$$\frac{dx}{dt} = g\left(\frac{x}{t}\right)$$

$$z = \frac{x}{t} \Rightarrow x = zt \Rightarrow {}^{z}g = \underline{x} = \underline{z}\,t + z \Rightarrow \frac{dz}{{}^{z}g - z} = \frac{dt}{t} \text{ sep}$$

$$\Rightarrow \int \frac{dz}{{}^{z}g - z} = \int \frac{dt}{t} = C + \log t$$

$$x\,\underline{y} - 2y = 3x \Rightarrow \underline{y} = 3 + 2\frac{y}{x} \Rightarrow \underline{z} = \frac{3+z}{x} \Rightarrow \overbrace{z+3} = A\,e^{x} \Rightarrow z = A\,e^{x} - 3 \Rightarrow y = Ax\,e^{x} - 3x$$

$$2xy\,\underline{y} - y^2 + x^2 = 0 \Rightarrow \underline{y} = \frac{1}{2}\left(\frac{y}{x} - \frac{x}{y}\right) \Rightarrow \underline{z} = -\frac{1}{2}\frac{z + z^{-1}}{x} \Rightarrow \cancel{7x} + C = -2\int_{dz} \frac{z}{z^2+1} = -^{z^2+1}\cancel{}$$

$$\Rightarrow z^2 + 1 = \frac{1}{Ax} \Rightarrow y = \sqrt{\frac{x}{A} - x^2} \underset{y\,(5)\,=\,2}{\Rightarrow} A = \frac{5}{29}$$

$$x^2\,dy - \underbrace{y^2 + 2xy}\,dx = 0 \Rightarrow \underline{y} = \left(\frac{y}{x}\right)^2 + 2\frac{y}{x} \Rightarrow \underline{z} = \frac{z^2+z}{x} \Rightarrow \cancel{7x} + C = \int_{dz} \frac{1}{z\,(z+1)} = \int_{dz} \frac{1}{z} - \int_{dz} \frac{1}{z+1} = \overbrace{\frac{z}{z+1}}\cancel{}$$

$$\Rightarrow \frac{z}{z+1} = Ax \Rightarrow z = \frac{Ax^2}{1 - Ax} \Rightarrow y = \frac{Ax^3}{1 - Ax}$$

$$xdy - ydx = (xy)^{1/2}\,dx \Rightarrow \underline{y} = \left(\frac{y}{x}\right)^{1/2} + \frac{y}{x} \Rightarrow y = x\left(\frac{\cancel{7x} + C}{2}\right)^2 \Rightarrow y = x + \frac{x}{C - \cancel{7x}}$$

$$x^2\,\underline{y} = x^2 - xy + y^2$$

$$\underline{y} = \frac{x+3y}{x-y} = \frac{1+3y/x}{1-y/x} \Rightarrow \cancel{7x} + C = \int_{dz} \frac{1-z}{(z+1)^2} = -\int_{dz} \frac{z+1}{(z+1)^2} + 2\int_{dz} \frac{1}{(z+1)^2} = -^{z+1}\cancel{} + \frac{2}{z+1}$$

$$x^2\,dy + \underbrace{y^2 - xy}\,dy = 0$$