**MTH401 Assignment #1 spring 2023**

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**Question 1:**

Consider the following IVP

𝑑𝑦/𝑑𝑥 + 𝑦 = 2𝑥𝑒− , 𝑦(−1) = 𝑒 + 3,

where 𝑦 = (𝑥 2 + 𝑐)𝑒 −𝑥 is the General solution of the given differential equation. Find its particular solution.

**Solution:**

First we need to substitute the initial condition into the general solution and then solve for constant.

General solution of the given differential equation is:



Now, put the initial condition y= (-1) e+3 into the general solution



So, the particular solution is:



**Question 2:**

Consider the following differential equation

𝑑2𝑦/𝑑𝑥2 − 2 𝑑𝑦/𝑑𝑥 + 𝑦 = 0,

Then,

1. Find Order and Degree of the given differential equation.
2. ii. Verify that 𝑦 = 𝑥𝑒𝑥 is the solution of the given differential equation.

**Solution:**

Given differential equation is:

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For finding the degree of the differential equation we have to analyze the highest derivative and power of highest derivative present in the equation.

The order of given equation is 2.

The highest derivatives is.

By default the power will be 1.

Now,

Lets verify that the y = xex is the solution of the given differentiation equation

>> 1

Differentiating the y = xex

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Differentiating again

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Put this into the eq. 1



Hence proved that the given solution is the general solution of the given differential equation which is our desired result.