1. 

Show that 

1. 
2. Examine the functional dependence of functions



Find the relation between them if functionally dependent.

1. In estimating the cost of a pile of bricks measured as 2m\*15m\*1.2m, the tape is stretched 1% beyond the standard length.If the count is 450 bricks to 1 cu. m. and bricks cost Rs 530 per 1000,find the approximate error in the cost.
2. Find the approximate value of (27.05)1/3.
3. Find maximum and minimum values of f(x,y) =
4. Find the point on the plane given by x + y − z = 1 that is closest to the point P (0, −3, 2) and calculate their distance. Use Lagrange multipliers.
5. A balloon is in the form of a right circular cylinder of radius 1.5 m and height 4 m and is surmounted by hemisphere ends. If the radius is increased by 0.01 m and the height by 0.05 m, find the percentage change in the volume of the balloon.
6. The altitude of the right circular cone is 15 cm and is increasing at 0.2 cm/sec. The radius of the base is 10 cm and is decreasing at 0.3 cm/sec. How fast is the volume changing?
7. Calculate the value of jacobian when the cartesian co-ordinates are changed into polar form.
8. Using Maclaurin series, express  in the form in the neighborhood of (0,0), where  is a polynomial of degree 2 in 
9. If f(x,y) = ,compute f(0.9,-1.2) approximately.
10. Evaluate the integral 
11. A cylindrical tank is 1 m high with 0.3 m radius. If height is increased by 5 cm and radius by 1 cm what is the effect on volume?
12. The height of a tree increases at a rate of 2 ft per year and the radius increases at 0.1 ft per year. At what rate is the volume of timber increasing when the height is 20 ft and the radius is 1.5 ft. (Assume the tree is a circular cylinder).
13. If two registers x , y ohms are in parallel, find percentage change in their resistance R if x increases from 20 to 20.1 ohms and y decreases from 25 to 24.9 ohms.
14. The total weekly revenue (in Rupee) that Acrosonic realizes in producing and selling its

bookshelf loudspeaker systems is given by

where x denotes the number of fully assembled units and y denotes the number of kits produced and sold each week. The total weekly cost is given by



Determine how many assembled units and how many kits Acrosonic should produce per week to maximize its profit.

1. A manufacturer can produce three distinct products in quantities q1, q2 and q3, respectively, and there by derive a profit p(q1,q2, q3) = 2q1+8q2+24q3. Find q1, q2, q3

that maximize profit if production is subject to the constraint q12+ 2q22+4q32= 450000.

1. Prove that of all rectangular parallelepiped of the same volume, the cube has the least surface area.
2. A container with an open top is to have 10 m3 capacity and be made of thin sheet metal. Calculate the dimensions of the box if it is to use the minimum possible amount of metal.
3. Evaluate



1. Evaluate where D is the region bounded by the parabolas and
2. Evaluate , where R is the region inside the unit square in which, .
3. Evaluate 