MATH 253
Handout # 5

A

1. Solve $y' + y\sin x = \cos x \sin x$, $y(\frac{\pi}{2}) = 3$.

2. Find the Taylor polynomial of degree 3 of $f(x) = \ln(3x-2)$ around $x_0 = 1$, then use it to approximate $\ln 2$.

3. Find the general solution, in the explicitt form, of
$(x+1)y' + (1+y)x^2 = 0$.

4. Find the solution,in the simpliest form, of the initial value problem
$y' = \dfrac{y}{x-y} \quad y(-2) = 1$.

B

1.Find theTaylor polynomial degree 2 of $f(x) = e^{1-4x^2}$around $x_0 = \frac{1}{2}$, then use it to approximate $e^{\frac{3}{4}}$.

2.Find the general solution of $y' - 2xy = x$.

3. Find the general solution, in the explicit form, of
$(x^2+1)y' + 2(1+y)x^2 = 0$.

4. Find the general solution,in the simpliest form, of
$y' = \dfrac{y}{x+y}$.

C

1. Find the Taylor polynomial of degree 3 of $f(x) = \arctan(3x)$ around $x_0 = 0$, then use it to approximate $\pi = 4\arctan 1$.

2. Find the general solution of $xy' = x^2 + y$.

3. Find the general solution, in the simpliest form,
$(x+y)y' + y - 3x = 0$.

4. Find the explicit solution of the initial value problem
$x\sin y + y'(x^2+1)\cos y = 0, y(0) = -\frac{\pi}{2}$.

D

1.Solve $y' - y = e^x \ln x$, $y(1) = -1$.

2. Find the Taylor polynomial of degree 3 of $f(x) = e^{1-x^2}$around $x_0 = -1$, then use it to approximate $e^{\frac{3}{4}}$.

3.Solve the initial value problem $yy' = 2y - x, y(1) = 0$.
Can you find a solution satisfying $y(0) = 0$?

4. Find the general solution of $x\ln x \cdot y' = y$.