

Math 217-001 201810  
Practice Assignment # 3

1. Solve, giving the largest possible interval in which a solution is defined.

(a)  $y' = \frac{\sin \sqrt{x}}{\sqrt{y}}, y(\pi^2) = 1.$

(b)  $t(t+1) \frac{dv}{dt} + tv = 1, v(e) = 1.$

(c)  $y' + (\tan x)y = \cos^2 x, y(0) = -1.$

2. Find a continuous solution

$$\begin{cases} (1+x^2)y' + 2xy = f(x), \\ y(0) = 0 \end{cases}$$

where

$$f(x) = \begin{cases} x, & x \in [0, 1] \\ -x, & x \in (1, \infty) \end{cases}$$

3. Solve

(a)  $\begin{cases} y' = -\frac{20x^3y - 6x}{5x^4 + 4y}, \\ y(0) = 1 \end{cases}$

(b)  $y(x+y+1) + (x+2y)y' = 0, y(0) = 0.$

(c)  $y^2(x^2+1) + (x^3y+3xy)y' = 0.$