$$dy/dx = x^{*}y^{2} - 2yx - 1/x^{3} \;,\; x=z,\; y=z^{\lambda} \;\to\; \lambda z^{\lambda-1} = z^{2\lambda+1} - 2z^{\lambda-1} - 1/z^{3}$$

$$\hookrightarrow\; 2\lambda+1 = \lambda-1 = \lambda-1 = -3 \;\Leftarrow\; \lambda = -2$$
$$z - z = \text{?}$$

$$\hookrightarrow\; y = 1/z^{2},\; dy = -2\,dz/z^{3} \;\to\; -2\,dz/z^{3}\,dx = z^{2}/xz^{2} + x/z^{4} - 1/x^{3}$$

$$M(kz,kx) = k^{n}M(z,x) \;\to\; -2/k^{3}z^{3} = -z/k^{3}xz^{2} + x/k^{3}z^{4} - 1/k^{3}x^{3}$$

$$\hookrightarrow\; z = vx,\; dz = v\,dx + x\,dv \;\Rightarrow\; -2\,dx/v^{2}x^{3} = \;\Rightarrow\; v\,dx = 2p$$

$$\hookrightarrow\; -2\,dv/v^{3}x^{2} = dx/v^{4}x^{3} - dx/x^{3} \;\to\; -2vx\,dv = (1-v^{4})\,dx$$

$$\hookrightarrow\; v\,dv/(1-v^{4}) = -dx/2x \;\to\; \int v\,dv/(1+v^{4}) = -\int dx/2x$$

$$\hookrightarrow\; -\ln(v^{2}-1/v^{2}+1)/4 = C - \ln x/2 \;\to\; \sqrt[4]{v^{2}+1}/\sqrt[4]{v^{2}-1} = k/\sqrt{x}$$

$$\hookrightarrow\; v = z/x \;\to\; z = 1/\sqrt{y} \;\to\; y = C/x^{2}(x^{2}+C) - 1/z^{2} + C$$

$$y(\sqrt{2}) = C/2(2+C) - 1/z + C = 0 \;\Rightarrow\; z$$

$$\hookrightarrow\; y = 2/x^{2}(x^{2}+2) - 1/x^{2}+2$$