United International **University**

School of Science and Engineering

Assignment-2(Mid- term Examination) Trimester: Summer-2024

Course Title: Calculus and Linear Algebra

Course Code: MATH 2183 Submission deadline :3 weeks

1.	Find the solution of the given differential equations **i)** $ty' - y = t^2e^{2t}$, $y(1) = \frac{1}{2}$ **ii)** $y' = \frac{(1-x^2)y^3}{x}$, $y(1) = 2$ **iii)** $x\frac{dy}{dx} - y = sinx$ **iv)** $y' - 5y = cos(2x) + 4x$	
2.	**a)** The initial temperature of a cake when it is removed from an oven was measured as **250**°F. Five minutes later the temperature of the cake was recorded as **200**°F. **i)** Construct a first order differential equation with initial conditions. **ii)** Find the decay constant. **iii)** How long will the cake take to cool down to the room temperature of **75**°F **?** **iv)** Graph the solution of the IVP in (i) **b)** The population of a community is known to increase at rate proportional to the number of people present at time t. If an **initial** population A_0 has **doubled** in **5 years**, how long will it take to **triple**?	