IŞIK UNIVERSITY, MATH 203 MIDTERM EXAM I

First Name:	Last	Name:			Row#	:				
Student ID:	Q1		$\mathbf{Q2}$		Q3		$\mathbf{Q4}$			
Q1. (10p) Given that $z = f\left(\frac{x+y}{x-y}\right)$ is a continuously differentiable function. Show										
that the identity $x\frac{\partial z}{\partial x} + y\frac{\partial z}{\partial y} = 0$ holds.										

Q2. (13p) Examine the function $f(x, y) = x^3 - 6xy + y^2 + 6x + 3y$ for local extrema.

Q3. (13p) Find an equation of the plane tangent to the surface $x^2 + 2y^2 + 3xz = 10$ at the point $P_0(1, 2, 1/3)$. Also, find the parametric equations for the line that is normal to the surface at P_0 .

Q4. (12p) What is the largest value that the directional derivative of $f(x, y, z) = yze^x$ can have at the point P(0, 1, 2)?

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First Name:	Last Name:		Row#:			
Student ID:	Q5	Q6	Q7	Q8		

Q5. (13p) Find the point on the plane 2x - y + 2z = 20 closest to the origin.

Q6. (13p) Evaluate the integral $\int \int_{R} \int_{R} x^2 dx dy$ where R is the region lies above the line y = x and inside the circle $x^2 + y^2 = 1$.



Q8. (13p) Find the volume of the region enclosed by the surfaces $z = \sqrt{x^2 + y^2} - 3$ and $z = 3 - \sqrt{x^2 + y^2}$.