

MAT 2384 3X Assignment # 1
due Wednesday, May 17th

Solve the following initial value problems:

1. $y' = \frac{1 + y^2}{x^2 + 4}, \quad y(0) = 1$

2. $(x + 2y) dx - x dy = 0, \quad y(1) = 3$

3. $(\cos y + y^2 \cos x + 1) dx + (2y \sin x - x \sin y) dy = 0, \quad y(\pi) = \pi$

4. $(x + xy^2) dx + y dy = 0, \quad y(0) = 2$

5. $(y \cos(x + y)) dx + (3 \sin(x + y) + y \cos(x + y)) dy = 0, \quad y(0) = \pi/2$

6. $(x + 1) dx + (y + 3) dy = 0, \quad y(1) = 4$

7. $(\cos x - 2x \sin x - 2y \sin x) dx + \cos x dy = 0, \quad y(0) = 5$

8. Use fixed point iteration to find the root of $f(x) = x^3 + 7x - 6$ in $[0, 1]$ to 5 decimal places. Start with $x_0 = 0.75$.

9. Use Newton's Method to find the positive solution of $x = \cos x$ to 6 decimal places. Start with $x_0 = \pi/4$.