

International Institute for
Technology and Management



Tutoring Sheet # 16

Unit 05a : Mathematics 1

HomeWork to be submitted: # 2,3:b,d,4:b,e,5,6

1. Suppose that $f(x,y) = x^2y$. Let $x = 2 - t$ and $y = 3t + 7$
Use the chain rule to find $F'(t)$.
2. Suppose that $f(x,y) = x^2y + y^2$. Let $x = 3t^2 + 3$ and $y = t^3 - 7$
Use the chain rule to find $F'(2)$
3. Find $\frac{dy}{dx}$ in each of the following cases:
 - a.) $2x^2 + 5xy + y^2 = 19$
 - b.) $x^4y^3 + 4x^2y^2 - 2x^5y = 3$
 - c.) $x^2y^3 - 6x^3y^2 + 2xy = 1$
 - d.) $e^{xy} + 2(x+y) = 5$
4. Find and classify the critical points of the following functions :
 - a.) $f(x,y) = 2x^2 + 2y^2$
 - b.) $f(x,y) = e^{-(x^2+y^2)}$
 - c.) $f(x,y) = x^2 - y^2$
 - d.) $f(x,y) = y^3 + 3xy - x^3$
 - e.) $f(x,y) = 6 + 4x - 3x^2 + 4y + 2xy - 3y^2$
5. Find the critical point of the function
 $f(x,y) = \text{Ln}(x^2 - 2xy + 2y^2 - 2y + 2)$
and show that this critical point is a local minimum.
6. Find the values of x and y that minimize the function:
 $f(x,y) = 8x^2 + 10y + 8xy + 10y^2 + 12x + 6$
and verify that these values do indeed give a minimum.