

MTH101 SPRING (2021)

ATTIQ KUNDI

QUIZ NO.3 FILE

1. Forms of L ‘Hopital’s rule are -----.

Ans. All of the given/above

2. Length of the curve $y = \sin(x)$ from $x = 0$ to $x = \pi$ is -----.

Ans. $\int_a^{\pi} \sqrt{1 + \cos^2 x} dx$

3. Distance between (3,-2) and (4, 0) using the distance formula is ---
-----.

Ans. None of these.

4. A ----- Function is a function that has continuous derivatives up to some desired order over some domain.

Ans. Smooth.

5. Arc length of the curve $y=x$ from $x=0$ to $x=2$ is -----.

Ans. All of the above.

6. The volume V of a cylinder with base area A and height h is calculated by --
-----.

Ans. $V = A h$

7. Definite integral indicating the arc length of the curve $y = x^2$ between $x = 0$ and $x = 2$ is -----.

Ans. None of these.

8. The value of $\int_0^1 e^{-x} dx$ -----.

Ans. None of these.

9. Evaluate $\frac{d}{dx} \int_2^x t dt$

Ans. x .

10. The value of $\lim \dots\dots\dots ?$

Ans. 1. $\lim_{z \rightarrow a} \frac{\ln(x-a)}{\ln(e^x - e)}$

11. Find the area between $y = z$ and $y = -z$ ($z = 4$).

Ans. $\frac{9}{2}$

12. To get better approximation to actual area under a continuous curve over a closed intervals we have to increase -----.

Ans. Number of subintervals.

13. Arc length of the smooth curve $x = g(y)$ for $y = a$, to $y = b$ is -----.

$$\text{Ans. } L = \int_a^b \sqrt{1 + \left(\frac{dx}{dy}\right)^2} dy$$

14. For a sequence $\{a_n\}$ if the difference between successive terms $a_{n+1} - a_n \geq 0$.

Ans. Non decreasing.

15. The value of $\lim_{x \rightarrow 0} \frac{e^{x^2} - 1}{\cos x - 1}$.

Ans. -2

16. The volume by the washer perpendicular to the x-axis is -----.

$$\text{Ans. } \int_a^b \pi([f(x)]^2 - [g(x)]^2) dx$$

17. Distance formula is based on the -----.

Ans. Pythagoras theorem

18. Define integral indicating the arc length of the curve $y = \cos hx$ between $x=0$ and $x=a$ is -----.

$$\text{Ans. } \int_a^b \pi([f(x)]^2 - [g(x)]^2) dx$$

19. The area bounded by the parabola $y^2 = x$, straight line $y = 4$ and y – axis is - ----.

Ans. No clear ans .

20. The value of Lim? $\lim_{x \rightarrow a} \frac{\ln \tan x}{\ln x}$

Ans. No clear ans.

21. The value of $\int_{-2}^2 |x| dx$ -----.

Ans. 0

22. Length of the arc $y=c$ from $x=0$ to $x=1$ is -----.

Ans. 1.

23. Arc length of the curve $y = x^{3/2}$ on $[1, 3]$ is -----.

Ans. $\int_1^3 \sqrt{1 + \left[\frac{d}{dx}(x^{3/2})\right]^2} dx$

24. A strictly monotone sequence is -----.

Ans. Increasing or decreasing.

25. For a sequence $\{a_n\}$ if the ration of successive terms $a_{n+1}/a_n < 1$ then the sequence is known as -----.

Ans. Decreasing.

26. Use L'Hopital's rule to evaluate the $\lim_{x \rightarrow 0} \frac{\sin 2x}{x}$

Ans. 2.

27. If $\{-8, 8\}$ is subdivided into '16' equally subintervals, the RIGHT end point if 13th sub-intervals will be -----.

Ans. 4.

28. If $y = 3x$, then instantaneous rate of change of 'y' w.r.t 'x' at '5' is -----.

Ans. 2

29. 0.121212 is an example of -----.

Ans. Rational numbers.

30. Consider the function defined by $f(x) = 2/(x-1)$ the point of discontinuity is -----.

Ans. $X=3$.

31. If $f(x) = x^{3/2}$ then $f'(1) =$

NOTE: x^n means 'x' to the power 'n'.

Ans. 1.

32. Which of the following point satisfies the equation: $2x + 5y = 15$?

Ans. (5, 1)

33. What is the derivative of $\sin(20x)$?

Ans. $20\cos(20x)$.

34. What is the derivative of $3\sec(x)$?

Ans. $3\sec(x)\tan(x)$.

35. Which of the following is solution of equation:

$$|3x+4| = |2x|$$

Ans. Does not exist.

36. Which of the following is distance between the points (2, 5) and (-1, 1)?

Ans. 5.

37. ----- Of domain must have image in the range under the defined function.

Ans. Each element.

38. L 'Hopital's rule $\lim_{x \rightarrow a} \frac{f(x)}{g(x)} = \text{-----}$.

$$\text{Ans. } \lim_{x \rightarrow a} \frac{f'(x)}{g'(x)}$$

39. Arc length of the curve $y=7$ from $x=0$ to $x=1$ is -----.

$$\text{Ans. } 1.$$

40. Arc length of the curve $y=x$ from $x=0$ to $x=2$ is -----.

$$\text{Ans. } \sqrt{2}$$

41. Use L'Hopital's rule to evaluate the $\lim_{x \rightarrow 0} \frac{\sin 2x}{x} =$

$$\text{Ans. } 2.$$

42. If the interval $[3, 7]$ is divided into '4' equal subintervals, then left endpoint of each subinterval will be -----.

$$\text{Ans. } 4, 5, 6, 7.$$

43. Length of the curve $y=3x$ from $x=0$ to $x=1$ is -----.

$$\text{Ans. } \sqrt{10}$$

44. Length of the curve $y=4x$ from $x=0$ to $x=1$ is -----.

Ans. Sqrt (17)

45. The value of $\int_0^1 e - x \, dx$

Ans. $\frac{e-1}{e}$

46. Integral of $(1-2x)$ from $[0, 1]$ is -----.

Ans. 0.

47. By the use of L'Hopital's rule the value of

Ans. 2.

48. For a sequence $\{a_n\}$ if the difference between successive terms $a_{n+1} - a_n \leq 0$.

Ans. Non increasing.

49. ----- gives a relation between definite integral and indefinite integral.

Ans. First fundamental theorem of calculus.

50. The value of theorem of $f(x)$ at $[k, k-1]$ is -----.

$$\text{Ans. } \frac{f(x_k) - f(x_{k-1})}{x_k - x_{k-1}} = f'(x_k).$$

51. Let f is a smooth function on $[0, 3]$ what will be the arc length L of the curve $y = f(x)$ from $x=0$ and $x=3$.

$$\text{Ans. } \int_0^3 \sqrt{1 + [f'(x)]^2} dx$$

52. The volume of the cylindrical shell is given by -----.

$$\text{Ans. } (\pi R^2 - \pi r^2)h.$$

53. Mathematically second fundamental theorem of calculus can be written as.

$$\frac{d}{dx} \int_a^x f(t) dt = f(x)$$

54. A monotone sequence is either non decreasing or _____.

Non Increasing

55. A sequence is a function whose _____ is the set of positive integers

domain

56. By the use of L'Hopital's rule the value of $\lim_{x \rightarrow \infty} \frac{x}{e^x}$

Ans. 0

57. The length of the WHOLE polygonal path will be

None of these

$$\sum_{k=1}^n L_k = \sum_{k=1}^n \sqrt{1 + (f'(x_k^*))^2} \Delta x_k$$

58. a plane curve (not line) is a curve that lies in a _____ plane.

Two dimensional

59. The volume of solid obtained when the region under the curve $x=y$ over the interval $[1,4]$ is revolved about the y -axis is

$$V = \int_1^4 4\pi y^2 dy$$

60. If the upper and lower limits for the definite integral are the same, then $\int_a^a f(x) dx =$ If the upper and lower limits for the definite integral are the same, then $\int_a^a f(x) dx =$

Zero

61. The value of $\int_0^1 2x dx =$

1

62. Let R be the plane region bounded above by a continuous curve $y=f(x)$ below by the x -axis and on the left and right, respectively, by the lines $x=a$ and $x=b$ the volume of the solid generated by revolving R about the y -axis is given by _____.

$$V = \int_a^b 2\pi x f(x) dx$$

63. The volume by the Washers generated by revolving the region around y -axis is given by the formula -----

$$\int_a^b \pi ([u(y)]^2 + [v(y)]^2) dy$$

64. The method of slicing by integration is used for finding -----

Volume

65. EVERY continuous function on an interval has an anti-derivative
.....

66. In order to fully determine the anti-derivative of a function f ($F(x)$), we must have.....

67. If the integral of $f(x) = x$ from $x = 1$ to $x = 3$ is 4, then the integral of $f(x) = 10x$ from

68. $x = 1$ to $x = 3$ is _____.

4

69. If $F(x)$ is the anti-derivative of $f(x)$ on $[a, b]$, i.e. $F'(x) = f(x)$, then If $F(x)$ is the anti-derivative of $f(x)$ on $[a, b]$, i.e. $F'(x) = f(x)$, then

$$\int_a^b f(x) dx = F(b) - F(a)$$

70. If the curve over $[a, b]$ is revolved about y -axis, then the volume is calculated by the formula-----

$$\int_a^b \pi [f(y)]^2 dy$$

71. Integral of $(1-2x)$ from $[0, 1]$ is

0

72. The volume of the solid bounded by planes $y=a$ and $y=b$ with cross-sectional area $A(y)$ perpendicular to the y -axis is

$$V = \int_a^b A(y) dy \quad V = \int_a^b A(y) dy$$

73. First fundamental theorem of calculus gives the definite integral of a function on a given closed interval in a quick way.

Continuous

74. $x^4 - 14 = \underline{\hspace{2cm}}$

$\int 12t^3 dt$

75. We can break up definite integrals across a sum or difference

$\int_a^b [f(x) \pm g(x)] dx = \int_a^b f(x) dx \pm \int_a^b g(x) dx$ As

$\int_a^b f(x) dx \pm \int_a^b g(x) dx = \int_a^b [f(x) \pm g(x)] dx$

76. If the solid is revolved around the y-axis and generates a solid with a circular cross section of radius $g(y)$ at y . Then the area of this cross section is

$\pi [g(y)]^2$

77. $\int_a^b f(x) dx = \underline{\hspace{2cm}}$.

$-\int_b^a f(x) dx$

78. EVERY continuous function on an interval has an anti-derivative

.....

On that interval

79. In integration of $f(x) = x(x^2 + 1)^3$ from $x=0$ to $x=2$ by substitution method, we take $u = x^2 + 1$ then $du = \dots\dots\dots$

$2x dx$

80. If the upper and lower limits for the definite integral are the same, then $\int_a^a f(x) dx = 0$. If the upper and lower limits for the definite integral are the same, then $\int_a^a f(x) dx =$

negative integer

81. The volume of the solid generated by the region enclosed between $y = x - \sqrt{x}$, $x = 1$, $x = 3$ and x -axis is revolved by y -axis. Which of the following equation gives the volume of solid by cylindrical shell

_____.

$$V = \int_1^3 2\pi x(x - \sqrt{x}) dx \quad V = \int_1^3 2\pi x x dx$$

82. The integral of $f(x) = \sin(x)$ from $x = 0$ to $x = \pi$ is

$$0$$

83. The region bounded by the curves $y = x - \sqrt{x}$, $y = 1$ and $x = 4$. The region bounded by the curves $y = x$, $y = 1$ and $x = 4$

$$\frac{1}{2}$$

84. If $f(x) = 3x^2$ then $F(x)$ (antiderivative of f) will be

$$6x$$

85. If the upper limit of Definite Integral is equal to its lower limit, then the value of Definite Integral will be _____.

$$\text{Zero}$$

86. The volume of a cylinder is the area of a cross section of the cylinder multiplied by the _____ of the cylinder.

$$\text{Height}$$

87. Find the area between $y = x$ and $y = -x(x - 4)$. Find the area between $y = x$ and $y = -x(x - 4)$

$$\text{None of these}$$

88. Why the equation: $x^2 + 8 = 0$ does not have approximate solution while using Newton's method?

x^2 will always be nonnegative

89. What are critical points of the function $f(x) = x^2 - 1$?

$x = 1$

90. Let A be the area of a rectangle under a continuous function $f(x)$ over a closed interval $(a, b]$. If this area is divided into n sub-rectangles then width of each approximated sub-intervals is –

$(b-a)/n$

91. Increase in number of rectangles under any continuous function gives approximation to area.

Better

92. If Newton's Method succeeded to get the approximate solution of an equation, then which of the following is NOT true about it.

The tangent line (at any approximated point) is not parallel to x-axis.

93. Summation of 2 where sum ranges from 0 to 10 equals 20.

True

94. If the closed interval $[a, b]$ is divided into 20 equally spaced subintervals each of which having the width equals to 1 unit then the value of Δx is

10

95. If $f(x) = x^4$, then which of the following is Not true about it.

Its anti-derivative is $x^{5/5}$.

96. Let $y = f(x)$ be a discontinuous function on a finite closed interval, then which of the following is true about it.

It must have absolute extreme values

97. Integral of x^2 is NOTE: x^n means ' x to the power n '

$\frac{x^3}{3}$

98. If $f(x) = x^3$ is defined on the interval $[1, 3]$, then which of the following is true about it.

Its relative minimum value does not exist at the critical point

99. Integral of x^2 is NOTE: x^n means ' x to the power n '

$\frac{x^3}{3}$

100. In approximation to an area R_n (where n is subscript) when limit is taken as n goes to infinity, approximation becomes actual area

False

101. If $f(x) = \sec^2(x) + x^3$, then which of the following is NOT true about it.

Its anti-derivative is $\tan(x) + \frac{x^4}{4} + 15$

102. Integration of 5 with respect to x is.

$5x$

103. Sum of n -terms of a series whose n th term is ' $\frac{1}{n^2}$ '. Then what is the sum of the first two terms is

$\frac{5}{6}$

104. Newton's method uses the to approximate the root.

Tangent line

105. The polynomial function $f(x)=6x^2-30x+36$ has the critical point over the real line is

$\frac{5}{2}$

106. If $f(x)=x^5+6$, then which of the following is Not true about it.

Its anti - derivative is $x^6/6 + 6x + 6$

107. If $x=1+2+3+4+\dots+20$, then $x =$

210

108. In summation $12+14+16+18+20$ can be written as.

summation of $(2k)$ where $(k \text{ varies from } 6 \text{ to } 10)$

109. $x=1$ is a critical value of the function. $f(x)=(x-1)^3$ Total Marks: 1

NOTE: x^n means 'X to the power n'

True

110. If $2x+7$ is defined on the interval $(2,4)$. then which of the following is true about it

It has both absolute maximum and minimum values

111. The indefinite integral of $5\sin x$ is

$-5\cos x + c$

112. summation of (e^i) (i varies from 1 to n), summation of (o^j) (j varies from 1 to n), summation of (a^k) (k varies from 1 to n) All these three represents same summation

True

113. Which of the following will be left end points if the interval $(-2, 2]$ is divided into 4 equal subintervals.

-2, -1, 1, 2

114. Why the equation: $x^2 + 8 = 0$ does not have approximate solution while using Newton's method?

x^2 will always be nonnegative

115. If $x = (1^2)(2^2) + (3^2) + (4^2) + \dots + (30^2)$, then $x =$

9455

116. If $f(x) = \tan(x)$ then mean value theorem can be applied to it on the interval $(0, 2\pi)$

False

117. If ' n ' goes from 1 to 4 and the summation of ' na ' = Maxima of (e^x) in the interval $[-e, 0]$. then the value of ' a ' is

10

118. Subdivide the interval $[a, b]$ into 4 equal subintervals then the width of each subinterval is

$(b-a)/4$

119. If $f(x) = x^4$, then which of the following is Not true about it.

Its anti-derivative is $x^5 + 5$.

120. Subdivide the interval $[3, 5]$ into n equal parts, and then the width of each subinterval is

$$2/n$$

121. If $(x) = x^5 + x$, then which of the following is true about it

$$\text{Its anti-derivative is } x^6/6 + x^2/2 + 6.$$

122. If ' n ' goes from 1 to 3 and the summation of ' na ' = 6, then the value of ' a ' is –

Undetermined

123. $1 + 2^3 + \dots + 1000$ equals

$$500500$$

124. If $(x) = |x| - 2$ is defined as the interval $[-2, 2]$. then which of the following is true about it.

There is a point in the interval $(-2, 2)$ where $f(x)$ has a horizontal tangent

125. Which of the following is the absolute minima of the function ; $f(x)$ in the interval $[-1, 1]$?

$$1$$

126. If $f(x) = \cos(x) + \sin(x) + x$, then which of the following is NOT true about it.

$$\text{Its anti - derivative is } \sin(x) - \cos(x) + x^2/2 + 4.$$

127. Maximum of the function $f(x) = 2x^7$ occurs at

$$x=0$$

128. Maximum of the function $f(x)=2x^7$ occurs at

$$x=-7/2$$

129. What are critical points of the function $f(x) = x^2 - 1$?

NOTE: X^n means 'x' to the power 'n'

$$x=0$$