Ejercicios 1.2

5) $y = \frac{1}{x^2+C} \rightarrow y' + 2xy^2 = 0 \quad y(0) = 1$

$1 = \frac{1}{0+C} \rightarrow C = 1 \rightarrow$ Solución Particular $y = \frac{1}{x^2+1}$

10) $x = C_1 \cos t + C_2 \sin t \rightarrow x'' + x = 0, \; x(\frac{\pi}{4}) = \sqrt{2}$ y $x'(\frac{\pi}{4}) = 2\sqrt{2}$

$x' = -C_1 \sin t + C_2 \cos t \rightarrow \sqrt{2} = C_1 \cos(\frac{\pi}{4}) + C_2 \sin(\frac{\pi}{4}) = \frac{C_1 + C_2}{\sqrt{2}}$

$2\sqrt{2} = -C_1 \sin(\frac{\pi}{4}) + C_2 \cos(\frac{\pi}{4}) = \frac{-C_1 + C_2}{\sqrt{2}} \rightarrow \begin{matrix} C_1 + C_2 = 2 \\ -C_1 + C_2 = 4 \end{matrix}$

$2C_2 = 6 \rightarrow C_2 = 3 \rightarrow C_1 + 3 = 2 \rightarrow C_1 = -1$

$x = -\cos t + 3 \sin t$

15) $y' = 3y^{2/3}, \; y(0) = 0 \rightarrow y(x) = 0$

$\int y^{-2/3} dy = \int 3 dx \rightarrow 3y^{1/3} = 3x + C \rightarrow y = (x + C)^3$

$y(0) = 0 \rightarrow C = 0$; Otra solución $y(x) = x^3$

$y(x) = 0$ y $y(x) = x^3$

2o) $\frac{dy}{dx} - y = x \rightarrow \frac{dy}{dx} = x + y \leftarrow f(x,y) = y + x$

$\frac{\partial f}{\partial y} = 1$ son continuas en todo el plano xy

2s) $y' = \sqrt{y^2 - 9}$, $(1, 4)$

$y^2 - 9 \geq 0 \rightarrow |y| \geq 3$ en $(1,4)$ $y = 4 > 3$ así que f es continua

$\frac{\partial f}{\partial y} = \frac{y}{\sqrt{y^2 - 9}} \rightarrow y = 4$ es continua Si garantiza

3o)

a) $y' = \sec^2(x+C) = 1 + \tan^2(x+C) = 1 + y^2$ por lo tanto

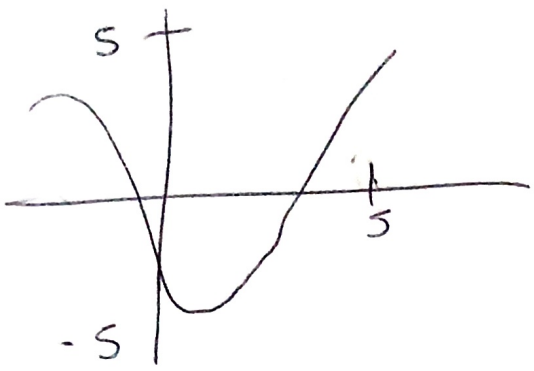
$y = \tan(x+C)$ satisface a $y' = 1 + y^2$

b) $\tan(0 + C) = 0 \rightarrow C = \tan^{-1}(0) = 0$

La solución explícita es $y = \tan x$

c) $I = (-\frac{\pi}{2}, \frac{\pi}{2})$

35)



Coincide con

d) $y(0) = 1,\ y'(0) = 2$ b

La curva pasa por $(0,-1)$ con $m+ (y'=2)$

e) $y(0) = -1,\ y'(0) = 0$ d

" con $m = 0 (y'=0)$

40) $y = f(x) \rightarrow y'' = 12x - 2$, $x = 1 \rightarrow y = -x + 5$

$\int y'' dy \rightarrow y' = 6x^2 - 2x + C_1 \rightarrow -1 = 6(1) - 2(1) + C \rightarrow C = -5$

$y' = 6x^2 - 2x - 5$

$\int y' dy \rightarrow y = 2x^3 - x^2 - 5x + C_2 \rightarrow 4 = 2(1) - 1 - 5 + C_2 \rightarrow C_2 = 8$

$y = 2x^2 - x^2 - 5x + 8$ X

95) $\frac{dP}{dt} = 0.15P(t) + 20$, $P(0) = 100$, calcule la razón de crecimiento en $t=0$ y cuando $P=500$

$t=0 \rightarrow \frac{dP}{dt} = 0.15(100) + 20 = 15 + 20 = 35$ personas/año

$P=500 \quad \frac{dP}{dt} = 0.15(500) + 20 = 75 + 20 = 95$ personas/año

$t=0 \rightarrow$ 35 Personas/año

$P=500 \rightarrow$ 95 Personas/año