CLASS – XII SUBJECT – MATHEMATICS ASSIGNMENT NO. 3 TOPIC – CONTINUITY & DIFFERENTIATE

1. Find the point of discontinuity for the function f(x) = $\left(\frac{x^4 - 16}{x - 2} \right.$ x ≠□

2. Show that f(x) = 5x-4 $\left[\begin{array}{ll} & a < x < 1 \text{is continuous at } x = 1 \\ 4x^3 - 3x & 1 < x < 2 \end{array} \right.$

3. For what value of K in the for continuous x = 0, f(x) $\frac{1 - \cos 4x}{8x^2}$ x ≠□0

4. If fx f(x) = $\left[\begin{array}{ll} 3ax+b & \text{if } x > 1 \quad 5ax - 2b \text{ if } x < 1 \text{ is continuous at } x = 1. \text{ find a, b} \\ 11 & \text{if } x = 1 \end{array} \right.$

5. If f(x) is differentiable at x = a find line x → □a, $\frac{x^2 f(a) - a^2 f(x)}{x - a}$

6. Find values of 680 that fx given by f(x) $\left[\begin{array}{ll} 1 & : f\, x \le 3 \\ ax+b & 3<x<5 \\ 7 \text{ if} & x \le 5 \end{array} \right.$

7. If y = - $\cot^2 \frac{x}{2}$ – x by $\sin \frac{x}{2}$, prove : $\frac{dy}{dx}$: $\cot 3 \frac{x}{2}$

8. If x = Cos θ□+ θsin θ, y = sin θ– θcosθ, prove $\frac{d^2y}{dx^2} = \frac{\sec^2 \theta}{\theta}$

9. If y = $\frac{2 - 3\cos x}{\sin x}$, find $\frac{dy}{dx}$ at x = $\frac{\Pi}{6}$

10. If y = 10g (1 + cos x), Prove $\frac{d^3y}{dx^3} + \frac{d^2y}{x} \cdot \frac{dy}{dx} = 0$

11. If y = $\tan^{-1} \frac{\sqrt{a^2 + x^2} + \sqrt{a^2 - x^2}}{\sqrt{a^2 + x^2} - \sqrt{a^2 - x^2}}$ show that $\frac{dy}{dx} = \frac{-2a^2}{x^3} 1 \left(+ \frac{a^2}{\sqrt{a^4 - x^4}} \right.$

12. If Y = $\sqrt{\frac{1 + e^x}{1 - e^x}}$, then show that $\frac{dy}{dx} = \frac{e^x}{(1 - e^x)\sqrt{1 - e^{2x}}}$

13. If y = $\sin^{-1}$ [x $\sqrt{1 - x}$ - $\sqrt{x}$ $\sqrt{1 - x^2}$ find $\frac{dy}{dx}$

14 If y = $\text{Sin}^{-1} \left(\frac{x^2 - y^2}{x^2 + y^2} \right)$ = $\tan^{-1}$a, prove : $\frac{dy}{dx} = \frac{y}{x}$

15. If $e^y = y^x$, prove $\frac{dy}{dx} = \frac{(\log y)^2}{\log y - 1}$

16. If x = a (cost + log tan t/2), y = □sin t then find $\frac{dy}{dx} at$ t = $\frac{\pi}{4}$

17. Differentiate $e^{\sin x}$ + $(anx)^x$ w.r.t. x.

18. If $y = e^x$ (Sin + cos x) Prove : $\frac{d^2y}{dx^2} - \frac{2dy}{dx} + 2y = 0$

19. If x = 3 sin t – sin 3t, y = 3 cost - cos 3 t find $\frac{d^2y}{dx^2}$ at t = □□□

20. Find dy if (i) x = a $1 + t^2$, y = 2t (ii) x = 1 + 10gt, y = 2 sin□

21. Find $\frac{dy}{dx}$,if (i) x = a $\frac{(1+t^2)}{1-t^2}$, y = $\frac{2t}{1-t^2}$, (ii) x = $\frac{1+\log t}{E^2}$, y = 2sin□ - $\sin^2$□ (iii) $x^y = y^x$

22. If e^y (x + 1) = 1, Prove that $\frac{dy}{dx} = \left(\frac{dy}{dx}\right)^2$

23. If $x^4 = c^{x-y}$, then prove that $\frac{dy}{dx} = \frac{\log x}{\log(ex)^2}$

24. If Sin (x, y) = x^2 – y, find $\frac{dy}{dx}$

25. If $e^x + e^y = e^{x+y}$ prove that $\frac{dy}{dx} = e^{y-x}$

26. Find $\frac{dy}{dx}$ if cos (x + y) = y sin a.

27. If x $\sqrt{1}$ + y = y . $\sqrt{1+x}$ = 0 then prove that $\frac{dy}{dx} = \frac{-1}{\sqrt{1+x^2}}$

28. If x $\sqrt{1-y^2}$ + y $\sqrt{1-x^2}$ = 1, then prove $\frac{dy}{dx} = \frac{\sqrt{1-y^2}}{\sqrt{1-x^2}}$

29. If y = x (a + y) show : $\frac{dy}{dx} = \frac{Sin^2(a+y)}{\sin a}$

30 .If $\sqrt{1-x^2}$ + $\sqrt{1-y^2}$ = a (x – y), prove $\frac{dy}{dx} = \frac{\sqrt{1-y^2}}{\sqrt{1-x^2}}$