③ $y = y_p + \frac{1}{v} \longrightarrow y' = -\frac{2}{x^3} - \frac{1}{v^2} \cdot v'$

$= \frac{1}{x^2} + \frac{1}{v}$

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

$$-\frac{2}{x^3} - \frac{v'}{v^2} = x\left(\frac{1}{x^2} + \frac{1}{v}\right)^2 - \frac{2}{x}\left(\frac{1}{x^2} + \frac{1}{v}\right) - \frac{1}{x^3}$$

$$-\frac{2v^2 - v'x^3}{x^3v^2} = x\left[\frac{1}{x^4} + \frac{2}{x^2v} + \frac{1}{v^2}\right] - \frac{2}{x^3} - \frac{2}{xv} - \frac{1}{x^3}$$

$$-\frac{2v^2 - x^3v'}{x^3v^2} = \frac{1}{x^3} + \cancel{\frac{2}{xv}} + \frac{x}{v^2} - \frac{3}{x^3} - \cancel{\frac{2}{xv}}$$

$$-\frac{2v^2 - x^3v'}{x^3v^2} = -\frac{2}{x^3} + \frac{x}{v^2}$$

$$-\cancel{2v^2} - x^3v' = -\cancel{2v^2} + x^4$$

$$0 = x^4 + x^3v' \quad (x \neq 0)$$

$$-x = v'$$

$$-x = \frac{dv}{dx}$$

$$\int -x\,dx = v$$

$$-\frac{x^2}{2} + c = v \longrightarrow y = \frac{1}{x^2} + \frac{1}{c - x^2/2}$$

$\downarrow$

$$y(\sqrt{2}) = \frac{1}{-\sqrt{2}^2/2 + c} + \frac{1}{(\sqrt{2})^2}$$

$$= \frac{1}{-1+c} + \frac{1}{2} = 0$$

$$\frac{1}{2} = \frac{1}{1-c} \rightarrow c = -1$$

Entonces $y = \frac{1}{x^2} - \frac{1}{1 + x^2/2}$ //