**Properties and Applications of Definite Integrals**

**Choose the most appropriate option (a, b, c or d).**

Q 1. , where for 0 ≤ x ≤ , has the value

(a) f(0) (b)  (c)  (d) none of these

Q 2. is equal to

(a)  (b)  (c) 0 (d) 

Q 3. is equal to

(a) π (b)  (c)  (d) none of these

Q 4. The equation where λ, μ, ν are constants gives a relation between

(a) λ, μ and ν (b) λ and ν (c) λ and μ (d) μ and ν

Q 5. Let f(x) = x – [x] for x ∈ R, where [x] = the greatest integer ≤ x. Then is

(a) 4 (b) 2 (c) 0 (d) 1

Q 6. is equal to

(a)  (b) 0 (c) 1 (d) none of these

Q 7. is

(a) 4 (b) 2 (c) -2 (d) 0

Q 8. , n > 0, is equal to

(a) π (b) 2π (c) π2 (d) 

Q 9. is equal to

(a) 0 (b) 2 (c) e (d) none of these

Q 10. If [x] denotes the greatest integer less than or equal to x then is equal to

(a) loge 2 (b) e2 (c) 0 (d) 

Q 11. is equal to

(a)  (b)  (c)  (d) none of these

Q 12. is

(a)  (b)  (c)  (d) 

Q 13. The value of , where [x] = the greatest integer greater than or equal to x, is

(a) 1 (b) 0 (c) 4 – sin 4 (d) none of these

Q 14. The value of , where [.] is the greatest integer function, is

(a)  (b) 0 (c) π (d) 

Q 15. Let . Then an : an+1 is equal to

(a) 3 : 1 (b) 2 : 3 (c) 2 : 1 (d) 3 : 4

Q 16. If then the value of f(1) is

(a)  (b) 0 (c) 1 (d) 

Q 17. The value of is

(a) 4 (b)  (c) 2 (d) none of these

Q 18. Let f be a positive function. If



where 2k – 1 > 0, then is

(a) 2 (b) k (c)  (d) 1

Q 19. If x ∈ (2nπ, 2nπ + π) then , where [x] = greatest integer less than or equal to x, is equal to

(a) -π (b) -nπ (c) 0 (d) none of these

Q 20. The value of is

(a) 0 (b) 2 (c) 1 (d) none of these

Q 21. is equal to

(a) π (b) 0 (c)  (d) none of these

Q 22. If [y] = the greatest integer less than or equal to y then is

(a) -π (b) 0 (c)  (d) 

Q 23. The value of is

(a) π (b) 0 (c) 2π (d) 

Q 24. is equal to

(a)  (b) a (c) –a (d) none of these

Q 25. is equal to

(a)  (b)  (c) 1 (d) none of these

Q 26. If , 0 < x < , then is

(a)  (b)  (c) 1 (d) none of these

Q 27. The value of , where α < 0 < β, is

(a)  (b)  (c)  (d) none of these

Q 28. The value of is equal to

(a)  (b)  (c)  (d) none of these

Q 29. is equal to

(a) 1 (b) 0 (c) 2 (d) 4

Q 30. If f(x) = |x| + 1, -1 ≤ x < 0

1 + |x|2, 0 ≤ x ≤ 1

then is equal to

(a)  (b)  (c)  (d) none of these

Q 31. Let f(x) = maximum {x + |x|, - [x]}, where [x] = the greatest integer ≤ x. Then is equal to

(a) 3 (b) 2 (c) 1 (d) none of these

Q 32. is equal to

(a)  (b)  (c)  (d) none of these

Q 33. Let f(x) be a continuous function such tat f(a – x) + f(x) = 0 for all x ∈ [0, a]. Then is equal to

(a) a (b)  (c) f(a) (d) 

Q 34. is equal to

(a) 2loge a (b) 0 (c) loge 2 + log a (d) none of these

Q 35. Let = λ. Then is equal to

(a) 0 (b) 2λ (c) λ (d) none of these

Q 36. Let f(x) be a continuous function in R such that f(x) + f(y) = f(x + y). If then is equal to

(a) 2k (b) 0 (c) k/2 (d) -2k

Q 37. Let f(x) be a continuous function such that f(x) does not vanish for all x ∈ R. If then f(x), x ∈ R, is

(a) an even function (b) an odd function (c) a periodic function (d) none of these

Q 38. Let , where p, q, r are arbitrary constants. The numerical value of I depends on

(a) p, q, r (b) q, r, a (c) q, a (d) p, r, a

Q 39. Let . Then

(a) I1 < I2 < I3 (b) I3 < I2 < I1 (c) I2 < I1 < I3 (d) I2 < I3 < I1

Q 40. is equal to

(a) 0 (b)  (c)  (d) 100

Q 41. The value of is

(a) -1 (b) 2 (c) 1 + e-1 (d) none of these

Q 42. If then the value of is

(a) 7 (b) 3 (c) -7 (d) -3

Q 43. Let f(x) be a continuous function such that , . Then the value of is

(a) 9 (b) -27 (c) -9 (d) none of these

Q 44. If then the smallest interval in which I lies is

(a)  (b)  (c)  (d) 

Q 45. If then

(a) λ = 0 (b) λ ∈ (0, 1) (c) λ ∈ (-∞, 0) (d) λ ∈ (1, 2)

Q 46. is equal to

(a)  (b) 0 (c) 2 cos 2 (d) none of these

Q 47. Let . Then is equal to

(a) λ + μ (b) λ - μ (c) 2λ - μ (d) λ - 2μ

Q 48. If f(-x) + f(x) = 0 then is

(a) an odd function (b) an even function (c) a periodic function (d) none of these

Q 49. If f(x) and g(x) be continuous functions over the closed interval [0, a] such that f(x) = f(a – x) and g(x) + g(a – x) = 2. Then is equal to

(a)  (b)  (c) 2a (d) none of these

Q 50. If f(x) = f(a + x) and is equal to

(a) np (b) (n – 1)p (c) (n + 1)p (d) none of these

Q 51. Let f(x) be a given integrable function such that f(x + k) = f(x) for all x ∈ R. Then depends for its value on

(a) a only (b) k only (c) both a and k (d) neither a nor k

Q 52. The value of is equal to

(a)  (b)  (c) π (d) none of these

Q 53. The value of is

(a)  (b)  (c) π (d) none of these

Q 54. Let f and g be two continuous functions. Then



is equal to

(a) π (b) 1 (c) -1 (d) 0

Q 55. Let . Then

(a) |p| ≤ q (b) p > q (c) p + q = 0 (d) none of these

Q 56. If then the value of f"(1) is equal to

(a) 2 (b) 0 (c) 1 (d) none of these

Q 57. If is equal to

(a)  (b)  (c)  (d) none of these

Q 58. If f(2a – x) = f(x) and then is

(a) 2λ (b) λ (c) 0 (d) none of these

Q 59. Let f(x) be a continuous function such that the area bounded by the curve y = f(x), the x-axis, and the lies x = 0 and x = a is sin a. Then

(a)  (b) 

(c)  (d) none of these

Q 60. If then the value of is

(a) 0 (b) 1 (c) -1 (d) none of these

Q 61. If then the value of is

(a)  (b)  (c)  (d) none of these

Q 62. The function has a local minimum at x which is equal to

(a) 0 (b) 1 (c) 2 (d) 3

Q 63. Let f(x) be a differentiable function and f(1) = 2. If then the value of f'(1) is

(a) 1 (b) 2 (c) 4 (d) none of these

Q 64. If φ(x) =  1 ≤ x ≤ 2, then the greatest value of φ(x) is

(a) 2 (b) 4 (c) 8 (d) none of these

Q 65. If then the quadratic equation ax2 + bx + c = 0 has

(a) at least one root in (1, 2) (b) no root in (1, 2)

(c) two equal roots in (1, 2) (d) both roots imaginary

Q 66. Let f(x) be a function defined by f(x) = , 1 ≤ x ≤ 3. Ten the range of f(x) is

(a) [0, 2] (b)  (c)  (d) none of these

**Choose the correct options. One or more options may be correct.**

Q 67. If then

(a) A + B = 0 (b) A = B (c) A = B = π/2 (d) A = −B = π

Q 68. Let f(a) > 0, and let f(x) be a nondecreasing continuous function in [a, b].

Then has the

(a) maximum value of f(b) (b) minimum value f(a)

(c) maximum value bf(b) (d) minimum value 

Q 69. The value of ¸n ∈ N, is

(a) π if n is even (b) 0 if n is odd (c) 0 if n is even (d) π for all n ∈ N

Q 70. If , x ≠ 0, x ≠ 1, then f(x) is

(a) monotonically increasing in (2, +∞) (b) monotonically increasing in (1, 2)

(c) monotonically increasing in (2, +∞) (d) monotonically decreasing in (0, 1)

Q 71. Let f(x) = ax3 + bx2 + cx have relative extrema x = 1 and at x = 5. If then

(a) a = -1 (b) b = 9 (c) c = 15 (d) a = 1

Q 72. Let , x ≥ 0. Then f'(x) is

(a) continuous at x = 1 (b) continuous at x = 2

(c) differentiable at x = 1 (d) differentiable at x = 2

1d 2b 3d 4b 5b 6b 7a 8c 9a 10a

11b 12d 13b 14d 15c 16a 17b 18c 19b 20a

21c 22c 23a 24a 25b 26b 27c 28a 29a 30b

31d 32c 33b 34b 35b 36b 37d 38c 39d 40c

41d 42a 43b 44b 45b 46b 47a 48b 49a 50b

51b 52a 53b 54d 55a 56c 57b 58a 59c 60b

61c 62d 63a 64b 65a 66c 67bc 68ab 69c 70ad

71ab 72abd