

$$(24) \quad B \quad (x^2 + u)y' + 3xy = x, \quad y(0) = 1$$

$$x(v) = (x^2 + u)$$

$$\frac{(x^2 + u)y'}{x^2 + u} + \frac{3xy}{x^2 + u} = x$$

$v = x^2 + u$
 $dv = 2x dx$
 $\frac{dv}{2} = x dx$

$$y' + \frac{3xy}{x^2 + u} = x$$

$$\int \frac{3x}{x^2 + u} dx \quad \rightarrow \quad 3 \int \frac{x}{x^2 + u}$$

$$3 \int \frac{\frac{dv}{2}}{v} \rightarrow \frac{3}{2} \int \frac{dv}{v} \rightarrow \frac{3}{2} \ln v$$

$$\frac{3}{2} \ln |x^2 + u|$$

$$(x^2 + u)^{3/2}$$

$$(x^2 + u)^{3/2} y' +$$

$$\frac{3x(x^2 + u)^{3/2} y}{x^2 + u} = \frac{x}{(x^2 + u)^{1/2}}$$

$$(x^2 + u)^{3/2} y' + 3x(x^2 + u)^{1/2} y = \frac{x(x^2 + u)^{3/2}}{x^2 + u}$$

$$(x^2 + u)^{3/2} y' + 3x(x^2 + u)^{1/2} y = x(x^2 + u)^{1/2}$$

$$\frac{dy}{dx} [(x^2 + u)^{3/2} \cdot y] = x(x^2 + u)^{1/2}$$

$$(x^2 + u)^{3/2} y = \int x(x^2 + u)^{1/2} dx$$

$$(x^2 + u)^{3/2} y = \int \frac{x(u)^{1/2}}{2x} du$$

$$(x^2 + u)^{3/2} y = \frac{1}{2} \frac{u^{3/2} x}{3} + C$$

$$(x^2 + u)^{3/2} y = \frac{1}{3} (x^2 + u)^{3/2} + C$$

$$y = \frac{1}{3} + \frac{C}{(x^2 + u)^{3/2}}$$

$$u = x^2 + u$$

$$du = 2x dx$$

$$\frac{du}{2x} = dx$$

$$t = \frac{1}{3} + \frac{c}{(u)^{3/2}}$$

$$\frac{2}{3} = c$$

$$\frac{2}{3} = \frac{c}{8}$$

$$\frac{16}{3} = c$$

$$y = \frac{1}{3} + \frac{16}{3(x^2+u)^{3/2}}$$