MIDTERM TEST- CALCULUS 2 – Class E22CLC

Time: 90 minutes

Problem 1 (3 marks):

a) Find extreme points of the following functions:

$$z = x^2 + 8x + y^3 + 13y - 8xy + 2.$$

b) Given the implicit function $z = z(x, y)$ be defined by $x^4 + y^3 - 2x^3yz^2 = z^3$.

Calculate $dz(0;1)$

Problem 2 (2.5 marks): For double integral $I = \int_1^2 dx \int_{2x}^{6-x} f(x, y)dy.$

a) Change the order of integral.

b) Evaluate the integral with $f(x, y) = 2x + 3.\sqrt[3]{y}.$

Problem 3 (2 marks): Evaluate intergal $I = \iint_D \frac{y}{x^2} dxdy$, where

$$D = \{(x, y) : x = y^2,\ x = \frac{y^2}{2},\ y = \frac{1}{x},\ y = \frac{3}{x}.\}.$$

Problem 4 (2 marks): Let a function $z = y\ln(y^2 - x^2)$.

Calculate $A = y.z'_x + x.z'_y - \frac{x}{y}z$.

Problem 5 (0.5 marks): Find the absolute maximum and minimum values of $f(x, y) = x + y - xy$, D is the closed triangular region with vertices A(0; 0); B(0; 2), and C(4;0).