Math 204 **First midterm examination** **Summer time** **1439-1438** **Time: 90 minute**	Department mathematics College of Science

Solve the following questions

Q1: Find the solution of the differential equation **[5]**

$$\left(3x^2\tan(y)+1\right)dx+\left(x^3\sec^2(y)-1\right)dy=0$$

Q2: Determine the region in the xy - plane for which the following equation

$$\left(x^2-81\right)\frac{dy}{dx}=e^x\ln(y-1)$$ **[5]**

would have a unique solution through the point $(0,3)$.

Q3: Find the general solution of the differential equation **[5]**

$$(x+1)\frac{dy}{dx}+(x+2)y=2xe^{-x}$$

Q4: Solve the initial value problem **[5]**

$$ye^{-2x}+y^3-e^{-2x}\frac{dy}{dx}=0$$

$$y(0)=-1$$

Q5: Find the orthogonal trajectories of the family curves **[5]**

$y=cx^n$ **For** $n\neq 0$