Chapter- 5  
Continuity and Differentiability

**Very Short Type[ 1 mark Questions]**

1. If and, then which of the following may not be a continuous function?

a) b) c) d)

2. The function is discontinuous on the set

a) b)

c) d)

3. The function

a) Discontinuous at only one point b) discontinuous at exactly two points

c) Discontinuous at exactly three points d) None of these

4. Determine the value of for which the following function is continuous at

5. Determine the value of the constant so that the function is continuous at .

6. The function is

a) Continuous everywhere but not differentiable at

b) Continuous and differentiable everywhere

c) Not continuous at

d) None of these

7. The set of points where the function given by is differentiable is

a) b) c) d) None of these

8. Fill in the blank: The greatest integer function defined by is not differentiable at ­­­­\_\_\_\_\_\_\_\_ .

**Long Type – I [ 4 Marks Questions]**

9. For what value of k is the function continuous at x=2? *f(x)*=

10. Discuss the continuity of the function x=0: *f(x)=*

11. If the function *f(x)* given by *f(x)=*  is continuous at x=1, find the value of a & b.

12. Find the relationship between a and b so that the function *f* defined by *f(x)= *is continuous at x=3.

13. Find the value of k, for which f(x)=is continuous at x=0.

14. Find the value of k so that the function f, defined by *f(x)* = is continuous at x=

15. Find the value of a for which the function f defined as *f(x)=* is continuous at x=0.

16. Find all points of discontinuity of f, where f is defined as follows f(x)=

17. For what value of , the following function is continuous at

18. Find the value of such that the function defined by is continuous at .

19.The function is defined as If is continuous in , find the values of and .

20. If the function is differentiable at , then find the value of and .

21. Find the values of and so that the function is differentiable for.

22. Show that the function f*(x)* = ,xR is continuous but not differentiable at x=3.

23. Show that the function is not differentiable at .

24. If function show that is not differentiable at and .

25. Discuss the differentiability of the function at .

26. Show that the function defined as follows is continuous at but not differentiable at

27. If , then find .

28. If , then find .

29. If f(x)= then find f’(x).

30. Differentiate with respect to x:

31. If, find.

32. If, find 

33. Differentiate the function w.r.t x:

34. Differentiate  w.r.t x.

35. Differentiate  w.r.t x

36. Find ,if y= (cosx)x+(sinx)1/x

37. Differentiate the function w.r.t x: (x)cosx+(sinx)tanx

38. If (cosx)y=(siny)x,find .

39. Find ,if (x2+y2)2=xy

40. If siny=x sin(a+y),Prove that 

41. If log(x2+y2)=2 tan-1(y/x),then show that 

42. If , then show that 

43.If xy=ex-y then show that

44. If  then show that .

45. If xmym=(x+y)m+n find 

46. If x16y9=(x2+y)17 then find 

47. If  prove that

48. If y=,then prove that 

49. If y=ex(sinx+cosx),then show that 

50. If x=a(cost+tsint) and y=a(sint-tcost),then find .

51. If, then show that 

52. If y=cosec-1x,x>1 then show that 

53. If y=a cos(logx)+b sin(logx) then show that 

54. Prove that 

55. If x=a(t-sint),y=a(1+cost),then find 

56. If  then show that 

57. If y=sin-1x, then show that 

58. If x=acos3t and y=asin3t then find the value of  at t=

59. Differentiate  with respect to 

60. Differentiate  w.r.t 

61. Verify Rolle’s theorem for in and find the value of .

62. Using Rolle’s theorem find a point on the curve , where the tangent is parallel to .

63. Verify Mean value Theorem for in .

64. Verify Lagrange’s mean value theorem for the function f(x) =x2+2x+3, for [4,6].

65. For what value of , Mean value theorem is applicable for the function on ?

66. Find  if 

67. Find  if and 