

2EI HOMEWORK II

1 Find the partial derivatives of the following functions with respect to each variable

a) $r \cos \theta + r \sin \theta$

b) $(R_1)^{-1} + (R_2)^{-1} + (R_3)^{-1}$

c) $n R T V^{-1}$

[T-F (9th Ed) 995 Q 19, 21, 22]

2 Test for Maxima, Minima & Saddle Points

a) $x^2 - xy + y^2 + 2x + 2y - 4$

b) $2x^3 + 3xy + 2y^3$

c) $x^3 + y^3 + 3x^2 - 3y^2$

[TF p. 997 Q 67, 69, 71]

3 Using Lagrange Multipliers or otherwise

a) find the extreme values of

a) $f = x^3 + y^2$ on the circle $x^2 + y^2 = 1$

b) $f = x - y + z$ on the sphere $x^2 + y^2 + z^2 = 1$

[TF p. 997 Q 81, 85]

4 Find the normal vector to the surface S and the equation of the tangent plane at the given point P .

a) $S: x^2 - y - 5z = 0$ $P(2, -1, 1)$

b) $S: x^2 + y^2 + z = 4$ $P(1, 1, 2)$

[TF 996 Q 59, 60]