MAP 2302

EXAM 1 (25 POINTS)

NO CALCULATORS

Please show all your working. Please write your answers in full detail. There is not enough space on the question sheet for your answers. Keep the question sheet for later discussions.

1. (6 points) Solve the initial value problem

$$\frac{dy}{dx} = 2x\cos^2 y, \quad y(0) = \pi/4.$$

2. (7 points) Solve the initial value problem

$$\cos x\frac{dy}{dx} + y\sin x = 2x\cos^2 x, \quad y(\pi/4) = \frac{-15\sqrt{2}\pi^2}{32}.$$

3. (6 points)

Use Euler's method with 3 steps to approximate the value of the solution of the initial value problem $y' = x/y$, $y(0) = -1$, at the point $x = 0.3$.

4. (6 points) Find the general solution of the equation

$$\frac{dy}{dx} - 3\frac{y}{x} + 2 = 3x.$$