RAMA STUDY CENTRE - WHATSAPP - 8754834604

XII - STANDARD - MATHEMATICS

CHAPTER - 8 [IMPORTANT QUESTIONS]

If you need answer means cost Rs. 25/-

1) Let us assume that the shape of a soap bubble is sphere. Use linear approximation the increase in the surface area of a soap bubble as its radius increases from 5 cm to 5.2 cm. Also calculate the percentage error.

2) Find the linear approximation for $f(x)=\sqrt{1+x}$, $x \geq -1$, at $x_0=3$. Use the linear approximation to estimate $f(3.2)$

3) The time T, taken for a complete oscillation of a single pendulum with length l is given by the equation $T = 2\pi\sqrt{l/g}$, where g is a constant. Find the approximate percentage error in the calculated value of T corresponding to an error of 2 percent in the value of l

4) Show that the percentage error in the n^{th} root of a number is approximately $1/n$ times percentage error in number

5) Let $f, g : (a,b) \rightarrow R$ be differentiable functions. Show that $d(fg) = f dg + g df$

6) Let $g(x) = x^2 + \sin x$. Calculate the differential dg

7) If the radius of a sphere, with radius 10 cm, has to decrease by 0.1 cm, approximately how much will its volume decrease?

8) Find df for $f(x) = x^2 + 3x$ and evaluate i) $x=2$ and $dx=0.1$

9) Assuming $\log_{10} e = 0.4343$, find an approximate value of $\log_{10} 1003$

10) In a newly developed city, it is estimated that the voting population (in thousands) will increase according to $V(t) = 30+12t^2-t^3$, $0 \leq t \leq 8$ where t is the time in years. Find the approximate change in votes for the time change from 4 to $4\frac{1}{6}$ years

11) Show that $f(x,y) = \frac{x^2-y^2}{y^2+1}$ is continuous at every $(x,y) \in R^2$

12) Let $w(x,y) = xy + \frac{e^y}{y^2+1}$ for all $(x,y) \in R^2$. Calculate $\frac{\partial^2 w}{\partial y \partial x}$ and $\frac{\partial^2 w}{\partial x \partial y}$ [illegible]

13) Let $u(x,y) = e^{-2y}\cos(2x)$ for all $(x,y) \in R^2$. Prove that u is a harmonic function in R^2

14) If $U(x,y,z) = \log(x^3+y^3+z^3)$, find $\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y} + \frac{\partial u}{\partial z}$

15) If $w(x,y,z) = x^2y + y^2z + z^2x$, $x,y,z \in R$, find differential dw

16) Let $z(x,y) = x^2y + 3xy^4$, $x,y \in R$. find linear approximation for z at $(2,-1)$

17) Verify $\frac{dw}{dt} = \frac{\partial w}{\partial x}\frac{dx}{dt} + \frac{\partial w}{\partial y}\frac{dy}{dt}$ for $F(x,y) = x^2 - 2y^2 + 2xy$ and $x(t) = \cos t$, $y(t) = \sin t$, $t \in [0, 2\pi]$

18) Let $z(x,y) = x^3 - 3x^2y^3$, where $x = se^t$, $y = se^{-t}$, $s,t \in R$ Find $\frac{\partial z}{\partial s}$ and $\frac{\partial z}{\partial t}$

19) $F(x,y) = \frac{x^2 + 5xy - 10y^2}{3x + 7y}$, show that $F(x,y)$ is a homogenous function of degree 1

20) If $u = \sin^{-1}\left(\frac{x+y}{\sqrt{x}+\sqrt{y}}\right)$, show that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \frac{1}{2}\tan u$

21) If $u(x,y) = \frac{x^2+y^2}{\sqrt{x+y}}$, prove that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} = \frac{3}{2}u$

22) If $v(x,y) = \log\left(\frac{x^2+y^2}{x+y}\right)$, prove that $x\frac{\partial v}{\partial x} + y\frac{\partial v}{\partial y} = 1$

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