + Cv^2 + Cv = v^2 + 1$$

$$v - A = 1$$

$$A = v - 1$$

$$\left(\frac{-1}{v} + \frac{1}{v+1} + \frac{1}{v-1} \right) dv = \frac{1}{x} dx$$

$$\ln \left(\frac{(v+1)(v-1)}{v} \right) = \ln n + \ln A$$

$$\ln \left(\frac{v^2-1}{v(v+1)} \right) = \ln A_n$$

where $y = v_n$

$$v = \frac{y}{y_n}$$

$$\ln \left(\frac{\frac{y^2 - 1}{n^2}}{y_n} \right) = \ln A_n$$

$$\ln \left(\frac{y^2 - n^2}{n^2} \times \frac{n}{y} \right) = \ln A_n$$

$$\ln \left(\frac{y^2 - n^2}{n^2} \right) = \ln A_n$$