

FURDA SECONDARY SCHOOL

MATHEMATICS WORK-SHEET FOR GRADE 12 STUDENTS

I. CHOOSE THE BEST ALTERNATIVES

1. The value of C of the mean value theorem if $f(x)=x(x-1)(x-2)$ on $[0, \frac{1}{2}]$

- A. $1 - \frac{\sqrt{21}}{6}$ B. $-1 + \frac{\sqrt{21}}{6}$ C. $1 + \frac{\sqrt{21}}{6}$ D. 1

2. What is the Equation of the line tangent to the graph of $f(x) = 3x + \cos(4x)$ at $x=0$?

- A. $Y=3x+1$ B. $Y=4x-3$ C. $Y=2x+1$ D. $Y=3x-1$

3. Let $f(x) = x^3 + 2x^2 - 15x + 2$ then what is the Equation of the tangent line at the point where the graph crosses $y=2$?

- A. $Y=-15X+2$ B. $Y=24+0$ C. $Y=12x+2$ D. A and B

4. Let $F(x) = \frac{\ln(x^2 + 4x)}{x^2 + 4x}$, then $f'(1)$ is equal to _____

- A. $1/6(1-\ln 6)$ B. $1+\ln 6$ C. $1/3(1-3\ln 2)$ D. $1+2\ln 3$

5. Let $f(x) = x^2 e^{-x}$, then $f''(1)$ is equal to _____

- A. $-\frac{1}{e}$ B. e C. $\frac{1}{e}$ D. $-e$

6. Let $f(x) = 2x^3 - 6x$, then the value of x at which the slope is positive is equal to _____

- A. $(-1, 1)$ B. $(-\infty, -1)$ C. -1 D. 1

7. Let $f(x) = e^{4x-1}$, $g(x) = x^2 + 3x$ and $F(x) = x^3 f(x) + f(g(x))$, then $F'(1)$ is

- A. $7e^3 + 4e^{15}$ B. $7e^3 + 20e^{15}$ C. $1 + e^{15}$ D. $15e^3$

8. Let $f(x) = 3x^2 + 2x + 5$ on $[-1, 1]$ then for what value of 'C' the conclusion of the mean value theorem is satisfied?

- A. 0 B. 2 C. 1 D. 2

9. For what value of C the conclusion of Roll's theorem is satisfied for the function $f(x) = x^3 - 3x^2 + 2x + 5$ on $[0, 2]$

- A. $\frac{3 \pm \sqrt{3}}{3}$ B. $\frac{-3 \pm \sqrt{3}}{3}$ C. $\frac{3 + \sqrt{3}}{3}$ D. $\frac{3 - \sqrt{3}}{3}$

10. Let $f(x) = 2\cos x + x$, on the interval $[0, 2\pi]$, then the Absolute maximum and Absolute minimum value of $f(x)$ respectively is equal to _____

- A. $(2+2\pi)$ and 2 B. $\left(\frac{-2\sqrt{3}}{2}\right)$ and 2 C. $(\sqrt{3} + \frac{\pi}{6})$ and 2π D. 2 and $(2+\pi)$

11. The critical number of $f(x) = |x^2 - 6x + 8|$ is equal to _____

- A. $\{2, 3, 4\}$ B. $\{3\}$ C. $\{2, 4\}$ D. No critical

12. The product of two positive real number is 288, such that the sum of the second number and twice the first number is minimum. Which of the ff pairs of numbers are first and the second numbers respectively?

- A. 12 and 24 B. 144 and 2 C. 9 and 32 D. 96 and 3

13. Given the function $f(x) = x - 2\sin x$ on $[0, 2\pi]$, then which one of the ff is NOT TRUE?

- A. The critical number is $\pi/3$ and $5\pi/3$ B. The maximum value is $5\pi/3 + \frac{2\sqrt{3}}{2}$
C. f is increasing on $[\pi/3, 5\pi/3]$ D. f is decreasing $[0, \pi/3]$ and $[5\pi/3, 2\pi]$
E. The local maximum value is $\pi/6 - \sqrt{3}/2$

14. What is slope of the tangent to the graph of $f(x) = \frac{e^x \sin x}{e^x + 1}$ at $(0, f(0))$?
 A. $\frac{1}{2}$ B. e C. 0 D. $\frac{1}{4}$
15. If $f(x) = \sec x$, then $f''(x)$ is equal to _____
 A. $\sec x(1+2\tan^2 x)$ B. $\sec x \tan^2 x + \sec^3 x$ C. $\tan^{2x} + 1$ D. $\csc x \tan x + \csc^3 x$
16. Let f be k times differentiable function of degree ' n ' and $f^k(x) = 0$, then which of the ff is TRUE?
 A. $k > n$ B. $k < n$ C. $k \geq n$ D. $k \leq n$
17. The first derivative of $f(x) = \ln \sqrt{\cos(x^2 + 3)}$ is equal to
 A. $-x \tan(x^2 + 3)$ B. $\sec^2(x^2 + 1)$ C. $2x^2 \tan(x^2 + 3)$ D. $x \sec(x^2 + 3)$
18. The maximum profit that a company can make, if the profit function is given by $p(x) = 36 + 72x - 18x^2$ is equal to _____
 A. 108 B. 2232 C. 144 D. 98
19. The volume of a cube is increasing at rate of $9\text{cm}^3/\text{sec}$. How fast is the surface area increasing, when the length of cm edge is 10cm ?
 A. $3.6\text{cm}^2/\text{sec}$ B. $36\text{cm}^2/\text{sec}$ C. $18\text{cm}^2/\text{sec}$ D. $6\text{cm}^2/\text{sec}$
20. The second derivative of $f(x) = \frac{\ln 2}{x^2}$ is equal to
 A. $\frac{6 \ln 2}{x^4}$ B. $\frac{-2 \ln 2}{x^3}$ C. $\frac{1}{3x^2}$ D. $\frac{1 - 3 \ln x}{x^4}$
21. Given $f(x) = e^x$ and $g(x) = \ln x$, then which one of the ff is NOT TRUE about graph of two function ?
 A. The Domain of both are all real number
 B. $f(x)$ is strictly increasing on $\mathbb{R}$ and $g(x)$ is strictly increasing on $(0, \infty)$
 C. $f(x)$ has horizontal asymptote at $y=0$ and $g(x)$ has vertical asymptote at $x=0$
 D. Both are no critical number
 E. $f(x)$ is concave upward on $\mathbb{R}$ and $g(x)$ is concave downward on $(0, \infty)$
 F. Both has no local minimum and maximum value
22. Which one of the ff points on the graph of $f(x) = x^2 + 1$ that are closest to the point $(0, 4)$?
 A. $(-\sqrt{\frac{5}{2}}, \frac{7}{2})$ B. $(\sqrt{\frac{5}{2}}, \frac{7}{2})$ C. $(\sqrt{5}, 7)$ D. A and B
23. Let $f(x) = x^3 + 3x^2 - 9x + 5$ on the interval $[-2, 2]$, which one of the following is NOT TRUE?
 A. The absolute maximum value is 27 B. -3 and -1 is critical number
 C. The local minimum value is zero D. $f(x)$ is strictly increasing on $(-\infty, -3]$ and $[1, \infty)$
24. The radius of a right circular cylinder of height 10cm increases at rate of $3\text{cm}/\text{min}$. What is the rate of change of the volume of cylinder when the radius is 8cm ?
 A. $480\pi\text{cm}^3/\text{min}$ B. $8\pi\text{cm}^3/\text{min}$ C. $640\text{cm}^3/\text{min}$ D. $320\pi\text{cm}^3/\text{min}$
25. A mass connected to spring moves along the x -axis so that its x -coordinate at time t given by $x(t) = \sin 2t + \sqrt{3} \cos 2t$, then the maximum distance of the mass from the origin is equal to _____
 A. 2 B. 8 C. 6 D. 4
26. $\int \frac{\log_3 x}{x} dx$ is equal to _____
 A. $\frac{(\ln x)^2}{\ln 3} + C$ B. $(\ln 3)(\ln x)^2 + C$ C. $(\frac{\ln x}{\ln 3})^2 + C$ D. $(\ln 3) \ln x + C$

27. $\int \frac{e^x}{(e^x - 1)(e^x - 4)} dx$ is equal to _____
 A. $\frac{1}{5} \ln \left(\frac{e^x - 1}{e^x + 4} \right) + C$ B. $\frac{1}{5} \ln \left(\frac{e^x + 2}{e^x - 1} \right) + C$ C. $\frac{1}{5} \ln \left(\frac{e^x + 2}{e^x + 1} \right) + C$ D. None
28. $\int_1^2 x^2 e^x dx$ is equal to _____ A. $2e^2 - e$ B. $e - 1$ C. $2 \ln 2 - e$ D. e^2
29. $\int_1^2 x^2 \ln x dx$ is equal to _____ A. $\frac{24 \ln 2 - 7}{9} - 7$ B. $\frac{8 \ln 2 - 2}{3}$ C. $3 \ln 2$ D. $\frac{1}{3} \ln 24$
30. The area of the region bounded by the graph if $f(x) = \sin x$ and $g(x) = \cos x$ and the x-axis on $[\pi/4, 5\pi/4]$ is equal to _____
 A. $2\sqrt{2}$ sq unit B. $\sqrt{3}$ sq unit C. $\sqrt{2} - 1$ sq unit D. $\sqrt{3} + 2$ sq unit
31. The volume of solid obtained by revolving the region bounded by the graph of $f(x) = x^3$ and $g(x) = 4x$ about the x-axis is _____ A. $\frac{1024}{21}\pi$ B. $\frac{20}{3}\pi$ C. $\frac{1792}{21}\pi$ D. $\frac{234}{7}\pi$
32. $\int \frac{(\ln x)^2}{x} dx$ is _____ A. $\frac{(\ln x)^3}{3} + C$ B. $\frac{-1}{2(\ln x)^2} + C$ C. $\frac{\ln x}{2} + C$ D. $e^x + C$
33. $\int \frac{x^2 - 1}{x^3 + x} dx$ is equal to _____
 A. $\ln \left| \frac{x^2 + 1}{x} \right| + C$ B. $\ln |x^2 - 1| + C$ C. $\ln |x^2 - 1| + C$ D. $\ln |x| + C$
34. If $f(0) = -1$, $f(1) = 2$ and $f'(x)$ is continuous on $[0, 1]$ then $\int_0^1 f(x) \sqrt{2 + f(x)} dx$ is equal to _____
 A. $14/3$ B. $16/3$ C. $4/3$ D. $8/3$
35. The volume of the region rotating the graph of $y = x^2 + 2$ and the line $y = 6$ about y-axis is _____
 A. 8π B. $9/2\pi$ C. 4π D. π
36. $\int_0^{\pi/2} \cos^2 x dx$ is equal to _____
 A. $\pi/4$ B. $\pi/4 - 1/\pi$ C. $\pi/2$ D. π
37. $\int_0^{\pi/2} \frac{\cos x}{1 + \sin x} dx$ is equal to _____ A. $\ln 2$ B. $2 \ln 2$ C. 1 D. 2
38. The definitive integral of $y = \cos^3 x$ on the interval $[0, \pi/2]$ is equal to _____
 A. $2/3$ B. $1/3$ C. $3/2$ D. 1
39. $\int_{\pi/3}^{\pi/2} \sin x \cos^2 x dx$ is equal to _____ A. $1/24$ B. $3/8$ C. $8/3$ D. 24
40. $\lim_{x \rightarrow \infty} \left(1 + \frac{3}{x+1} \right)^{x+6}$ is equal to _____ A. e^3 B. $\frac{1}{e^3}$ C. $3e$ D. e^{18}
41. The left side limit of $f(x) = x^2 \left| \frac{x^2 - 49}{x - 7} \right|$ is equal to _____ A. -686 B. -98 C. 686 D. 98
42. $\int \frac{x + 5}{x^2 + 4x + 3} dx$ is equal to _____
 A. $2 \ln |x + 1| - \ln |x + 3| + C$ B. $\ln |x - 1| + C$
 C. $\frac{1}{2} \ln \left| \frac{x - 1}{x - 3} \right| + C$ D. $\ln |x| + C$
43. $\lim_{x \rightarrow 7} x^2 \left| \frac{x^2 - 49}{x - 7} \right|$ is equal to A. 14 B. 43 C. 21 D. does not exist
44. The equation of a tangent line to the graph of $f(x) = e^x (\sin x + \cos x)$ at $x = 0$ is _____

- A. $y = 2x + 1$ B. $y = -2x + 1$ C. $y = -3x + 1$ D. $y = 3x - 1$
45. The radius of a right circular cylinder of height 10cm increases at rate of 3cm/min. What is the rate of change of volume of cylinder, when the radius is 8cm?
- A. $480\pi\text{cm}^3/\text{min}$ B. $8\pi\text{cm}^3/\text{min}$ C. $640\pi\text{cm}^3/\text{min}$ D. $320\pi\text{cm}^3/\text{min}$
46. What is the volume of solid revolution about the x-axis generated by revolving the region enclosed by the graphs of $(f(x) = \sin x)$ and $g(x) = \cos x$ from $x = 0$ and $\pi/2$?
- A. π B. $\pi/4$ C. $\pi - 1$ D. $2\sqrt{2}\pi$
47. $\int_0^1 2^x \sqrt{1 + 2^x} dx$ is equal to _____
- A. $\frac{1}{15\ln 2}(9\sqrt{3} - 4\sqrt{2})$ B. $\frac{9\sqrt{3} - 4\sqrt{2}}{15}$ C. $\frac{3\sqrt{3}}{5\ln 2}$ D. $\frac{1}{\ln 2}(9\sqrt{3} - 4\sqrt{2})$
48. $\int \frac{3^x + 1}{5^{1-4x}} dx$ is equal to _____
- A. $\frac{3(1875)^x}{5\ln(18+5)} + C$ B. $\frac{3(375)^x}{5\ln(375)} + C$ C. $\frac{3(1875)^{-x}}{5\ln(1875)} + C$ D. $\frac{5(375)^x}{3\ln(375)} + C$
49. $\int \frac{\sec^2 \sqrt{x}}{\sqrt{x}} dx$ is equal to _____
- A. $2\tan \sqrt{x} + C$ B. $-2\tan \sqrt{x} \sec \sqrt{x} + C$ C. $\sec^3 \sqrt{x} + C$ D. $-C \sec \sqrt{x} \cot \sqrt{x} + C$
50. $\int x x \log \sqrt{x^2 + 1} dx$ is equal to
- A. $\frac{x^2 + 1}{4\ln 10} \left(\frac{\ln(x^2 - 1) - 1}{+C} \right)$ B. $\frac{x^2 + 1}{4\ln 10} + C$ C. $\frac{x^2 + 1}{2\ln 10} + C$ D. $\ln|x^2 - 1| + C$
51. Among the following which one is incorrect?
- A. $\int a^x dx = a^x \ln a + C$ B. $\int f'(x) dx = \frac{(f(x))^2}{2} + C$
- C. $\int \frac{f'(x)}{f(x)} dx = \ln|f(x)| + C$ D. $\int \ln x dx = x \ln x - x + C$
52. $\int \frac{4}{x^2(x+1)^2} dx$ is equal to _____
- A. $\frac{6}{5} \ln \left| \frac{x+1}{x} \right| - \frac{8x-4}{x(x+1)} + C$ B. $\frac{6}{5} \ln \left| \frac{x+1}{x} \right| + 4\ln|x^2| + 4\ln|x+1|^2$
- C. $-4 \frac{(2x+1)}{x(x+1)} + C$ D. $\frac{5}{6} \ln \left| \frac{x}{x+1} \right| - x \frac{(x+1)}{8x-4} + C$
53. $\int \cos x e^{\sin x} dx$ is equal to _____
- A. $e^{\sin x} + C$ B. $e^{|\sin x|} + C$ C. $\cos x + C$ D. $e^{-\sin x} + C$
54. What is the area of the region bounded by the graph of $f(x) = \ln x$ about x-axis and the line $x = 1/e$ and $x = e$?
- A. $2/e$ B. $1/e$ C. e D. $-e$

ከ9-12 ላላችሁ ተማሪዎች

እንደሚታወቀው ከ2015 ዓ.ም ጀምሮ የዩኒቨርሲቲ መግቢያ ፈተና ከ9ኛ-12ኛ ክፍል ያለውን የሚያጠቃልል ነው። ይህም ተማሪዎች ላይ ጫና መፍጠሩ የማይቀር ነው። እኛም ከ2015 ዓ.ም የት/ት ዘመን ጀምሮ በነፃ Mathematics ትምህርትን ከ9ኛ-12ኛ ክፍል ላላችሁ ተማሪዎች Example & Exercise Solution ጨምሮ ቀለል ባለ እና በሚገባችሁ መንገድ ለየት ያሉ YouTube video እያዘጋጀን የምናግዛችሁ መሆኑን ስናሳውቃችሁ በታላቅ አክብሮት ነው።

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Computation የበዛበት ጊዜ ላይ ስላለን ታሪክ ለመቀየር ለስኬት ዛሬ ጀምራችሁ ተነሱ

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Thank You

Fana Education

