Question Bank for Multiple Choice Questions

Program: Diploma in Computer Engineering	**Program Code:-CO**
Scheme:-I	**Semester:-II**
Course:- Applied Mathematics	**Course Code:-22224**

01 – Differential Calculus	**Marks: - 24**
Content of Chapter: - 1.1 Functions and Limits 1.2 Derivatives 1.3 Application of Derivatives	

1.1 Functions and Limits

1. Let f and g be the function from the set of integers to itself, defined by f(x) = 2x + 1 and g(x) = 3x + 4. Then the composition of f and g is____________.

A) 6x + 9
B) 6x + 7
C) 6x + 6
D) 6x + 8

Answer: Option A

Explanation: Put value of g(x) in f(x)

2. The inverse of function $\mathbf{f(x) = x^3 + 2}$ is________

A) $f^{-1}(y) = (y-2)^{1/2}$
B) $f^{-1}(y) = (y-2)^{1/3}$
C) $f^{-1}(y) = (y)^{1/3}$
D) $f^{-1}(y) = (y-2)$

Answer: Option B

Explanation: Put y = f(x) and find inverse.

3. The domain of a function is the_______________.

A) the maximal set of numbers for which a function is defined
B) the maximal set of numbers which a function can take values
C) it is a set of natural numbers for which a function is defined
D) none of the mentioned

Answer: Option A

Explanation: Definition of domain of function.

4. The domain of function $f(x) = x^{1/2}$ is__________

A) (2, ∞)

B) (-∞, 1)

C) [0, ∞)

D) None of the mentioned

Answer: Option C

Explanation: Definition of domain of function.

5. The range of a function is _____________.

A) the maximal set of numbers for which a function is defined

B) the maximal set of numbers which a function can take values

C) it is set of natural numbers for which a function is defined

D) None of these

Answer: Option B

Explanation: Definition of range of function.

6. What is domain of function $f(x) = x^{-1}$ for it to be defined everywhere on domain?

A) (2, ∞)

B) (-∞, ∞) – {0}

C) [0, ∞)

D) None of these

Answer: Option B

Explanation: Definition of domain of function.

7. The range of function f(x) = sin(x) is ____________.

A) (2, ∞)

B) (-∞, ∞) – {0}

C) (-∞, ∞).

D) None of these

Answer: Option C

Explanation: Definition of range of function.

8. Codomain is the subset of _____________.

A) Domain

B) Range

C) both A & B

D) Neither A nor B

Answer: Option B

Explanation: Definition of range of function.

9. If $f(x) = 2^x$ then range of the function is___________.

A) (-∞, ∞)

B) (-∞, ∞) – {0}

C) (0, ∞)

D) None of these

Answer: Option C

Explanation: Put different values of x and use definition of range of function.

10. **What is range of function $f(x) = x^{-1}$ which is defined everywhere on its domain?**

A) $(-\infty, \infty)$

B) $(-\infty, \infty) - \{0\}$

C) $[0, \infty)$

D) None of these

Answer: Option A

Explanation: Definition of range of function.

11. If $f(x) = x^2 + 4$ then range of f(x) is given by?

A) $[4, \infty)$

B) $(-\infty, \infty) - \{0\}$

C) $(0, \infty)$

D) None of these

Answer: Option A

Explanation: Put different values of x and use definition of range of function.

12. If f(x) = y then $f^{-1}(y)$ is equal to________.

A) y

B) x

C) x^2

D) None of these

Answer: Option B

Explanation: Definition for inverse of function.

13. A function f(x) is defined from A to B then f^{-1} is defined________.

A) from A to B

B) from B to A

C) depends on the inverse of function

D) None of these

Answer: Option B

Explanation: Definition for inverse of function.

14. If f is a function defined from R to R, is given by $f(x) = 3x - 5$ then $f^{-1}(x)$ is given by ____.

A) 1/(3x-5)

B) (x+5)/3

C) does not exist since it is not a bijection

D) None of these

Answer: Option B

Explanation: Let y = f(x), therefore y=3x-5, put x = y in in f(x) you will get f(y) then find $f^{-1}(x)$.

15. If $f(x) = x^4 - 2x + 7$ then $f(0) + f(2) =$ ______________

A) 16

B) 19

C) 7

D) 26

Answer: Option D

Explanation: Put x = 0 and x = 2 in f(x).

16. If $f(x) = 16^x + \log_2 x$ then $f(1/4) =$ _____________.

A) 2

B) 1

C) 3

D) 0

Answer: Option D

Explanation: Put x = 1/4 in f(x).

17. **If $f(x) = \log(\sin x)$ then $f\left(\frac{\pi}{2}\right) =$ ____________.**

A) 2 B) 1

C) 3 D) 0

Answer: Option D

Explanation: Put x=$\left(\frac{\pi}{2}\right)$ in f(x)

18. **If $f(x) = 3\cos x + 5$ then $f(x)$ is __________ function.**

A) odd B) even

C) both odd & even D) Implicit

Answer: Option B

Explanation: By definition of even function.

19. **If $f(x) = 4x^4 + 3\cos x + x\sin x + 1$ then $f(x)$ is __________ function.**

A) Odd B) Even

C) Both odd & even D) Parametric

Answer: Option B

Explanation: By definition of even function.

20. **The range of the function $f(x) = 2x + 1$, for all $3 \le x \le 5$ is____________.**

A) [0, 0] B) [7, 11]

C) [3, 5] D) [5, 11]

Answer: Option C

Explanation: Put values of x in $3 \le x \le 5$ and use definition of range of function.

21. **In the relation $y = f(x)$, 'x' is called as ___________variable.**

A) dependent B) Independent

C) both dependent & independent D) None of these

Answer: Option B

Explanation: Definition of dependent and independent variable.

22. **If $f(x) = 5$ for all $x \in R$ then $f(0) =$ _________.**

A) 0 B) 5

C) -1 D) 1

Answer: Option B

Explanation: The value of constant function is constant for all values of 'x'. Therefore f(x) is constant function.

23. **In the relation $y = f(x)$, 'y' is called as ___________variable.**

A) dependent B) Independent

C) both dependent & independent D) None of these

Answer: Option A

Explanation: Definition of dependent and independent variable.

24. **The function $f(x)$ is an even function if___________.**

A) $f(-x) = f(x) \quad \forall x$

B) $f(-x) = -f(x) \quad \forall x$

C) $f(x) = f(x) \quad \forall x$

D) $f(-x) = -f(-x) \quad \forall x$

Answer: Option A

Explanation: By definition of even function.

25. **The function $f(x)$ is an odd function if___________.**

A) $f(-x) = f(x) \quad \forall x$

B) $f(-x) = -f(x) \quad \forall x$

C) $f(x) = f(x) \quad \forall x$

D) $f(-x) = -f(-x) \quad \forall x$

Answer: Option A

Explanation: By definition of odd function.

26. **The function $f(x)$ is an even function if___________.**

A) $f(x) - f(-x) = 0 \quad \forall x$

B) $f(x) + f(-x) = 0 \quad \forall x$

C) $f(-x) + f(-x) = 0 \quad \forall x$

D) None of these

Answer: Option A

Explanation: By definition of even function.

27. **The function $f(x)$ is an odd function if___________.**

A) $f(x) - f(-x) = 0 \quad \forall x$

B) $f(x) + f(-x) = 0 \quad \forall x$

C) $2f(x) = 0 \quad \forall x$

D) $2f(-x) = 0 \quad \forall x$

Answer: Option B

Explanation: By definition of odd function.

28. **If $f(-x) = f(x) \quad \forall x$ then the function $f(x)$ is known as______.**

A) odd function

B) even function

C) algebraic function

D) trigonometric function

Answer: Option B

Explanation: By definition of even function.

29. **If $f(-x) = -f(x) \quad \forall x$ then the function $f(x)$ is known as ____________.**

A) odd function

B) even function

C) algebraic function

D) trigonometric function

Answer: Option A

Explanation: By definition of odd function.

30. **If $f(x) = x^2 + 6x + 10$, then $f(-2) + f(2) =$ ____________.**

A) 28

B) 19

C) 26

D) 2

Answer: Option A

Explanation: Put x = -2 and x = 2 in f(x)

31. If $\mathbf{f(x) = 16^x - \log_2 x}$, find $\mathbf{f\left(\frac{1}{4}\right)} =$ ____________.

A) 0 B) 2

C) 1 D) 4

Answer: Option D

Explanation: Put x = $\left(1/_4\right)$ in f(x) and use laws of Logarithms.

32. If $\mathbf{f(x) = 16^x - \log_2 x}$, find $\mathbf{f\left(\frac{1}{2}\right)} =$____________.

A) 3 B) 5

C) 1 D) 4

Answer: Option A

Explanation: Put x = $\left(1/_2\right)$ in f(x) and use laws of Logarithms.

33. If $\mathbf{f(x) = 16^x + \log_2 x}$, find $\mathbf{f\left(\frac{1}{2}\right)} =$ ____________

A) 3 B) 5

C) 0 D) 4

Answer: Option A

Explanation: Put x=$\left(\frac{1}{2}\right)$ in f(x)

34. If $\mathbf{f(x) = \log(\sin x)}$, find $\mathbf{f\left(\frac{\pi}{2}\right)} =$ _________

A) 3 B) 1

C) 0 D) 4

Answer: Option C

Explanation: Put x=$\left(\frac{\pi}{2}\right)$ in f(x)

35. If $\mathbf{f(x) = 3x^2 - 5x + K \text{ and } f(-1) = 3f(1)}$ then K = ___________________

A) 3 B) 7

C) 1 D) 4

Answer: Option A

Explanation: put x= -1 and x=1 in f(x)

36. If $\mathbf{f(x) = ax + 10 \text{ and } f(1) = 15}$ then $\mathbf{a} =$ ______________

A) 3 B) 7

C) 5 D) 4

Answer: Option C

Explanation: put x=1 in f(x)

37. If $\mathbf{f(x) = x^3 - 5x^2 - 4x + P}$, and $\mathbf{f(0) = -2\, f(3)}$ then P = ____________________

A) 20 B) -10

C) -20 D) 10

Answer: Option A

Explanation: put x= 0 and x=3 in f(x)

38. If $\mathbf{f(x) = x^3 - 3x + \sin x}$, then $\mathbf{f(x) + f(-x)} =$ _______________

A) 3 B) 1

C) 0 D) 4

Answer: Option C

Explanation: put x= -x in f(x)

39. If $\mathbf{f(x) = x^3 + x}$, find $\mathbf{f(1) + f(2)} =$ ________.

A) 8 B) 12

C) 10 D) 14

Answer: Option B

Explanation: put x= 1 and x=2 in f(x)

40. If $\mathbf{f(x) = x^3 - 3x + \sin x + x \cdot \cos x}$, then $\mathbf{f(x) + f(-x)} =$ _______________.

A) 3 B) 1

C) 0 D) 4

Answer: Option C

Explanation: put x= -x in f(x)

41. If $\mathbf{f(x) = 3x^4 + x^2 + 5 - 3\cos x + 2\sin^2 x}$, then $\mathbf{f(x) + f(-x)} =$ _____________.

A) $f(x)$ B) 2 $f(x)$

C) $-f(x)$ D) none of these

Answer: Option B

Explanation: put x= -x in f(x)

42. If $\mathbf{f(x) = \sin x}$, show that $\mathbf{3f(x) - 4f^3(x)} =$ _________.

A) $f(2x)$ B) 2 $f(3x)$

C) $f(x)$ D) $f(3x)$

Answer: Option D

Explanation: Use formula for sin 3x and put x=3x

43. If $\mathbf{f(x) = \cos x}$, show that $\mathbf{4f^3(x) - 3f(x)} =$ _________.

A) $f(2x)$ B) $f(3x)$

C) $f(x)$ D) 2 $f(3x)$

Answer: Option B

Explanation: Use formula for cos 3x and put x=3x

44. If $f(x) = \frac{a^x + a^{-x}}{2}$ then $f(x)$ is an ____________________ function.

A) odd function

B) even function

C) Algebraic function

D) Trigonometric function

Answer: Option B

Explanation: Put x=-x in f(x)

45. If $f(x) = \frac{3^x - 3^{-x}}{2}$ then $f(x)$ is an ____________________ function.

A) odd function

B) even function

C) Algebraic function

D) Trigonometric function

Answer: Option B

Explanation: Put x=-x in f(x)

46. If $f(x) = \frac{e^{-x} + e^x}{2}$ then $f(x)$ is an ____________________ function.

A) odd function

B) even function

C) Algebraic function

D) Trigonometric function

Answer: Option B

Explanation: Put x=-x in f(x)

47. If $f(x) = 3x^4 - 2x^2 + \cos x$ then $f(x)$ is an ____________________ function.

A) odd function

B) even function

C) Algebraic function

D) Trigonometric function

Answer: Option B

Explanation: Put x=-x in f(x)

48. If $f(x) = x^3 + 3\sin x + x$ then $f(x)$ is an ____________________ function.

A) odd function

B) even function

C) Algebraic function

D) Trigonometric function

Answer: Option A

Explanation: Put x=-x in f(x)

49. If $f(x) = \frac{x^2 + x}{x^2 + 1}$ then $f(x)$ is ____________________ function.

A) odd function

B) even function

C) even and odd both

D) neither even nor odd

Answer: Option D

Explanation: Put x=-x in f(x)

2. Derivative

1. If $\mathbf{y = 5^x + x^5}$ then $\frac{dy}{dx}$ = __________.

A) $5x^4 + 5^x \log 5$

B) 0

C) $x^5 + 5^x \log 5$

D) $5x^4 + 5^x$

Answer: Option A

Explanation: use formula $\frac{d}{dx}(a^x)= \log(a)\, a^x$ and $\frac{d}{dx}(x^n)=nx^{n-1}$

2. If $\mathbf{y = \left(x - \frac{1}{x}\right)^2}$ then $\mathbf{y' =}$ __________

A) 0

B) $2x + \frac{2}{x^3}$

C) $2x - \frac{2}{x^3}$

D) 1

Answer: Option C

Explanation: $\frac{d}{dx}(x^n)=nx^{n-1}$ and derivative of composite function

3. If $\mathbf{y = x.e^x}$ then $\frac{dy}{dx}$ = __________.

A) e^x

B) $e^x(x+1)$

C) $(x+1)$

D) $x(e^x+1)$

Answer: Option B

Explanation: Use rule of Derivative of product of functions

4. If $\mathbf{y = (x+1)(x+2)}$ then $\frac{dy}{dx}$ = __________.

A) $2x$

B) $2x + 3$

C) 0

D) $2x - 3$

Answer: Option B

Explanation: Use rule of Derivative of product of functions

5. If $\mathbf{y = \frac{1-x}{1+x}}$ then $\frac{dy}{dx}$ = __________.

A) $\frac{-2}{(1+x)^2}$

B) $\frac{2}{1+x}$

C) $\frac{1-x}{(1+x)^2}$

D) none of these

Answer: Option A

Explanation: Use rule of Derivative of quotient of functions

6. If $\mathbf{y = \frac{e^x}{e^x - 1}}$ then $\frac{dy}{dx}$ = __________.

A) $\frac{-e^x}{(e^x-1)^2}$

B) $\frac{e^x}{(e^x-1)^2}$

C) $\frac{-1}{(e^x-1)^2}$

D) none of these

Answer: Option A

Explanation: Use rule of Derivative of quotient of functions

7. If $\mathbf{y = (x^2+1)^{10}}$ **then** $\mathbf{y' =}$ __________.

A) $10(x^2+1)^9$

B) $20x(x^2+1)^9$

C) $10\ (x^2+1)$

D) $20\ (x^2+1)$

Answer: Option B

Explanation: $\frac{d}{dx}(\ x^n)$=nx^{n-1} and derivative of composite functions

8. If $\mathbf{f(x) = \sin^3 x}$ then $\mathbf{f'(x) =}$ ___________.

A) $3\cos^2 x\ \sin x$

B) $3\sin^2 x\ \cos x$

C) $3\sin^2 x$

D) $3\ \sin x \cos x$

Answer: Option B

Explanation: $\frac{d}{dx}(\sin x)$= cos x and derivative of composite function

9. If $\mathbf{y = e^{3x}}$ then $\frac{\mathbf{dy}}{\mathbf{dx}} =$ __________.

A) e^{3x}

B) $3e^{3x-1}$

C) $3e^{3x}$

D) $3x\ e^{2x}$

Answer: Option C

Explanation: $\frac{d}{dx}(e^x)$= e^x and derivative of composite function

10. If $\mathbf{y = 10^{x^2}}$ **then** $\mathbf{y' =}$ _________.

A) $10^{x^2}\log 10$

B) $10^{x^2}\log x^2$

C) $2x.\ 10^{x^2}\log 10$

D) $10^{x^2}\log x\ .\ 2$

Answer: Option C

Explanation: $2x\log 10.\frac{d}{dx}(x^2)$= $2x.\ 10^{x^2}\log 10$

11. If $\mathbf{y = \log(\sin x)}$ then $\frac{\mathbf{dy}}{\mathbf{dx}} =$ __________.

A) $\frac{1}{\sin x}$

B) $\cot x$

C) $\frac{1}{\cos x}$

D) $\tan x$

Answer: Option B

Explanation: $\frac{d}{dx}(\log\ x)$= $\frac{1}{x}$ and derivative of composite function

12. If $\mathbf{y = \log(x.e^x)}$ then $\frac{\mathbf{dy}}{\mathbf{dx}} =$ __________.

A) $\frac{x-1}{x}$

B) $\frac{1}{x.e^x}$

C) $\frac{x+1}{x}$

D) $x.\ e^x$

Answer: Option C

Explanation: $\frac{d}{dx}(\log\ x)$= $\frac{1}{x}$ and derivative of composite function

13. If $y = \sin^{-1}(\cos x)$ then $\frac{dy}{dx} =$ __________.

A) 0 B) 1

C) -1 D) $\frac{\pi}{2}$

Answer: Option C

Explanation: $(\cos x) = \sin\left(\frac{\pi}{2} - x\right)$

14. If $y = \cos\left(\sec^{-1}\left(\frac{1}{x}\right)\right)$ then $y' =$ __________.

A) 0 B) 1

C) -1 D) 2

Answer: Option B

Explanation: $\sec^{-1}\left(\frac{1}{x}\right) = \cos^{-1}x$

15. If $y = \sin^{-1}(\sqrt{1-x^2})$ then $\frac{dy}{dx} =$ __________.

A) $\frac{-1}{\sqrt{1-x^2}}$ B) $\frac{1}{1-x^2}$

C) $\frac{1}{\sqrt{1-x^2}}$ D) $\frac{-1}{1-x^2}$

Answer: Option A

Explanation: Put $x = \cos\theta$

16. If $y = \cos^{-1}(3x - 4x^3)$ then $\frac{dy}{dx} =$ __________.

A) $\frac{-3}{\sqrt{1+x^2}}$ B) $\frac{3}{1-x^2}$

C) $\frac{1}{\sqrt{1-x^2}}$ D) $\frac{-3}{\sqrt{1-x^2}}$

Answer: Option D

Explanation: put x= sin θ and formula for sin 3θ

17. If $x^2 + 3xy - y^2 = 11$ then $\frac{dy}{dx}$ at point $(1, 2)$ is __________.

A) 0 B) 5

C) 3 D) 8

Answer: Option D

Explanation: Use derivative of Implicit functions

18. If $x^2 + y^2 = xy$ then $\frac{dy}{dx} =$ __________.

A) $\frac{y - 2x}{2y - x}$ B) $\frac{x - 2y}{2y + x}$

C) $\frac{y + 2x}{2y + x}$ D) $\frac{x - y}{y + x}$

Answer: Option A

Explanation: Use derivative of Implicit functions

19. If $y = x^x$ then $\frac{dy}{dx} =$ __________.

A) $\frac{1 + \log x}{2}$ B) $x.x^{x-1}$

C) $y(1 + \log x)$ D) $\frac{y(1 - \log x)}{2}$

Answer: Option C

Explanation: Use Logarithmic differentiation

20. If $y = x^{\sqrt{x}}$ then $\frac{dy}{dx} =$ __________.

A) $\frac{y(2 + \log x)}{2\sqrt{x}}$ B) $\sqrt{x}.x^{\sqrt{x}-1}$

C) $\frac{y(1 - \log x)}{2}$ D) $\sqrt{x}.x^{x-1}$

Answer: Option A

Explanation: Use Logarithmic differentiation

21. If $x = at^2$, $y = 2at$ then $\frac{dy}{dx} =$ __________.

A) $\frac{-1}{t^2}$ B) $\frac{1}{t}$

C) $\frac{1}{2}$ D) $\frac{2at}{-5}$

Answer: Option B

Explanation: Use derivative of Parametric functions

22. If $x = a\cos\theta$, $y = a\sin\theta$ then $\frac{dy}{dx}$ at $\theta = \frac{\pi}{4}$ is ______________________.

A) 0 B) -1

C) 1 D) $1/2$

Answer: Option B

Explanation: Use derivative of Parametric functions

23. Differentiate $\log x$ w. r. to x:

A) $-x$ B) x

C) -1 D) 1

Answer: Option A

Explanation: Use derivative of one function with respect to another function

24. Differentiate $\sin^{-1} x$ w. r. to $\sqrt{1 - x^2}$:

A) $-x$ B) x

C) $1/x$ D) $-1/x$

Answer: Option D

Explanation: Use derivative of one function with respect to another function

25. The $\frac{d^2y}{dx^2}$ is known as ________________

A) First order derivative
B) Second order derivative
C) Higher order derivative of order 'n'
D) None of These

Answer: Option B

Explanation: Use definition of 2nd order derivative

26. Geometrically $f'(x)$ is known as______________.

A) Slope of Normal
B) Slope of Curve
C) Slope of Tangent
D) Equation of curve

Answer: Option C

Explanation: Geometrical meaning of derivative

27. The geometrically $\frac{dy}{dx}$ is known as______________.

A) Slope of Normal
B) Slope of Curve
C) Slope of Tangent
D) Equation of curve

Answer: Option C

Explanation: Geometrical meaning of derivative

28. The slope of tangent to the curve $x.y = 6$ at (1, 6) is______________.

A) 5
B) -1
C) -6
D) 3

Answer: Option C

Explanation: slope of tangent=$\frac{dy}{dx}$

29. The slope of tangent to the curve $x^2 + y^2 = 25$ at the point (-3, 4) is_____________.

A) $^3/_4$
B) $^4/_3$
C) $^{-3}/_4$
D) $^{-4}/_3$

Answer: Option A

Explanation: slope of tangent=$\frac{dy}{dx}$

30. At what point on the curve $y = e^x$ the slope is 1?

A) (1, 0)
B) (0, 1)
C) (1, -1)
D) (1, 1)

Answer: Option B

Explanation: slope of tangent=$\frac{dy}{dx}$

31. The equation of tangent to the curve $y = x^2$ at (-1, 1) is_______________

A) $y + x - 1 = 0$
B) $y - x - 1 = 0$
C) $2x + y + 1 = 0$
D) $2x - y - 1 = 0$

Answer: Option C

Explanation: Use $y-y_1=m(x-x_1)$, m=slope of tangent

32. The tangent to the curve $y = f(x)$ is parallel to x- axis then $\frac{dy}{dx} =$ ____________.

A) 1
B) 0
C) -1
D) not defined

Answer: Option B

Explanation: here y=0, $\frac{dy}{dx}$ =0

33. The tangent to the curve $y = f(x)$ is parallel to x- axis then slope of normal is _________________.

A) 1
B) 0
C) -1
D) not defined

Answer: Option D

Explanation: slope of normal = $\frac{-1}{\text{slope of tangent}}$= $\frac{-1}{0}$ = not defined

34. If $y = f(x)$ be any curve then slope of normal to the curve is_____________________.

A) $\frac{dy}{dx}$
B) $\frac{1}{\frac{dy}{dx}}$
C) $\frac{-1}{\frac{dy}{dx}}$
D) $\frac{dx}{dy}$

Answer: Option C

Explanation: slope of normal = $\frac{-1}{\text{slope of tangent}}$

35. If $y = f(x)$ be any curve then slope of normal to the curve is_____________________.

A) $f'(x)$
B) $\frac{-1}{f'(x)}$
C) $\frac{1}{f'(x)}$
D) None of these

Answer: Option B

Explanation: slope of normal = $\frac{-1}{\text{slope of tangent}}$

36. If $y = f(x)$ be any curve then slope of tangent to the curve is_____________________.

A) $\frac{dy}{dx}$
B) $\frac{1}{\frac{dy}{dx}}$
C) $\frac{-1}{\frac{dy}{dx}}$
D) $\frac{dx}{dy}$

Answer: Option A

Explanation: slope of tangent=$\frac{dy}{dx}$

37. If $y = f(x)$ be any curve then slope of tangent to the curve is_____________________.

A) $f'(x)$
B) $\frac{-1}{f'(x)}$
C) $\frac{1}{f'(x)}$
D) None of these

Answer: Option A

Explanation: $f'(x)$

38. The tangent to the curve $y = f(x)$ is parallel to x- axis then ____________.

A) $\frac{dy}{dx} \neq 0$

B) $\frac{dy}{dx} > 0$

C) $\frac{dy}{dx} < 0$

D) $\frac{dy}{dx} = 0$

Answer: Option D

Explanation: Equation of tangent is y=0

39. The tangent to the curve $y = f(x)$ is parallel to y- axis then ____________.

A) $\frac{dy}{dx} \neq 0$

B) $\frac{dy}{dx} > 0$

C) $\frac{dy}{dx} = 0$

D) slope of tangent cannot defined

Answer: Option C

Explanation: Equation of tangent is x=0

40. If $y = x^{10} + 10^x + e^x + 10^{10}$ then $\frac{dy}{dx} =$ ____________.

A) $10x^9 + 10^x.\log_e 10 + e^x + 10.10^9$

B) $10x^9 + 10^x.\log_e 10 + e^x$

C) $10x^9 + 10^x + e^x + 10.10^9$

D) $10x^{10-1} + 10^x.\log_e 10 + e^x + 10 \times 10^9$

Answer: Option B

Explanation: Use derivatives of standard functions

41. If $y = e^x.\sin x$ then $\frac{dy}{dx} =$ ____________.

A) $e^x(\sin x - \cos x)$

B) $(\sin x - \cos x)$

C) $e^x(\sin x + \cos x)$

D) $(\sin x + \cos x)$

Answer: Option C

Explanation: Use rule of derivative of Product of 2 functions

42. If $y = \sec x.\tan x$ then $\frac{dy}{dx} =$ ____________.

A) $\sec x\,(\sec^2 x - \tan^2 x)$

B) $\sec x\,(\sec^2 x + \tan^2 x)$

C) $\sec x\,(\tan^2 x - \sec^2 x)$

D) none of these

Answer: Option B

Explanation: Use rule of derivative of Product of 2 functions

43. If $y = e^x.\tan x$ then $\frac{dy}{dx} =$ ____________.

A) $e^x(\sec^2 x - \tan^2 x)$

B) $e^x(\sec^2 x + \tan^2 x)$

C) $e^x(\sec^2 x + \tan x)$

D) $e^x(\sec^2 x - \tan x)$

Answer: Option C

Explanation: Use rule of derivative of Product of 2 functions

44. If $y = \frac{\sin x}{1-\cos x}$ **then** $\frac{dy}{dx} =$ ______________.

A) $\frac{1}{1-\cos x}$

B) $\frac{-1}{1-\cos x}$

C) $\frac{1}{1+\cos x}$

D) $\frac{-1}{1+\cos x}$

Answer: Option B

Explanation: Use rule of derivative of Quotient of 2 functions

45. If $y = x^a + a^x + e^x + a^a$ **then** $\frac{dy}{dx} =$ ______________.

A) $ax^{a-1} + a^x.\log_e a + e^x$

B) $ax^{a-1} + a^x.\log_e a + e^x + 1$

C) $ax^{a-1} + a^x + e^x$

D) $ax^{a-1} + a^x.\log_e a + e^x - 1$

Answer: Option C

Explanation: Use derivatives of standard functions

46. If $y = \frac{\sin x}{e^x}$ **then** $\frac{dy}{dx} =$ ______________.

A) $\frac{\sin x - \cos x}{e^x}$

B) $\frac{\cos x + \sin x}{e^x}$

C) $\frac{\sin x + \cos x}{e^x}$

D) $\frac{\cos x - \sin x}{e^x}$

Answer: Option D

Explanation: Use rule of derivative of Quotient of two functions.

47. If $y = x^{2a} + (2a)^x + (2a)^{2a}$ **then** $\frac{dy}{dx} =$ ______________.

A) $ax^{2a-1} + 2a^x.\log_e a$

B) $2a.x^{2a-1} + (2a)^x.\log_e(2a)$

C) $2a.x^{2a-1} + (2a)^x.\log_e(2a) + 2a.(2a)^{2a-1}$

D) $ax^{2a-1} + 2a^x.\log_e a + 2a.(2a)^{2a-1}$

Answer: Option A

Explanation: Use rule of derivative of Product of two functions.

48. If $y = \cos^2 x$ **then** $\frac{dy}{dx} =$ ______________.

A) $\sin(2x)$

B) $-\sin(2x)$

C) $\cos(2x)$

D) $-\cos(2x)$

Answer: Option B

Explanation: Derivative of Composite functions.

49. If $y = e^{3x}.\sin 2x$ **then** $\frac{dy}{dx} =$ ______________.

A) $e^{3x}[2\cos(2x) + 2\sin(2x)]$

B) $e^{3x}[2\cos(2x) - 2\sin(2x)]$

C) $e^{3x}[2\cos(2x) + 3\sin(2x)]$

C) $e^{3x}[3\cos(2x) + 2\sin(2x)]$

Answer: Option C

Explanation: Use rule of derivative of Product of 2 functions

50. If $y = \sin(x^\circ)$ then $\frac{dy}{dx} =$ ______________.

A) $\cos(x^\circ)$

B) $\frac{\pi}{180}\cos(x^\circ)$

C) $\frac{180}{\pi}\cos(x^\circ)$

D) $\frac{\pi}{180}\sin(x^\circ)$

Answer: Option B

Explanation: Use Derivative of Composite functions

51. If $y = \sin(\log x)$ then $\frac{dy}{dx} =$ ______________.

A) $\frac{1}{x}.\sin(\log x)$

B) $\frac{1}{\sin x}.\sin(\log x)$

C) $\frac{1}{x}.\cos(\log x)$

D) $\frac{1}{\log x}.\cos(\log x)$

Answer: Option C

Explanation: Use Derivative of Composite functions

52. If $y = \sin(3x+5)$ then $\frac{dy}{dx} =$ ______________.

A) $3.\sin(3x+5)$

B) $3.\cos(3x+5)$

C) $5.\sin(3x+5)$

D) $5.\cos(3x+5)$

Answer: Option B

Explanation: Use Derivative of Composite functions

53. If $y = \cos(3x+5)$ then $\frac{dy}{dx} =$ ______________.

A) $-3.\sin(3x+5)$

B) $-3.\cos(3x+5)$

C) $-5.\sin(3x+5)$

D) $-5.\cos(3x+5)$

Answer: Option A

Explanation: Use Derivative of Composite functions

54. If $y = e^{\log_e x}$ then $\frac{dy}{dx} =$ ______________.

A) $e^{\log_e x}$

B) -1

C) $\frac{1}{x}$

D) 1

Answer: Option D

Explanation: Use derivative of Logarithmic Functions

55. If $y = \log x + \log_5 x + \log_5 5$ then $\frac{dy}{dx} =$ ______________.

A) $\frac{1}{x} + \frac{1}{x\log 5} + \frac{1}{5\log 5}$

B) $\frac{1}{x} + \frac{1}{x\log 5}$

C) $\frac{1}{x} - \frac{1}{x\log 5} - \frac{1}{5\log 5}$

D) None of these

Answer: Option B

Explanation: Use derivative of Logarithmic Functions

56. If $y = \log(\sec x + \tan x)$ then $\frac{dy}{dx} =$ ______________.

A) $\tan x$

B) $\frac{1}{\sec x+\tan x}$

C) $\sec x$

D) None of these

Answer: Option C

Explanation: Use derivative of Logarithmic Functions

57. If $y = e^{x.\log_e 5}$ then $\frac{dy}{dx} =$ ______________.

A) $5^x.\log_e 5$

B) $e^{x.\log_e 5}$

C) $e^{x.\log_e 5}.\frac{1}{5}$

D) None of these

Answer: Option A

Explanation: Use derivative of Logarithmic Functions

58. If $y = \cos^{-1}(\sin x)$ then $\frac{dy}{dx} =$ __________.

A) 0

B) 1

C) -1

D) $\frac{\pi}{2}$

Answer: Option C

Explanation: Use derivative of Inverse Trigonometric functions

59. If $y = \tan\left[\cot^{-1}\left(\frac{1}{x}\right)\right]$ then $\frac{dy}{dx} =$ __________.

A) 0

B) 1

C) -1

D) $\frac{\pi}{2}$

Answer: Option B

Explanation: Use derivative of Inverse Trigonometric functions

60. If $y = \cos^{-1}(2x^2 - 1)$ then $\frac{dy}{dx} =$ __________.

A) $\frac{-1}{\sqrt{1-x^2}}$

B) $\frac{1}{1-x^2}$

C) $\frac{-2}{\sqrt{1-x^2}}$

D) $\frac{-1}{1-x^2}$

Answer: Option C

Explanation: Use derivative of Inverse Trigonometric functions using substitution x=cos Θ

61. If $y = \log(4 - 3x)$ then $\frac{dy}{dx} =$ __________.

A) $\frac{3}{4-3x}$

B) $\frac{4}{4-3x}$

C) $\frac{3}{4 + 3x}$

D) $\frac{3}{3x - 4}$

Answer: Option D

Explanation: Use derivative of composite functions

62. If $\mathbf{y = \log(\operatorname{cosec} x - \cot x)}$ then $\frac{dy}{dx} =$ ______________.

A) $\operatorname{cosec} x$

B) $\frac{1}{\operatorname{cosec} x - \cot x}$

C) $\sec x$

D) None of these

Answer: Option A

Explanation: Use derivative of Logarithmic Functions

63. If $\mathbf{y = \sin^{-1}\left(\frac{1}{x}\right)}$ then $\frac{dy}{dx} =$ ______________.

A) $\frac{1}{x\sqrt{1-x^2}}$

B) $\frac{-1}{x\sqrt{1-x^2}}$

C) $\frac{1}{x\sqrt{x^2-1}}$

D) $\frac{-1}{x\sqrt{x^2-1}}$

Answer: Option D

Explanation: Use derivative of Inverse Trigonometric functions

64. If $\mathbf{x^2 + y^2 + xy - y = 0}$ then $\frac{dy}{dx}$ at the point (1, 2) is ___________.

A) 0

B) 1

C) -1

D) None of these

Answer: Option C

Explanation: Use derivative standard functions

65. If $\mathbf{x^p . y^q = (x+y)^{p+q}}$ then $\frac{dy}{dx} =$ ______________.

A) $\frac{y}{x}$

B) $\frac{-y}{x}$

C) $\frac{x}{y}$

D) $\frac{-x}{y}$

Answer: Option A

Explanation: Use derivative of Logarithmic Functions

66. Differentiate $\mathbf{x^{(1/x)}}$ w. r. to x:

A) $\frac{1}{x}(1 - \log x)$

B) $\frac{1}{x^2}(1 - \log x)$

C) $\frac{1}{x^2}(1 + \log x)$

D) None of these

Answer: Option D

Explanation: Derivative of one function w.r.to another function

67. If $\mathbf{x = 3at^2,\ y = 2at^3}$ then $\frac{dy}{dx} =$ ______________.

A) -t

B) $\frac{1}{t}$

C) $\frac{-1}{t}$

D) t

Answer: Option D

Explanation: Derivative of Parametric functions

68. The equation of tangent to the curve $\mathbf{y = f(x)}$ at point $(\mathbf{x_1, y_1})$ is___________________.

A) $(y - y_1) = -\left(\frac{dy}{dx}\right)_{(x_1,y_1)}(x - x_1)$

B) $(y - y_1) = \left(\frac{dy}{dx}\right)_{(x_1,y_1)}(x - x_1)$

C) $(y + y_1) = \left(\frac{dy}{dx}\right)_{(x_1,y_1)}(x + x_1)$

D) $(y + y_1) = -\left(\frac{dy}{dx}\right)_{(x_1,y_1)}(x + x_1)$

Answer: Option B

Explanation: Use $y\text{-}y_1 = m.(x - x_1)$

69. The equation of normal to the curve $\mathbf{y = f(x)}$ at point $(\mathbf{x_1, y_1})$ is___________________.

A) $(y + y_1) = \frac{1}{\left(\frac{dy}{dx}\right)_{(x_1,y_1)}}(x + x_1)$

B) $(y - y_1) = \frac{1}{\left(\frac{dy}{dx}\right)_{(x_1,y_1)}}(x - x_1)$

C) $(y + y_1) = \left(\frac{dy}{dx}\right)_{(x_1,y_1)}(x + x_1)$

D) $(y - y_1) = \frac{-1}{\left(\frac{dy}{dx}\right)_{(x_1,y_1)}}(x - x_1)$

Answer: Option D

Explanation: slope of normal = $\frac{-1}{\text{slope of tangent}}$

70. The gradient of the curve $\mathbf{y = \sqrt{x^3}}$ at $\mathbf{x = 4}$ is _________________.

A) -3

B) 3

C) 2

D) -2

Answer: Option B

Explanation: The gradient of the curve = $\left(\frac{dy}{dx}\right)$

71. At point on the curve $\mathbf{y = 3x - x^2}$ the slope is $\mathbf{-5}$?

A) $(4, 4)$

B) $(-4, 4)$

C) $(4, -4)$

D) $(-4, -4)$

Answer: Option C

Explanation: slope = $\left(\frac{dy}{dx}\right)$

72. The equation of tangent to the curve $\mathbf{y = x(2 - x)}$ at point (2, 0) is ______________.

A) $2x - y = 4$

B) $2x + y + 4 = 0$

C) $x - 2y = 2$

D) $2x + y = 4$

Answer: Option D

Explanation: Use slope point form

73. The equation of normal to the curve $\mathbf{y = x(2 - x)}$ at point (2, 0) is ______________.

A) $2x - y = 4$

B) $2x + y + 4 = 0$

C) $x - 2y = 2$

D) $2x + y = 4$

Answer: Option C

Explanation: Use slope point form

74. At point on the curve $y = x^2 - 4x + 2$ the slope of tangent is 10 ?

A) $(7, 23)$ B) $(-7, 23)$

C) $(4, -4)$ D) $(-4, -4)$

Answer: Option A

Explanation: Use slope point form and slope $=\left(\frac{dy}{dx}\right)$

75. The function $y = f(x)$ has said to have maximum value at $x = a$ if ______________.

A) $\frac{dy}{dx} = 0$ & $\frac{d^2y}{dx^2} > 0$ B) $\frac{dy}{dx} = 0$ & $\frac{d^2y}{dx^2} < 0$

C) $\frac{dy}{dx} \neq 0$ & $\frac{d^2y}{dx^2} > 0$ D) $\frac{dy}{dx} \neq 0$ & $\frac{d^2y}{dx^2} < 0$

Answer: Option B

Explanation: Use Condition for Maxima

76. The function $y = f(x)$ has said to have minimum value at $x = a$ if ______________.

A) $\frac{dy}{dx} = 0$ & $\frac{d^2y}{dx^2} > 0$ B) $\frac{dy}{dx} = 0$ & $\frac{d^2y}{dx^2} < 0$

C) $\frac{dy}{dx} \neq 0$ & $\frac{d^2y}{dx^2} > 0$ D) $\frac{dy}{dx} \neq 0$ & $\frac{d^2y}{dx^2} < 0$

Answer: Option A

Explanation: Use Condition for Minima

77. If a metal wire 36cm long is bent to form a rectangle, then what are its dimensions when its area is maximum?

A) Length = 9, Breadth = 8 B) Length = 8, Breadth = 9

C) Length = 9, Breadth = 9 D) None of these

Answer: Option C

Explanation: Use Condition for Maxima and perimeter of rectangle

78. Divide 80 into two parts such that their product is maximum i.e., one part = ___ and other part =____

A) 60, 20 B) 50, 30

C) 70, 10 D) 40, 40

Answer: Option D

Explanation: Use Condition for Maxima

79. If a metal wire 40cm long is bent to form a rectangle, then what are its dimensions when its area is maximum?

A) Length = 10, Breadth = 10 B) Length = 20, Breadth = 20

C) Length = 9, Breadth = 9 D) None of these

Answer: Option A

Explanation: Use Condition for Maxima and perimeter of rectangle

80. Divide 20 into two parts such that the product of one and cube of the other is maximum then one part = _______ and other part = ______.

A) 10, 10 B) 12, 8

C) 9, 11 D) 15, 5

Answer: Option D

Explanation: Use Condition for Maxima

81. A fence of length 100m is to be used to form three sides of a rectangular enclosure, the fourth side being a wall then the maximum area which can be enclosed by the fence is________________.

A) 1250 sq. m. B) 1200 sq. m.

C) 1150 sq. m. D) 1300 sq. m.

Answer: Option A

Explanation: Use Condition for Maxima

82. The Curvature of the curve is nothing but ________________.

A) amount of curvature B) tightness of bends

C) radius of circle D) none of these

Answer: Option B

Explanation: Use definition of the Curvature of the curve

83. The curvature of the Circle is ___________________.

A) Variable B) Tightness of bends

C) Constant D) None of these

Answer: Option C

Explanation: Use definition of the Curvature of the curve

84. The curvature of the circle is __________________________.

A) equal to radius of circle B) equal to reciprocal of radius

C) equal to curvature of the curve D) none of these

Answer: Option B

Explanation: Use definition of the Curvature of the curve

85. The radius of curvature is equal to________________.

A) $\rho = \frac{\left[1+\left(\frac{dy}{dx}\right)^2\right]^3}{\frac{d^2y}{dx^2}}$ B) $\rho = \frac{\left[1-\left(\frac{dy}{dx}\right)^2\right]^{3/2}}{\frac{d^2y}{dx^2}}$

C) $\rho = \frac{\left[1-\frac{dy}{dx}\right]^{3/2}}{\frac{d^2y}{dx^2}}$ D) $\rho = \frac{\left[1+\left(\frac{dy}{dx}\right)^2\right]^{3/2}}{\frac{d^2y}{dx^2}}$

Answer: Option D

Explanation: Use definition of the Curvature of the curve

86. The radius of curvature is equal to________________.

A) reciprocal of radius of curve

B) reciprocal of curvature of the curve

C) reciprocal of radius of circle

D) curvature of the curve

Answer: Option B

Explanation: Use definition of the Curvature of the curve

87. Let 'R' is the radius of circle then curvature of circle is equal to ___________________.

A) R

B) R = 1

C) $\frac{1}{R}$

D) none of these

Answer: Option C

Explanation: Use definition of the Curvature of the curve

88. The radius of curvature is always ________________.

A) positive

B) negative

C) may be positive or negative

D) none of these

Answer: Option A

Explanation: Use definition of the Curvature of the curve

89. The radius of curvature can be negative only when______________.

A) $\frac{dy}{dx} < 0$

B) $\frac{dy}{dx} > 0$

C) $\frac{d^2y}{dx^2} > 0$

D) $\frac{d^2y}{dx^2} < 0$

Answer: Option D

Explanation: Use definition of the Curvature of the curve

90. The radius of curvature of the curve $y = x^3$ at $(1, 1)$ is =_______________.

A) 5.27 units

B) 31.623 units

C) 30.623 units

D) none of these

Answer: Option A

Explanation: Use formula of the Curvature of the curve

91. The radius of curvature of the curve $y = x^3$ at $(2, 8)$ is =_______________.

A) 145 units

B) 145.50 units

C) $\sqrt{145}$ units

D) none of these

Answer: Option B

Explanation: Use formula of the Curvature of the curve

92. A telegraph wire hangs in the form of a curve $y = a.\log\left(\sec\left(\frac{x}{a}\right)\right)$, where ' a' is constant then the curvature at any point is ________________.

A) $\frac{1}{a}\cos\left(\frac{x}{a}\right)$

B) $\frac{1}{a}\cos(x)$

C) $\frac{1}{a}\cos(a)$

D) $\frac{1}{a}\sec\left(\frac{x}{a}\right)$

Answer: Option A

Explanation: Use formula of the Curvature of the curve

93. A telegraph wire hangs in the form of a curve $y = a.\log\left(\sec\left(\frac{x}{a}\right)\right)$, where ' a' is constant then the radius of curvature at any point is ________________.

A) $\frac{1}{a}\cos\left(\frac{x}{a}\right)$

B) $\frac{1}{a}\cos(x)$

C) $\frac{1}{a}\cos(a)$

D) $a\sec\left(\frac{x}{a}\right)$

Answer: Option A

Explanation: Use formula of the Curvature of the curve

94. A telegraph wire hangs in the form of a curve $y = a.\log\left(\sec\left(\frac{x}{a}\right)\right)$, where ' a' is constant then the radius of curvature at any point is ________________.

A) $\frac{1}{a\sec\left(\frac{x}{a}\right)}$

B) $\frac{1}{a}\cos(x)$

C) $\frac{1}{a}\cos(a)$

D) $a\sec\left(\frac{x}{a}\right)$

Answer: Option A

Explanation: Use formula of the Curvature of the curve

95. A telegraph wire hangs in the form of a curve $y = a.\log\left(\sec\left(\frac{x}{a}\right)\right)$, where ' a' is constant then the curvature at any point is ________________.

A) $\frac{1}{a}\cos\left(\frac{x}{a}\right)$

B) $\frac{1}{a}\cos(x)$

C) $\frac{1}{a\ \sec\left(\frac{x}{a}\right)}$

D) $\frac{1}{a}\cos(a)$

Answer: Option C

Explanation: Use formula of the Curvature of the curve

96. The radius of curvature of the curve $y = e^x$ at the point where it crosses the y-axis.

A) $2\sqrt{3}$ units

B) $3\sqrt{3}$ units

C) $3\sqrt{2}$ units

D) $2\sqrt{2}$ units

Answer: Option A

Explanation: Use formula of the Curvature of the curve

97. If $y = e^x$ then which of the following is correct.

A) $\frac{dy}{dx} < \frac{d^2y}{dx^2}$

B) $\frac{dy}{dx} > \frac{d^2y}{dx^2}$

C) $\frac{d^2y}{dx^2} = \frac{dy}{dx}$

D) $\frac{d^2y}{dx^2} \neq \frac{dy}{dx}$

Answer: Option C

Explanation: Use definition of the Curvature of the curve

98. The curvature of the curve $y^2 = 4x$ at the point $(2, 2\sqrt{2})$ is ________________.

A) $6\sqrt{3}$ units

B) $\frac{1}{6\sqrt{3}}$ units

C) $-6\sqrt{3}$ units

D) $\frac{-1}{6\sqrt{3}}$ units

Answer: Option A

Explanation: Use formula of the Curvature of the curve

99. A beam is bent in the form of the curve $y = 2\sin x - \sin 2x$, then the radius of curvature of the beam at the point $x = \frac{\pi}{2}$ is ______________.

A) $\frac{5\sqrt{5}}{2}$ units

B) $-5\sqrt{5}$ units

C) $\frac{2}{5\sqrt{5}}$ units

D) $-\frac{5\sqrt{5}}{2}$ units

Answer: Option A

Explanation: Use formula of the Curvature of the curve.

100. Divide 120 into two parts such that their product is maximum i.e., one part = ___and other part =___

A) 60, 60

B) 50, 70

C) 80, 40

D) 90, 30

Answer: Option A

Explanation: Use Condition for Maxima

Question Bank for Multiple Choice Questions

Program: Diploma in Computer Engineering	Program Code:-CO
Scheme:-I	Semester:-II
Course:- Applied Mathematics	Course Code:-22224

02 – Integral Calculus	Marks: - 16
Content of Chapter: - 2.1 Simple integration: Rules of integration and integration of standard functions 2.2 Methods of integration a) Integration by Substitution b) Integration by parts c) Integration by partial fractions	

1. Integration is also known as______________________.

A) Derivative B) Anti-derivative

C) Function D) None of these

Answer: Option B

Explanation: By definition of integration

2. 'zero' is the integration of______________________.

A) $\int k\ dx$ B) $\int x\ dx$

C) $\int 1\ dx$ D) $\int 0\ dx$

Answer: Option D

Explanation: By definition of integration for integration of zero

3. $\int \mathbf{k\ dx} =$______________________.

A) 0 B) 1

C) $kx + c$ D) $x + c$

Answer: Option C

Explanation: By definition of integration for constant

4. $\int \mathbf{1\ dx} =$ _______________.

A) 1

B) $x + c$

C) 0

D) $1 + c$

Answer: Option B

Explanation: By definition of integration for constant

5. $\int \mathbf{dp} =$ ________________.

A) 0

B) p

C) $p + c$

D) Cannot defined

Answer: Option C

Explanation: By definition of integration for 1

6. $\int \mathbf{Body} =$ ______________.

A) 0

B) $Bdy + c$

C) $Boy + c$

D) Cannot defined

Answer: Option C

Explanation: By definition of integration

7. $\int \mathbf{x^m\ dx} =$ ________________.

A) $x^m + c$

B) $(m - 1)\ x^m + c$

C) $m.\,x^{m-1} + c$

D) $\frac{x^{m+1}}{m+1} + c$

Answer: Option D

Explanation: By definition of integration for power of x

8. $\int \mathbf{x^{2019}\ dx} =$ ________________.

A) $x^{2019} + c$

B) $2018\,x^{2019} + c$

C) $2019.\,x^{2019-1} + c$

D) $\frac{x^{2020}}{2020} + c$

Answer: Option D

Explanation: $\int x^m\,dx = \frac{x^{m+1}}{m+1} + c.$

9. $\int \mathbf{\frac{1}{x}\ dx} =$ ______________.

A) $\log x + c$

B) $\frac{-1}{x^2} + c$

C) $\frac{1}{\log x} + c$

D) $\frac{1}{x} + c$

Answer: Option A

Explanation: By definition of integration

10. $\int \frac{1}{x^n}\ dx =$ ________________.

A) $\log x^n + c$

B) $\frac{-1}{x^n} + c$

C) $\frac{-1}{x^{n-1}} + c$

D) $\frac{-1}{(n-1)x^{(n-1)}} + c$

Answer: Option D

Explanation: $\int x^m\ dx = \ \frac{x^{m+1}}{m+1} + c.$

11. $\int \sqrt{x}\ dx =$ ____________________.

A) $\frac{2\,x^{3/2}}{3} + c$

B) $\frac{3\,x^{3/2}}{2} + c$

C) $\frac{x^{3/2}}{3} + c$

D) $\frac{1}{2\sqrt{x}} + c$

Answer: Option A

Explanation: $\int x^m\ dx = \ \frac{x^{m+1}}{m+1} + c.$

12. $\int x^{3/2}\ dx =$ ________________.

A) $\frac{x^{5/2}}{2} + c$

B) $\frac{x^{5/2}}{5} + c$

C) $\frac{2\,x^{5/2}}{5} + c$

D) $\frac{3\sqrt{x}}{2} + c$

Answer: Option C

Explanation: $\int x^m\ dx = \ \frac{x^{m+1}}{m+1} + c.$

13. $\int \frac{1}{\sqrt{x}}\ dx =$ _____________.

A) $\sqrt{x} + c$

B) $\frac{1}{\sqrt{x}} + c$

C) $\frac{2}{\sqrt{x}} + c$

D) $2\sqrt{x} + c$

Answer: Option D

Explanation: $\int x^m\ dx = \ \frac{x^{m+1}}{m+1} + c.$

14. $\int e^x\ dx =$ _____________.

A) $\frac{1}{e^x} + c$

B) $x.\,e^{x-1} + c$

C) $e^x + c$

D) $\frac{e^{x+1}}{x+1} + c$

Answer: Option C

Explanation: By definition of integration for power of e.

15. $\int \mathbf{a^x\ dx} =$ ______________.

A) $\frac{a^{x+1}}{x+1} + c$

B) $\frac{a^x}{\log a} + c$

C) $x.a^{x-1} + c$

D) $a^x + c$

Answer: Option B

Explanation: By definition of integration for power of constant

16. $\int \mathbf{3^x.2^x\ dx} =$ ______________.

A) $3^x.2^x + c$

B) $x.6^{x-1} + c$

C) $\frac{6^x}{\log 6} + c$

D) $\frac{3^x}{\log 3} \times \frac{2^x}{\log 2} + c$

Answer: Option C

Explanation: $\int a^x\ dx = \frac{a^x}{\log a} + c$

17. $\int \mathbf{e^{x-1}\ dx} =$ ______________.

A) $\frac{1}{e^{x-1}} + c$

B) $e^{x-1} + c$

C) $(x-1)e^{x-2} + c$

D) $\frac{e^x}{x} + c$

Answer: Option B

Explanation: By definition of integration for power of e.

18. $\int \mathbf{e^{2\log x}\ dx} =$ __________________.

A) $\frac{x^3}{3} + c$

B) $e^{2\log x} + c$

C) $2\log x\ e^{2\log x - 1}$+ c

D) None of these

Answer: Option A

Explanation: $e^{2\log x} = x^2 \quad \int x^m\ dx = \frac{x^{m+1}}{m+1} + c.$

19. $\int \mathbf{e^{x\log 2}\ dx} =$ __________________.

A) $\frac{x^3}{3} + c$

B) $e^{x\log 2} + c$

C) $x\log 2\ e^{(x-1)\log 2}$+ c

D) $\frac{2^x}{\log 2} + c$

Answer: Option A

Explanation: $e^{2\log x} = x^2$ & $\int x^m\ dx = \frac{x^{m+1}}{m+1} + c.$

20. $\int \mathbf{\sin x\ \ dx} =$ ________________.

A) $\cos x + c$

B) $\sin x + c$

C) $-\cos x + c$

D) None of these

Answer: Option C

Explanation: By definition of integration for Trigonometric functions.

21. $\int \cos x \ dx =$ ______________.

A) $\cos x + c$

B) $\sin x + c$

C) $-\cos x + c$

D) None of these

Answer: Option B

Explanation: By definition of integration for Trigonometric functions

22. $\int \sec^2 x \ dx =$ ______________.

A) $\sec x + c$

B) $2.\sec x + c$

C) $\frac{\sec^3 x}{3} + c$

D) $\tan x + c$

Answer: Option D

Explanation: By definition of integration for Trigonometric functions

23. $\int \text{cosec}^2 x \ dx =$ ______________.

A) $\text{cosec}\, x + c$

B) $-\cot x + c$

C) $\frac{\text{cosec}^3 x}{3} + c$

D) $2.\text{cosec}\, x + c$

Answer: Option B

Explanation: By definition of integration for Trigonometric functions

24. $\int \sec x . \tan x . dx =$ ______________.

A) $\sec x + c$

B) $\sec x - \tan x + c$

C) $\sec x + \tan x + c$

D) $\tan x + c$

Answer: Option A

Explanation: By definition of integration for Trigonometric functions

25. $\int \frac{\sin x}{\cos^2 x} \ dx =$ ______________.

A) $\text{cosec}\, x + c$

B) $\sec x - \tan x + c$

C) $\sec x + c$

D) $\tan x + c$

Answer: Option C

Explanation: $\frac{\sin x}{\cos^2 x} = \sec x . \tan x$ & $\int \sec x . \tan x . dx = \sec x + c$

26. $\int \text{cosec}\, x . \cot x . dx =$ ______________.

A) $-\text{cosec}\, x + c$

B) $\text{cosec}\, x - \cot x + c$

C) $\text{cosec}\, x + \cot x + c$

D) $\cot x + c$

Answer: Option A

Explanation: By definition of integration for Trigonometric functions

27. $\int \frac{\cos x}{\sin^2 x} \ dx =$ ______________.

A) $\cos x + \sin x + c$

B) $-\text{cosec}\, x + c$

C) $\cos x - \sin x + c$

D) $\cot x + c$

Answer: Option B

Explanation: $\frac{\cos x}{\sin^2 x} = \text{cosec}\, x . \cot x$ $\quad \int \text{cosec}\, x . \cot x . dx = -\text{cosec}\, x + c$

28. $\int \tan x \; dx =$ ____________.

A) $\log|\tan x| + c$

B) $\operatorname{cosec} x + c$

C) $\log|\sec x| + c$

D) $\sec x + c$

Answer: Option C

Explanation: By definition of integration for Trigonometric functions

29. $\int \cot x \; dx =$ ____________.

A) $\log|\sin x| + c$

B) $\operatorname{cosec} x + c$

C) $\log|\operatorname{cosec} x| + c$

D) $\sec x + c$

Answer: Option A

Explanation: By definition of integration for Trigonometric functions

30. $\int \sec x \; dx =$ ____________.

A) $\log|\sec x + \tan x| + c$

B) $\log|\sec x - \tan x| + c$

C) $\log|\operatorname{cosec} x - \cot x| + c$

D) $\log\left|\tan\left(\frac{x}{2} - \frac{\pi}{4}\right)\right| + c$

Answer: Option A

Explanation: By definition of integration for Trigonometric functions

31. $\int \operatorname{cosec} x \; dx =$ ____________.

A) $\log|\sec x + \tan x| + c$

B) $\log|\operatorname{cosec} x + \cot x| + c$

C) $\log|\operatorname{cosec} x - \cot x| + c$

D) $\log\left|\tan\left(\frac{x}{2} - \frac{\pi}{4}\right)\right| + c$

Answer: Option C

Explanation: By definition of integration for Trigonometric functions

32. $\int \sec x \; dx =$ ____________.

A) $\log\left|\tan\left(\frac{x}{2} + \frac{\pi}{4}\right)\right| + c$

B) $\log|\sec x - \tan x| + c$

C) $\log|\operatorname{cosec} x - \cot x| + c$

D) $\log\left|\tan\left(\frac{x}{2} - \frac{\pi}{4}\right)\right| + c$

Answer: Option A

Explanation: By definition of integration for Trigonometric functions

33. $\int \operatorname{cosec} x \; dx =$ ____________.

A) $\log|\sec x + \tan x| + c$

B) $\log|\operatorname{cosec} x + \cot x| + c$

C) $\log\left|\tan\left(\frac{x}{2} - \frac{\pi}{4}\right)\right| + c$

D) $\log\left|\tan\left(\frac{x}{2}\right)\right| + c$

Answer: Option D

Explanation: By definition of integration for Trigonometric functions

34. $\int \log x \; dx =$ ___________.

A) $\frac{1}{x} + c$

B) $x. \log x + x + c$

C) $x. (\log x - 1) + c$

D) $x. (1 - \log x) + c$

Answer: Option B

Explanation: u = log x and v = 1 then by, ∫(uv)dx = u∫vdx – ∫[d(u)/dx ∫dv] dx

∫(logx.1) dx = logx∫1.dx – ∫[d(logx)/dx ∫1dx] dx

35. $\int \frac{1}{\sqrt{1-x^2}} \; dx =$ ___________.

A) $\sin^{-1} x + c$

B) $\cos^{-1} x + c$

C) $\sec^{-1} x + c$

D) $\tan^{-1} x + c$

Answer: Option A

Explanation: $\int \frac{dx}{\sqrt{a^2 - x^2}} = \sin^{-1}\left(\frac{x}{a}\right) + c.$

36. $\int \frac{1}{\sqrt{1-x^2}} \; dx =$ ___________.

A) $\operatorname{cosec}^{-1} x + c$

B) $-\cos^{-1} x + c$

C) $\sec^{-1} x + c$

D) $\tan^{-1} x + c$

Answer: Option B

Explanation: $\int \frac{dx}{\sqrt{a^2 - x^2}} = -\cos^{-1}\left(\frac{x}{a}\right) + c.$

37. $\int \frac{dx}{x^2+1} =$ ___________.

A) $\cot^{-1} x + c$

B) $\cos^{-1} x + c$

C) $\sec^{-1} x + c$

D) $\tan^{-1} x + c$

Answer: Option D

Explanation: By definition of integration for inverse Trigonometric functions

38. $\int \frac{1}{1+x^2} \; dx =$ ___________.

A) $-\cot^{-1} x + c$

B) $\cos^{-1} x + c$

C) $-\sec^{-1} x + c$

D) $-\tan^{-1} x + c$

Answer: Option A

Explanation: By definition of integration for inverse Trigonometric functions

39. $\int \frac{1}{x.\sqrt{x^2-1}} \; dx =$ ___________.

A) $\cot^{-1} x + c$

B) $\cos^{-1} x + c$

C) $\sec^{-1} x + c$

D) $\operatorname{cosec}^{-1} x + c$

Answer: Option C

Explanation: By definition of integration for inverse Trigonometric functions

40. $\int \frac{1/x}{\sqrt{x^2-1}}\, dx =$ __________.

A) $\sin^{-1} x + c$

B) $\cos^{-1} x + c$

C) $\sec^{-1} x + c$

D) $-\mathrm{cosec}^{-1} x + c$

Answer: Option D

Explanation: By definition of integration for inverse Trigonometric functions

41. $\int \frac{dx}{\sqrt{a^2 - x^2}} =$ ______________.

A) $\log\left|x + \sqrt{a^2 - x^2}\right| + c$

B) $\log\left|x - \sqrt{a^2 - x^2}\right| + c$

C) $\sin^{-1}\left(\frac{x}{a}\right) + c$

D) $\frac{1}{2a} \log\left|\frac{a - x}{a + x}\right| + c$

Answer: Option C

Explanation: By definition of integration for inverse Trigonometric functions

42. $\int \frac{dx}{\sqrt{x^2 + a^2}} =$ ______________.

A) $\log\left|x + \sqrt{a^2 + x^2}\right| + c$

B) $\log\left|x - \sqrt{x^2 + a^2}\right| + c$

C) $\sin^{-1}\left(\frac{x}{a}\right) + c$

D) $\frac{1}{a} \tan^{-1}\left(\frac{x}{a}\right) + c$

Answer: Option A

Explanation: By definition of integration for logarithmic functions

43. $\int \frac{dx}{\sqrt{x^2 - a^2}} =$ ______________.

A) $\log\left|x - \sqrt{x^2 - a^2}\right| + c$

B) $\log\left|x + \sqrt{x^2 - a^2}\right| + c$

C) $\sin^{-1}\left(\frac{x}{a}\right) + c$

D) $\frac{1}{2a} \log\left|\frac{x - a}{x + a}\right| + c$

Answer: Option B

Explanation: By definition of integration for logarithmic functions

44. $\int \frac{1}{a^2 - x^2}\, dx =$ ______________.

A) $\frac{1}{2a} \log\left|\frac{a + x}{a - x}\right| + c$

B) $\frac{1}{2a} \log\left|\frac{a - x}{a + x}\right| + c$

C) $\sin^{-1}\left(\frac{x}{a}\right) + c$

D) $\frac{1}{2a} \log\left|\frac{x - a}{x + a}\right| + c$

Answer: Option A

Explanation: By definition of integration for logarithmic functions

45. $\int \frac{1}{x^2 - a^2}\, dx =$ ______________.

A) $\frac{1}{2a} \log\left|\frac{a + x}{a - x}\right| + c$

B) $\frac{1}{2a} \log\left|\frac{a - x}{a + x}\right| + c$

C) $\frac{1}{2a} \log\left|\frac{x + a}{x - a}\right| + c$

D) $\frac{1}{2a} \log\left|\frac{x - a}{x + a}\right| + c$

Answer: Option D

Explanation: By definition of integration for logarithmic functions

46. $\int \frac{1}{x^2+a^2} dx =$ ______________.

A) $\frac{1}{2a}\log\left|\frac{a+x}{a-x}\right| + c$

B) $\frac{1}{2a}\log\left|\frac{a-x}{a+x}\right| + c$

C) $\frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right) + c$

D) $\frac{1}{2a}\log\left|\frac{x-a}{x+a}\right| + c$

Answer: Option C

Explanation: By definition of integration for inverse Trigonometric functions

47. $\int \frac{f(x)'}{f(x)} dx =$ ______________.

A) $\log(f(x)) + c$

B) $\log|f(x)| + c$

C) $f(x) + c$

D) None of These

Answer: Option A

Explanation: By definition of integration by substitution.

48. $\int \frac{f(x)'}{\sqrt{f(x)}} dx =$ ______________.

A) $\log\left(\sqrt{f(x)}\right) + c$

B) $\log\left|\sqrt{f(x)}\right| + c$

C) $2.f(x) + c$

D) $2.\sqrt{f(x)} + c$

Answer: Option D

Explanation: By definition of integration by substitution.

49. $\int \frac{\sin x}{\cos x} dx =$ ___________.

A) $\log(\cos x) + c$

B) $-\log|\cos x| + c$

C) $\log|\sec x| + c$

D) Both B) & C)

Answer: Option D

Explanation: $\frac{\sin x}{\cos x} = \tan x$

50. $\int \frac{1}{x+5} dx =$ _____________.

A) $\log(x) + 5 + c$

B) $\log|x + 5| + c$

C) $\frac{-1}{(x+5)^2} + c$

D) None of These

Answer: Option B

51. $\int (x^m + m^x + m^m) dx =$ _____________.

A) $m.x^{m-1} + \frac{m^x}{\log m} + c$

B) $\frac{x^{m+1}}{m+1} + m^x.\log m + 0 + c$

C) $\frac{x^{m+1}}{m+1} + m^x/\log m + m^m.x + c$

D) None of These

Answer: Option C

Explanation: $\int x^m dx = \frac{x^{m+1}}{m+1} + c.$ and $\int a^x dx = \frac{a^x}{\log a} + c$

52. $\int \frac{3x}{\sqrt{x^2-1}}\,dx =$ ____________.

A) $3\sqrt{x^2-1}$ +c

B) $\frac{3}{2}\sqrt{x^2-1}$ +c

C) $2\sqrt{x^2-1}$ +c

D) $\frac{3}{2}\log\sqrt{x^2-1}$ +c

Answer: Option A

Explanation: u= $\sqrt{x^2-1}$, convert dx into du

53. Evaluate: $\int \frac{dx}{2x+1} =$ ______________.

A) $\log(2x) + 1 + c$

B) $\frac{1}{2}\log|2x + 1| + c$

C) $\log\sqrt{2x + 1} + c$

D) Both B) & C)

Answer: Option D

Explanation: $\int \frac{1}{x}$ dx=$\log x + c$ AND $\frac{1}{2}\log x = \log\sqrt{x}$

54. Evaluate: $\int \left(\frac{1}{x^2+1} + e^{2x}\right) dx =$ ____________.

A) $\tan^{-1} x + e^{2x} + c$

B) $\tan^{-1} x + \frac{e^{2x}}{2} + c$

C) $\tan x + \frac{e^{2x}}{2} + c$

D) $\tan x + e^{2x} + c$

Answer: Option B

Explanation: $\int \frac{1}{x^2+a^2}dx = \frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right) + c.$ and $\int e^{mx}\,dx = \frac{e^{mx}}{m} + c$

55. Evaluate: $\int \frac{dx}{3x+5} =$ ______________.

A) $\log(3x) + 5 + c$

B) $\frac{1}{3}\log|3x + 5| + c$

C) $\tan^{-1}\left(\frac{3x}{5}\right) + c$

D) Both B) & A)

Answer: Option B

Explanation: $\int \frac{1}{x}$ dx=$\log x$

56. Evaluate: $\int \frac{dx}{3x^2+4} =$ ____________.

A) $\tan^{-1}\left(\frac{3x}{4}\right) + c$

B) $\frac{1}{2}\tan^{-1}\left(\frac{3x}{4}\right) + c$

C) $\frac{1}{3}\log(3x^2+4) + c$

D) $\frac{1}{2\sqrt{3}}\tan^{-1}\left(\frac{\sqrt{3}x}{2}\right) + c$

Answer: Option B

Explanation: Substitute u=$\frac{\sqrt{3}x}{2}$ AND $\int \frac{1}{x^2+a^2}dx = \frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right) + c.$

57. Evaluate: $\int \frac{dx}{\sqrt{4-9x^2}} =$ ______________.

A) $\frac{1}{3}\sin^{-1}\left(\frac{3x}{2}\right) + c$

B) $\frac{1}{2}\tan^{-1}\left(\frac{3x}{2}\right) + c$

C) $\frac{1}{3}\log\left(\sqrt{4-9x^2}\right) + c$

D) $\frac{1}{6}\tan^{-1}\left(\frac{3x}{2}\right) + c$

Answer: Option A

Explanation: Substitute u=$\frac{3x}{2}$ AND $\int \frac{dx}{\sqrt{a^2-x^2}} = \sin^{-1}\left(\frac{x}{a}\right) + c.$

58. Evaluate: $\int \frac{1}{3x^2+5}\,dx =$ ______________.

A) $\frac{1}{\sqrt{5}}\tan^{-1}\left(\frac{\sqrt{3}x}{\sqrt{5}}\right) + c$

B) $\frac{1}{\sqrt{15}}\tan^{-1}\left(\frac{\sqrt{3}x}{\sqrt{5}}\right) + c$

C) $\frac{1}{\sqrt{5}}\tan^{-1}\left(\frac{3x}{5}\right) + c$

D) None of These

Answer: Option B

Explanation: $\int \frac{1}{x^2+a^2}dx = \frac{1}{a}\tan^{-1}\left(\frac{x}{a}\right) + c.$

59. Evaluate: $\int \frac{dx}{25-9x^2} =$ _________.

A) $\frac{1}{3}\sin^{-1}\left(\frac{3x}{5}\right) + c$

B) $\frac{1}{15}\log\left|\frac{3x-5}{3x+5}\right| + c$

C) $\frac{1}{15}\log\left|\frac{5-3x}{5+3x}\right| + c$

D) $\frac{1}{30}\log\left|\frac{5+3x}{5-3x}\right| + c$

Answer: Option D

Explanation: $\int \frac{1}{x^2-a^2}dx = \frac{1}{2a}\log\left|\frac{a+x}{a-x}\right| + c.$

60. Evaluate: $\int \frac{dx}{9x^2-16} =$ _________.

A) $\frac{1}{24}\log\left|\frac{3x+4}{3x-4}\right| + c$

B) $\frac{1}{24}\log\left|\frac{3x-4}{3x+4}\right| + c$

C) $\frac{1}{12}\log\left|\frac{4-3x}{4+3x}\right| + c$

D) $\frac{1}{24}\log\left|\frac{4+3x}{4-3x}\right| + c$

Answer: Option B

Explanation: $\int \frac{1}{x^2-a^2}dx = \frac{1}{2a}\log\left|\frac{x-a}{x+a}\right| + c.$

61. Evaluate: $\int \frac{6x+9}{x^2+3x+2}\,dx =$ _________.

A) $3.\log(x^2+3x+2) + c$

B) $\log(x^2+3x+2) + c$

C) $3.[\log(x+2) + \log(x+1)] + c$

D) Both A) & C)

Answer: Option D

Explanation: $\int \frac{f(x)'}{f(x)}dx = \log(f(x)) + c.$ and log (u.v) = log(u)+ log(v)

62. Evaluate: $\int \mathbf{sin(3x+5)}\ \ \mathbf{dx} =$ __________.

A) $\cos(3x+5)+c$

B) $-\cos(3x+5)+c$

C) $-3.\cos(3x+5)+c$

D) $\frac{-\cos(3x+5)}{3}+c$

Answer: Option D

Explanation: $\int \sin x\ \ dx = -\cos x + c$

63. Evaluate: $\int \mathbf{e^{2x-1}}\ \ \mathbf{dx} =$ ________.

A) $e^{2x-1}+c$

B) $\frac{e^{2x-1}}{2}+c$

C) $2.e^{2x-1}+c$

D) None of these

Answer: Option B

Explanation: By definition of for power of e.

64. Evaluate: $\int \mathbf{3^{2x-1}}\ \ \mathbf{dx} =$ ________.

A) $3^{2x-1}\log 3+c$

B) $\frac{3^{2x-1}}{2}+c$

C) $2.3^{2x-1}\log 3+c$

D) $\frac{3^{2x-1}}{2\ \log 3}+c$

Answer: Option D

Explanation: By the formula for a^x

65. Evaluate: $\int \mathbf{(1-x)^{10}dx} =$ __________.

A) $10.(1-x)^9+c$

B) $\frac{-1}{11}(1-x)^{11}+c$

C) $\frac{1}{10}(1-x)^{10}+c$

D) $\frac{(1-x)^{11}}{11}+c$

Answer: Option B

Explanation: By the formula for x^m

66. Evaluate: $\int \mathbf{\frac{x-1}{x+1}}\ \mathbf{dx} =$ _________.

A) $x-2\log(x+1)+c$

B) $x-\log(x+1)+c$

C) $\log(x+1)+c$

D) None of these

Answer: Option A

Explanation: By the formula of integration for rational functions.

67. Evaluate: $\int \mathbf{\frac{2x+5}{2x-3}dx} =$ ________.

A) $x-4\log(2x-3)+c$

B) $x+4\log(2x-3)+c$

C) $\log(2x-3)+c$

D) $\log(2x+5)+c$

Answer: Option B

Explanation: By the formula of integration for rational functions.

68. **Evaluate:** $\int \frac{x^2-1}{x^2+1} dx =$ ________.

A) $x + 2\tan^{-1} x + c$

B) $x - 2\log\left|\frac{x-1}{x+1}\right| + c$

C) $x - 2\tan^{-1} x + c$

D) None of these

Answer: Option C

Explanation: By the formula of integration for rational functions.

69. **Evaluate:** $\int \frac{1+x^2}{x^2-1} dx =$ ________.

A) $x + 2\log\left|\frac{x-1}{x+1}\right| + c$

B) $x + 2\log\left|\frac{x+1}{x-1}\right| + c$

C) $x + 2\tan^{-1} x + c$

D) None of these

Answer: Option A

Explanation: By the formula of integration for rational functions.

70. **Evaluate:** $\int \sin^2 x \; dx =$ __________.

A) $\frac{\sin^3 x}{3} + c$

B) $\frac{1}{4}\ (2x - \sin 2x) + c$

C) $\frac{x}{2} - \frac{\sin 2x}{4} + c$

D) Both B) & C)

Answer: Option C

Explanation: Substitute, $\sin^2 x = \frac{1-\cos 2x}{2}$

71. **Evaluate:** $\int \tan^2 x \; dx =$ __________.

A) $\frac{\tan^3 x}{3} + c$

B) $\tan x - x + c$

C) $\tan x + x + c$

D) $\sec^2 x + c$

Answer: Option B

Explanation: Substitute, $\tan^2 x = \sec^2 x - 1$

72. **Evaluate:** $\int \cos^2 x \; dx =$ __________.

A) $\frac{\cos^3 x}{3} + c$

B) $\frac{1}{4}\ (2x + \sin 2x) + c$

C) $\frac{x}{2} - \frac{\sin 2x}{4} + c$

D) None of these

Answer: Option B

Explanation: Substitute, $\cos^2 x = \frac{1+\cos 2x}{2}$

73. **Evaluate:** $\int \frac{dx}{\sin^2 x . \cos^2 x} =$ ________.

A) $-\tan x . \cot x + c$

B) $\sec x . \text{cosec}\, x + c$

C) $\tan x - \cot x + c$

D) None of these

Answer: Option C

Explanation: Substitute, $1 = \sin^2 x. + \cos^2 x$

74. Evaluate: $\int \frac{\cos 2x}{\sin^2 x . \cos^2 x}\, dx =$ ________.

A) $-(\tan x + \cot x) + c$

B) $\sec x . \operatorname{cosec} x + c$

C) $\tan x + \cot x + c$

D) $\cot x - \tan x + c$

Answer: Option A

Explanation: Use formula $\cos 2x = \cos^2 x - \sin^2 x$

75. $\int \sin^3 x \ \ dx =$ __________.

A) $\frac{\sin^4 x}{4} + c$

B) $\frac{1}{12}\ (-9\cos x + \cos 3x) + c$

C) $\frac{1}{12}\ (9\cos x - \cos 3x) + c$

D) $\frac{\sin^4 x}{4\ \cos x} + c$

Answer: Option B

Explanation: Substitute, $\sin^3 x = \frac{3\sin x - \sin 3x}{4}$

76. $\int \cos^3 x \ \ dx =$ __________.

A) $\frac{\cos^4 x}{4} + c$

B) $\frac{1}{12}\ (-9\sin x + \sin 3x) + c$

C) $\frac{1}{12}\ (9\sin x + \sin 3x) + c$

D) $\frac{\cos^4 x}{4\ \sin x} + c$

Answer: Option C

Explanation: Substitute, $\cos 3x = 4\cos^3 x - 3\cos x$

77. Evaluate: $\int \sin x^{\cdot} \ \ dx =$ __________.

A) $-\cos x^{\cdot} + c$

B) $-\frac{180}{\pi}\cos x^{\cdot} + c$

C) $-\frac{\pi}{180}\cos x^{\cdot} + c$

D) $\cos x + c$

Answer: Option A

Explanation: $\int \sin x \ dx = -\cos x + c$ and $x^{\circ} = \frac{\pi . x}{180}$

78. Evaluate: $\int \sec^2 x^{\cdot} \ \ dx =$ __________.

A) $\tan x^{\cdot} + c$

B) $\left(\frac{180}{\pi}\right)\ \tan x^{\cdot} + c$

C) $\left(\frac{\pi}{180}\right)\tan x^{\cdot} + c$

D) None of these

Answer: Option A

Explanation: $\int \sec^2 x \ dx = \tan x + c$ and $x^{\circ} = \frac{\pi . x}{180}$

79. If $\int f[\emptyset(x)].\emptyset'(x)\ \ dx$ **then which of the following method is applicable.**

A) Substitution Method

B) Partial fraction Method

C) Integration By parts

D) None of these

Answer: Option A

Explanation: Definition of Substitution method.

80. If $\int \mathbf{f}[\emptyset(\mathbf{x})].\emptyset'(\mathbf{x})\ \mathbf{dx}$ then the proper substitution is_______________.

A) $\emptyset'(x) = t$ B) $\emptyset(x) = t$

C) $f[\emptyset(x)] = t$ D) None of these

Answer: Option B

Explanation: Definition of Substitution method.

81. Evaluate: $\int \mathbf{e}^{\mathbf{e}^{\mathbf{x}}}.\mathbf{e}^{\mathbf{x}}\mathbf{dx} =$ __________.

A) $e^x + c$ B) e^{e^x}

C) $e^{e^x} + c$ D) None of these

Answer: Option C

Explanation: By substitution method, put $e^x = t$

82. Evaluate: $\int \frac{\mathbf{1}}{\mathbf{x}.\log \mathbf{x}}\ \mathbf{dx} =$ _________.

A) $x.\ \log x + c$ B) $\log(\log x) + c$

C) $\log x + c$ D) None of these

Answer: Option B

Explanation: By substitution method.

83. Evaluate: $\int \frac{\cos(\log \mathbf{x})}{\mathbf{x}}\ \mathbf{dx} =$ _________.

A) $\sin(\log x) + c$ B) $\frac{1}{\sin(\log x)} + c$

C) $-\cos(\log x) + c$ D) None of these

Answer: Option A

Explanation: By substitution method, put $\log x = t$

84. Evaluate: $\int \frac{\cos \mathbf{x}}{\sin^2 \mathbf{x}+1}\ \mathbf{dx} =$ ___________.

A) $\log(\sin x) + c$ B) $\log(\cos x) + c$

C) $\tan^{-1}(\sin x) + c$ D) None of these

Answer: Option C

Explanation: By substitution method, put $\sin x = t$

85. Evaluate: $\int \frac{3^{\tan^{-1} \mathbf{x}}}{\mathbf{x}^2+1}\mathbf{dx} =$ ___________.

A) $3^{\tan^{-1} x} + c$ B) $\frac{3^{\tan^{-1} x}}{\log 3} + c$

C) $3^{\tan^{-1} x}.\log 3 + c$ D) None of these

Answer: Option B

Explanation: By substitution method, put $\tan^{-1}x = t$

86. Evaluate: $\int \mathbf{x^{n-1}.\cos(x^n)\ dx} =$ _________.

A) $\frac{\sin(x^n)}{n} + c$
B) $\frac{\cos(x^n)}{n} + c$
C) $-\frac{\sin(x^n)}{n} + c$
D) $-\frac{\cos(x^n)}{n} + c$

Answer: Option A

Explanation: By substitution method, put $x^n = t$

87. If $\int \frac{\mathbf{e^x(x+1)}}{\mathbf{\cos^2(e^x.x)}}\ \mathbf{dx}$ **then to solve this integration the standard substitution is** _________________.

A) $\cos^2 x = t$
B) $e^x = t$
C) $\cos^2(e^x.x) = t$
D) $e^x.x = t$

Answer: Option D

Explanation: By substitution method

88. If $\int \frac{\mathbf{e^x(x-1)}}{\mathbf{x^2\ \sin^2\left(\frac{e^x}{x}\right)}}\ \mathbf{dx}$ **then to solve this integration the standard substitution is** _________________.

A) $\sin^2 x = t$
B) $\sin^2\left(\frac{e^x}{x}\right) = t$
C) $\frac{e^x}{x} = t$
D) $e^x(x-1) = t$

Answer: Option C

Explanation: By substitution method

89. Evaluate: $\int \frac{\mathbf{\sec^2 x}}{\mathbf{3 + \tan x}}\ \mathbf{dx} =$ ____________.

A) $\log(3 + \tan x) + c$
B) $\log(\tan x) + c$
C) $\log(\sec^2 x) + c$
D) None of these

Answer: Option A

Explanation: By substitution method, put $\tan x = t$

90. If $\int \frac{\mathbf{\sec x.\operatorname{cosec} x}}{\mathbf{\log(\tan x)}}\ \mathbf{dx}$ **then to solve this integration the standard substitution is** _________________.

A) $\tan x = t$
B) $\log(\tan x) = t$
C) $\sec x.\operatorname{cosec} x = t$
D) None of these

Answer: Option A

Explanation: By substitution method

91. If $\int \frac{\mathbf{\log\left[\tan\left(\frac{x}{2}\right)\right]}}{\mathbf{\sin x}}\ \mathbf{dx}$ **then to solve this integration the standard substitution is** _________________.

A) $\tan\left(\frac{x}{2}\right) = t$
B) $\frac{x}{2} = t$
C) $\sin x = t$
D) $\log\left[\tan\left(\frac{x}{2}\right)\right] = t$

Answer: Option B

Explanation: By substitution method

92. If $\int \frac{dx}{ax^2+bx+c}$ **then the formula for Third Term is______________.**

A) $T.T. = \left(\frac{1}{2} \times \text{coefficient of x}\right)^2$

B) $T.T. = \left(\frac{1}{2} \times \text{coefficient of x}\right)$

C) $T.T. = \left(\frac{1}{2} \times \ a\right)^2$

D) $T.T. = \left(\frac{1}{2} \times b\right)$

Answer: Option A

Explanation: By Integration of Rational functions.

93. If $\int \frac{dx}{x^2+4x+5}$ **then the Third Term is = ______________.**

A) 2

B) 4

C) 5

D) $\frac{1}{2}$

Answer: Option B

Explanation: $T.T. = \left(\frac{1}{2} \times \text{coefficient of x}\right)^2$

94. To solve $\int \frac{dx}{2+3\sin x}$ **the standard Substitutions are______________.**

A) $\tan\left(\frac{x}{2}\right) = t,\ dx = \frac{2dt}{1+t^2},\ \sin x = \frac{1-t^2}{1+t^2}$

B) $\tan\left(\frac{x}{2}\right) = t,\ dx = \frac{2dt}{1+t^2},\ \sin x = \frac{2t}{1+t^2}$

C) $\tan(x) = t,\ dx = \frac{dt}{1+t^2},\ \sin x = \frac{2t}{1+t^2}$

D) $\tan(x) = t,\ dx = \frac{dt}{1+t^2},\ \sin x = \frac{1-t^2}{1+t^2}$

Answer: Option A

Explanation: By substitution method

95. To solve $\int \frac{dx}{4-5\cos 2x}$ **the standard Substitutions are______________.**

A) $2x = t,\ dx = \frac{dt}{2}$

B) $x = t,\ dx = \frac{dt}{2}$

C) $2x = t,\ dx = dt$

D) $x = t,\ dx = dt$

Answer: Option B

Explanation: By substitution method

96. Identify the correct method from following to solve $\int \frac{1}{x+\sqrt{x}}\, dx$

A) Direct method of Integration

B) Method of Substitution

C) Method of Partial Fraction

D) Method of By-parts

Answer: Option B

Explanation: By substitution method

97. Evaluate: $\int \frac{dx}{9\cos^2 x + 4\sin^2 x} =$ ____________.

A) $\frac{1}{6}\tan^{-1}\left(\frac{2t}{6}\right) + c$

B) $\frac{1}{6}\tan^{-1}\left(\frac{2\cos x}{6}\right) + c$

C) $\frac{1}{6}\tan^{-1}\left(\frac{2\tan x}{3}\right) + c$

D) None of these

Answer: Option C

Explanation: By substitution method

98. Identify the correct formula for $\int \mathbf{u.v\,dx} =$ ________

A) $u.\int v\,dx - \int\left(\frac{du}{dx}\int v\,dx\right)dx$

B) $u.\int v\,dx + \int\left(\frac{du}{dx}\int v\,dx\right)dx$

C) $v.\int u\,dx - \int\left(\frac{dv}{dx}\int u\,dx\right)dx$

D) $v.\int u\,dx + \int\left(\frac{dv}{dx}\int u\,dx\right)dx$

Answer: Option A

Explanation: Rule of Integration by parts.

99. From "LIATE" rule 'I' indicates___________.

A) Logarithmic function

B) Inverse Trigonometric functions

C) Algebraic function

D) Exponential function

Answer: Option B

Explanation: Integration by parts

100. From "LIATE" rule 'L' indicates__________.

A) Logarithmic function

B) Inverse Trigonometric functions

C) Algebraic function

D) Exponential function

Answer: Option A

Explanation: Integration by parts

101. From "LIATE" rule 'E' indicates__________.

A) Logarithmic function

B) Inverse Trigonometric functions

C) Algebraic function

D) Exponential function

Answer: Option D

Explanation: Integration by parts

102. If $\int \mathbf{e^{3x}.\cos 2x\ dx}$ then according to "LIATE" rule $\mathbf{u} =$ _____& $\mathbf{v} =$ _______

A) $u = e^{3x}, v = \cos 2x$

B) $u = \cos 2x, v = e^{3x}$

C) $u = \cos 3x, v = e^{2x}$

D) none of these

Answer: Option C

Explanation: Integration by parts

103. According to "LIATE" rule Logarithmic function and Exponential functions are always_______ respectively.

A) u = logarithmic, v = Exponential

B) u = Exponential, v = Logarithmic

C) u = Exponential

D) v = Logarithmic

Answer: Option A

Explanation: Integration by parts

104. Evaluate: $\int \mathbf{x.\sin x\ dx} =$ __________.

A) $x.\cos x + \sin x + c$

B) $-x.\cos x + \sin x + c$

C) $-x.\cos x - \sin x + c$

D) $-x.\sin x - \cos x + c$

Answer: Option B

Explanation: Integration by parts ("LIATE" rule)

105. Evaluate: $\int \mathbf{x.\sin 2x\ dx} =$ __________.

A) $-x.\cos 2x + \sin 2x + c$

B) $-\frac{x}{2}.\cos 2x - \frac{1}{4}\sin 2x +$

C) $-\frac{x}{2}.\cos 2x + \frac{1}{4}\sin 2x + c$

D) $-\frac{x}{2}.\sin 2x + \frac{1}{4}\cos 2x + c$

Answer: Option B

Explanation: Integration by parts ("LIATE" rule)

106. Evaluate: $\int \mathbf{x.\ e^x\ dx} =$ __________.

A) $e^x(x-1) + c$

B) $e^x(x+1) + c$

C) $x.(e^x - 1) + c$

D) $x.(e^x + 1) + c$

Answer: Option A

Explanation: Integration by parts ("LIATE" rule)

107. Evaluate: $\int \mathbf{x^2.\ e^{3x}\ dx} =$ __________.

A) $\frac{e^{3x}}{27}(9x^2 + 6x + 2) + c$

B) $\frac{e^{3x}}{27}(9x^2 + 6x - 2) + c$

C) $e^{3x}(9x^2 + 6x + 2) + c$

D) $\frac{e^{3x}}{27}(9x^2 - 6x + 2) + c$

Answer: Option D

Explanation: Integration by parts ("LIATE" rule)

108. Evaluate: $\int \mathbf{e^{ax}.\cos bx\ dx} =$ __________.

A) $\frac{e^{ax}}{a^2+b^2}(a\cos bx + b\sin bx) + c$

B) $\frac{e^{ax}}{a^2-b^2}(a\cos bx + b\sin bx) + c$

C) $\frac{e^{ax}}{a^2+b^2}(a\sin bx - b\cos bx) + c$

D) $\frac{e^{ax}}{a^2-b^2}(a\sin bx - b\cos bx) + c$

Answer: Option A

Explanation: Integration by parts ("LIATE" rule)

109. Evaluate: $\int \mathbf{e^{ax}.\sin bx\ dx} =$ __________.

A) $\frac{e^{ax}}{a^2+b^2}(a\cos bx + b\sin bx) + c$

B) $\frac{e^{ax}}{a^2-b^2}(a\cos bx + b\sin bx) + c$

C) $\frac{e^{ax}}{a^2+b^2}(a\sin bx - b\cos bx) + c$

D) $\frac{e^{ax}}{a^2-b^2}(a\sin bx - b\cos bx) + c$

Answer: Option C

Explanation: Integration by parts ("LIATE" rule)

110. Evaluate: $\int \mathbf{e^{2x}.\cos 3x\ dx} =$ ________.

A) $\frac{e^{2x}}{13}(3\cos 2x + 2\sin 3x) + c$

B) $\frac{e^{2x}}{13}(2\cos 3x + 3\sin 3x) + c$

C) $\frac{e^{2x}}{13}(2\cos 3x - 3\sin 3x) + c$

D) $\frac{e^{2x}}{13}(2\sin 3x - 3\cos 3x) + c$

Answer: Option B

Explanation: $\int e^{ax}.\cos bx\ dx = \frac{e^{ax}}{a^2+b^2}(a\cos bx + b\sin bx) + c$

111. Evaluate: $\int \mathbf{e^{3x}.\sin 4x\ dx} =$ __________.

A) $\frac{e^{3x}}{25}(3\cos 4x + 4\sin 3x) + c$

B) $\frac{e^{3x}}{25}(4\cos 3x + 3\sin 3x) + c$

C) $\frac{e^{3x}}{25}(4\cos 3x - 3\sin 3x) + c$

D) $\frac{e^{3x}}{25}(3\sin 4x - 4\cos 4x) + c$

Answer: Option D

Explanation: $\int e^{ax}.\sin bx\ dx = \frac{e^{ax}}{a^2+b^2}(a\sin bx - b\cos bx) + c$

112. Evaluate: $\int \frac{\mathbf{dx}}{\mathbf{x.(x+1)}} =$ ________.

A) $\log\left|\frac{x}{x+1}\right| + c$

B) $\log\left|\frac{x+1}{x}\right| + c$

C) $\log\left|\frac{x}{2x+1}\right| + c$

D) $\log\left|\frac{3x}{2x+1}\right| + c$

Answer: Option A

Explanation: Integration by partial fractions.

113. Evaluate: $\int \frac{\mathbf{1}}{\mathbf{(x+3).(x+2)}} =$ __________.

A) $\log\left|\frac{x+3}{x+2}\right| + c$

B) $\log\left|\frac{x+2}{x+3}\right| + c$

C) $\log\left|\frac{x+2}{2x+3}\right| + c$

D) $\log\left|\frac{3x+1}{2x+1}\right| + c$

Answer: Option B

Explanation: Integration by partial fractions.

114. $\int \mathbf{e^x(f(x) + f'(x))\ dx} =$ ________.

A) $e^x.f(x) + c$

B) $e^x.f'(x) + c$

C) $e^x(f(x) + f'(x)) + c$

D) None of these

Answer: Option A

Explanation: Integration by parts.

115. $\int \mathbf{e^x(\sin x + \cos x)\ dx} =$ ________.

A) $e^x.\cos x + c$

B) $e^x.\sin x + c$

C) $e^x(\sin x + \cos x) + c$

D) None of these

Answer: Option B

Explanation: $\int e^x(f(x) + f'(x))\ dx = e^x.f(x) + c.$

116. $\int \mathbf{e^x\left(\frac{1}{x}+\log x\right)\ dx} =$ _______.

A) $e^x.\frac{1}{x}+c$

B) $e^x.\log x + c$

C) $e^x\left(\frac{1}{x}+\log x\right)+c$

D) None of these

Answer: Option B

Explanation: $\int e^x\big(f(x)+f'(x)\big)\,dx = e^x.f(x)+c.$

117. $\int \mathbf{e^x(\cot x + \log(\sin x))\ dx} =$ _____.

A) $e^x \log(\sin x)+c$

B) $e^x.\cot x + c$

C) $e^x(\cot x + \log(\sin x)) + c$

D) None of these

Answer: Option A

Explanation: $\int e^x\big(f(x)+f'(x)\big)\,dx = e^x.f(x)+c.$

118. $\int \mathbf{e^x \operatorname{cosec} x\,(1-\cot(x))\ dx} =$ _________.

A) $e^x \cot(x)+c$

B) $e^x \operatorname{cosec} x + c$

C) $e^x.1+c$

D) None of these

Answer: Option B

Explanation: Integration by parts.

119. $\int \mathbf{e^x\left(\frac{x-1}{x^2}\right)\ dx} =$ _________.

A) $e^x x + c$

B) $e^x x^2 + c$

C) $e^x.\frac{1}{x}+c$

D) $e^x.\frac{1}{x^2}+c$

Answer: Option C

Explanation: Integration by parts.

120. $\int \mathbf{e^{f(x)}.f'(x)\ dx} =$ _________.

A) $e^{f(x)}.f'(x)+c$

B) $e^{f'(x)}f(x)+c$

C) $e^{f'(x)}+c$

D) $e^{f(x)}+c$

Answer: Option D

Explanation: Integration by parts.

121. Evaluate: $\int \mathbf{e^{\sin x}\ \cos x\ dx} =$ _______.

A) $e^{\cos x}\ \sin x + c$

B) $e^{\sin x}+c$

C) $e^{\sin x}\ \cos x + c$

D) $e^{\cos x}+c$

Answer: Option B

Explanation: $\int e^{f(x)}.f'(x)\ dx = e^{f(x)}+c$

Question Bank for Multiple Choice Questions

Program: Diploma in Computer Engineering	Program Code:-CO
Scheme:-I	Semester:-II
Course:- Applied Mathematics	Course Code:-22224

03 – Applications of Definite Integration	Marks: - 08
Content of Chapter: - 3.1 Definite Integration: a) Simple examples b) Properties of definite integral(without proof) and simple examples. 3.2 Applications of integration: a) Area under the curve. b) Area between two curves. c) Volume of revolution.	

1. Definite Integration has ____________ value.

A) Indefinite
B) Unique
C) Variable
D) Not Defined

Answer: Option B

Explanation: By definition of Definite Integration.

2. If $\int f(x)\,dx = F(x) + c$ then $\int_a^b f(x).\,dx =$ __________.

A) $F(a) + F(b)$
B) $F(a) - F(b)$
C) $F(b) + F(a)$
D) $F(b) - F(a)$

Answer: Option D

Explanation: By definition of Definite Integration.

3. Evaluate: $\int_4^9 \frac{dx}{\sqrt{x}} =$ _____________.

A) 2
B) 3
C) -2
D) -3

Answer: Option A

Explanation: Using Formula $\int \frac{f'(x)}{\sqrt{f(x)}}\,dx = 2.\sqrt{f(x)} + c$

4. Evaluate: $\int_2^4 \frac{dx}{2x+3} =$ ___________.

A) $\frac{1}{2}\log\left(\frac{7}{11}\right)$

B) $\frac{1}{2}\log\left(\frac{7}{11}\right) + c$

C) $\frac{1}{2}\log\left(\frac{11}{7}\right)$

D) $\frac{1}{2}\log\left(\frac{11}{7}\right) + c$

Answer: Option C

Explanation: Using Formula $\int \frac{f'(x)}{f(x)}\, dx = \log f(x) + c$

5. Evaluate: $\int_1^2 \frac{dx}{3x-2} =$ ___________.

A) $\frac{1}{3}.\log 3$

B) $\frac{1}{3}.\log 4$

C) $\log 4$

D) None of these

Answer: Option B

Explanation: Using Formula: $\int \frac{f'(x)}{f(x)}\, dx = \log f(x) + c$

6. Evaluate: $\int_0^{\log_e 2} e^{2x}\ dx =$ _________.

A) $\frac{2}{3}$

B) $\frac{1}{3}$

C) $\frac{3}{2}$

D) None of these

Answer: Option C

Explanation: Using Formula: $\int e^{ax}\, dx = \frac{e^{ax}}{a} + c$

7. Evaluate: $\int_0^{\pi} \sin 3\theta\, .\, d\theta =$ ____________.

A) $\frac{2}{3}$

B) $\frac{1}{3}$

C) $\frac{3}{2}$

D) None of these

Answer: Option A

Explanation: Using Formula: $\int \sin ax\ dx = \frac{-\cos ax}{a} + c$

8. Evaluate: $\int_0^1 \frac{1}{\sqrt{1-x^2}}\, dx =$ __________.

A) 0

B) 1

C) $\frac{\pi}{2}$

D) π

Answer: Option C

Explanation: Using Formula: $\int \frac{1}{\sqrt{1-x^2}}\, dx = \sin^{-1} x + c$

9. Evaluate: $\int_0^{\frac{\pi}{2}} \mathbf{e^{\sin x}\ \cos x\ dx} =$ __________.

A) e

B) 1

C) $e - 1$

D) $e + 1$

Answer: Option C

Explanation: Using substitution Method.

10. Evaluate: $\int_0^1 \mathbf{e^x . x\ dx} =$ _________.

A) e

B) 1

C) $e - 1$

D) $e + 1$

Answer: Option B

Explanation: Using Formula: $\int u.v\, dx = u. \int v\, dx - \int \left(\frac{du}{dx} \int v\, dx\right) dx$

11. Evaluate: $\int_1^e \mathbf{\log_e x\ \ dx} =$ _________.

A) e

B) $e - 1$

C) 1

D) $e + 1$

Answer: Option C

Explanation: Using Formula: $\int \log x\ \ dx = x.(\log x - 1) + c$

12. Evaluate: $\int_{-1}^1 \mathbf{\frac{dx}{x^2+1}} =$ ___________.

A) π

B) $\frac{\pi}{4}$

C) $\frac{\pi}{2}$

D) 1

Answer: Option C

Explanation: Using Formula: $\int \frac{dx}{x^2+1} = \tan^{-1} x + c$

13. Evaluate: $\int_0^1 \mathbf{x^2\ \ e^x . dx} =$ ___________.

A) $e + 2$

B) e

C) $e - 1$

D) $e - 2$

Answer: Option D

Explanation: Using Formula: $\int u.v\, dx = u. \int v\, dx - \int \left(\frac{du}{dx} \int v\, dx\right) dx$

14. Evaluate: $\int_1^e \mathbf{\frac{\log_e x}{x}\ dx} =$ _________.

A) e

B) $\frac{1}{2}$

C) $\frac{1}{e}$

D) none of these

Answer: Option B

Explanation: Using substitution Method.

15. Evaluate: $\int_0^1 \frac{x.\ dx}{x+1} =$ _______.

A) 1 B) 0

C) $1 - \log 2$ D) $\log 2$

Answer: Option C

Explanation: Using Formula: $\int \frac{f'(x)}{f(x)}\ dx = \log f(x) + c$

16. If the limits of Definite Integration are Identical then value of Definite Integration is equal to _____.

A) 1 B) 0

C) Upper Limit D) None of these

Answer: Option B

Explanation: Using Property of Integration.

17. Evaluate: $\int_a^a f(x)\ dx =$ __________.

A) 1 B) 0

C) a D) None of these

Answer: Option B

Explanation: Using Property of Integration.

18. Evaluate: $\int_2^2 x^2\ dx =$ ________.

A) 1 B) 0

C) 2 D) None of these

Answer: Option B

Explanation: Using Property of Integration. $\int_a^a f(x)\ dx = 0$.

19. Value of Definite Integration is independent of choice of ________________.

A) Variable B) Limits

C) Functions D) None of these

Answer: Option A

Explanation: Using Property of Integration

20. Value of Definite Integration is dependent of choice of ________________.

A) Variable B) Limits

C) Functions D) None of these

Answer: Option B

Explanation: Using Property of Integration

21. If $\int_{1}^{3} \mathbf{x} \;\mathbf{dx} = 4$ then $\int_{1}^{3} \mathbf{p} \;\mathbf{dp} =$ ________.

A) 3

B) 1

C) 2

D) 4

Answer: Option D

Explanation: Using Property of Integration

22. If the limits of Definite Integration are interchanged then the value of the definite integration is____.

A) equal to zero

B) changes by sign only

C) same

D) cannot defined.

Answer: Option B

Explanation: Using Property of Integration

23. $\int_{a}^{b} \mathbf{f(x)} \;\mathbf{dx} =$ ________.

A) $-\int_{a}^{b} f(x) \;dx$

B) $-\int_{a}^{b} F(x) \;dx$

C) $-\int_{b}^{a} f(x) \;dx$

D) None of these

Answer: Option C

Explanation: Using Property of Integration $\int_{a}^{b} f(x) \;dx = -\int_{b}^{a} f(x) \;dx$

24. If $\int_{2}^{3} \mathbf{x} \;\mathbf{dx} = \mathbf{2.5}$ then $\int_{3}^{2} \mathbf{x} \;\mathbf{dx} =$ _________ .

A) 2.5

B) -2.5

C) 1

D) None of these

Answer: Option B

Explanation: Using Property of Integration $\int_{a}^{b} f(x) \;dx = -\int_{b}^{a} f(x) \;dx$

25. If $\mathbf{a \le c \le b}$ i.e. 'c 'is the any point in the interval $[\mathbf{a}, \mathbf{b}]$, then $\int_{a}^{b} \mathbf{f(x)} \;\mathbf{dx} =$ ___ $+ \int_{c}^{b} \mathbf{f(x)} \;\mathbf{dx}$

A) $\int_{a}^{c} f(x) \;dx$

B) $\int_{a}^{b} f(x) \;dx$

C) $\int_{c}^{b} f(x) \;dx$

D) None of these

Answer: Option B

Explanation: Using Property of Integration: If $a \le c \le b$ i.e. 'c 'is the any point in the interval $[a, b]$,

then $\int_{a}^{b} f(x) \;dx = \int_{a}^{c} f(x) \;dx + \int_{c}^{b} f(x) \;dx$

26. If $\mathbf{0 \le f(x) \le g(x)}$ for all $\mathbf{x \in [a, b]}$, then _________.

A) $\int_{a}^{b} f(x) \;dx < \int_{a}^{b} g(x) \;dx$

B) $\int_{a}^{b} f(x) \;dx > \int_{a}^{b} g(x) \;dx$

C) $\int_{a}^{b} f(x) \;dx \ge \int_{a}^{b} g(x) \;dx$

D) $\int_{a}^{b} f(x) \;dx \le \int_{a}^{b} g(x) \;dx$

Answer: Option D

Explanation: Using Property of Integration:

27. If $\mathbf{f(x) = \frac{1}{x}}$ and $\mathbf{g(x) = x}$ both defined on the interval $[2, 3]$ then__________.

A) $\int_2^3 \frac{1}{x}\ dx < \int_2^3 x\ dx$

B) $\int_2^3 \frac{1}{x}\ dx > \int_2^3 x\ dx$

C) $\int_2^3 \frac{1}{x}\ dx \geq \int_2^3 x\ dx$

D) $\int_2^3 \frac{1}{x}\ dx \leq \int_2^3 x\ dx$

Answer: Option A

Explanation: Using Property of Integration: If $0 \leq f(x) \leq g(x)$ for all $x \in [a, b]$, then

$\int_a^b f(x)\ dx \leq \int_a^b g(x)\ dx$

28. $\int_a^b \mathbf{f(x)\ dx} = \int_a^b \mathbf{f(\_\_\_\_\_\_)\ dx}$

A) $a - x$

B) $b - x$

C) $a + b - x$

D) None of these

Answer: Option C

Explanation: Property of Integration

29. $\int_0^a \mathbf{f(x)\ dx} = \int_0^a \mathbf{f(\_\_\_\_\_\_\_)\ dx}$

A) $a - x$

B) $b - x$

C) $a + b - x$

D) None of these

Answer: Option A

Explanation: Property of Integration

30. Evaluate: $\int_0^3 \frac{\sqrt{3-x}}{\sqrt{3-x}+\sqrt{x}}\ dx =$ __________.

A) 3

B) $\frac{1}{2}$

C) $\frac{3}{2}$

D) None of these

Answer: Option C

Explanation: Using Property of Integration $\int_0^a f(x)\ dx = \int_0^a f(a - x)\ dx$

31. Evaluate: $\int_{\pi/6}^{\pi/3} \sin^2 x\, .\, dx =$ __________.

A) 0

B) $\frac{\pi}{2}$

C) $\frac{\pi}{3}$

D) $\frac{\pi}{12}$

Answer: Option D

Explanation: Using Property of Integration: $\int_a^b f(x)\ dx = \int_a^b f(a + b - x)\ dx$

32. Evaluate: $\int_{\pi/6}^{\pi/3} \cos^2 x\, .\, dx =$ _________.

A) 0

B) $\frac{\pi}{12}$

C) $\frac{\pi}{3}$

D) $\frac{\pi}{6}$

Answer: Option B

Explanation: Using Property of Integration: $\int_a^b f(x)\ dx = \int_a^b f(a + b - x)\ dx$

33. Evaluate: $\int_0^{\pi/2} \sin^2 x \, . \, dx =$ _______.

A) 0 B) $\frac{\pi}{4}$

C) $\frac{\pi}{3}$ D) $\frac{\pi}{12}$

Answer: Option B

Explanation: Using Property of Integration $\int_0^a f(x) \; dx = \int_0^a f(a-x) \; dx$

34. Evaluate: $\int_0^{\pi/2} \cos^2 x \, . \, dx =$ __________.

A) 0 B) $\frac{\pi}{12}$

C) $\frac{\pi}{2}$ D) $\frac{\pi}{4}$

Answer: Option D

Explanation: Using Property of Integration $\int_0^a f(x) \; dx = \int_0^a f(a-x) \; dx$

35. Evaluate: $\int_0^4 \frac{\sqrt[3]{x+5}}{\sqrt[3]{x+5} + \sqrt[3]{9-x}} \, dx =$ ________.

A) 2 B) 4

C) 5 D) 9

Answer: Option A

Explanation: Using Property of Integration $\int_0^a f(x) \; dx = \int_0^a f(a-x) \; dx$

36. Evaluate: $\int_0^{\pi/2} \frac{dx}{1 + \sqrt[3]{\cot x}} =$ __________.

A) 0 B) $\frac{\pi}{12}$

C) $\frac{\pi}{2}$ D) $\frac{\pi}{4}$

Answer: Option D

Explanation: Using Property of Integration $\int_0^a f(x) \; dx = \int_0^a f(a-x) \; dx$

37. Evaluate: $\int_{\pi/6}^{\pi/3} \frac{dx}{1 + \sqrt[3]{\tan x}} =$ __________.

A) 0 B) $\frac{\pi}{12}$

C) $\frac{\pi}{2}$ D) $\frac{\pi}{4}$

Answer: Option B

Explanation: Using Property of Integration: $\int_a^b f(x) \; dx = \int_a^b f(a+b-x) \; dx$

38. Evaluate: $\int_{\pi/6}^{\pi/3} \frac{dx}{1 + \sqrt{\cot x}} =$ __________.

A) 0 B) $\frac{\pi}{12}$

C) $\frac{\pi}{2}$ D) $\frac{\pi}{4}$

Answer: Option B

Explanation: Using Property of Integration: $\int_a^b f(x) \; dx = \int_a^b f(a+b-x) \; dx$

39. Evaluate: $\int_{\pi/6}^{\pi/3} \frac{dx}{1+\sqrt{\tan x}} =$ ___________.

A) 0
B) $\frac{\pi}{6}$
C) $\frac{\pi}{12}$
D) $\frac{\pi}{4}$

Answer: Option C

Explanation: Using Property of Integration: $\int_a^b f(x)\ dx = \int_a^b f(a+b-x)\ dx$

40. Evaluate: $\int_1^4 \frac{\sqrt[3]{9-x}}{\sqrt[3]{9-x}+\sqrt[3]{x+4}}\ dx =$ __________.

A) 3
B) $\frac{1}{2}$
C) $\frac{3}{2}$
D) 4

Answer: Option C

Explanation: Using Property of Integration: $\int_a^b f(x)\ dx = \int_a^b f(a+b-x)\ dx$

41. Evaluate: $\int_3^7 \frac{(10-x)^2}{(10-x)^2+x^2}\ dx =$ __________.

A) 3
B) 2
C) 7
D) 4

Answer: Option B

Explanation: Using Property of Integration: $\int_a^b f(x)\ dx = \int_a^b f(a+b-x)\ dx$

42. Evaluate: $\int_0^{\pi/2} \log(\tan x)\, dx =$ ________.

A) 0
B) 1
C) $\pi/2$
D) none of these

Answer: Option A

Explanation: Using Property of Integration $\int_0^a f(x)\ dx = \int_0^a f(a-x)\ dx$

43. Evaluate: $\int_0^{\pi/2} \log(\cot x)\, dx =$ ________.

A) 0
B) 1
C) $\pi/3$
D) $\pi/2$

Answer: Option A

Explanation: Using Property of Integration $\int_0^a f(x)\ dx = \int_0^a f(a-x)\ dx$

44. If $f(x)$ an even function then $\int_{-a}^{a} f(x)\ dx =$ __________.

A) $\int_0^a f(x)\ dx$
B) $2\int_0^a f(x)\ dx$
C) 0
D) None of these

Answer: Option B
Explanation: Property of Integration

45. If $f(x)$ an odd function then $\int_{-a}^{a} f(x)\ dx =$ ___________.

A) $\int_0^a f(x)\ dx$

B) $2\int_0^a f(x)\ dx$

C) 0

D) None of these

Answer: Option C

Explanation: Property of Integration

46. Evaluate: $\int_{-1}^{1} \frac{1}{1+x^2}\ dx =$ __________.

A) 0

B) $\frac{\pi}{2}$

C) $\tan^{-1}(1)$

D) $\frac{\pi}{4}$

Answer: Option B

Explanation: Property of Integration: If $f(x)$ an even function then $\int_{-a}^{a} f(x)\ dx = 2\int_0^a f(x)\ dx$

47. Evaluate: $\int_{-1}^{1} \frac{x}{1+x^2}\ dx =$ __________.

A) 0

B) $\frac{\pi}{2}$

C) $\tan^{-1}(1)$

D) $\frac{\pi}{4}$

Answer: Option A

Explanation: Property of Integration: If $f(x)$ an odd function then $\int_{-a}^{a} f(x)\ dx = 0$

48. $\int_0^{2a} f(x)\ dx = \int_0^a f(x)\ dx + \int_0^a f($__________$)\ dx$

A) $a - x$

B) $2a - x$

C) $a + b - x$

D) None of these

Answer: Option B

Explanation: Property of Integration: $\int_0^{2a} f(x)\ dx = \int_0^a f(x)\ dx + \int_0^a f(2a - x)\ dx$

49. Find the area bounded by the $y = x^3$ from $x = 0$ to $x = 3$ with $x - axis$.

A) $\frac{81}{4}$ sq. units

B) $\frac{27}{3}$ sq. units

C) 27 sq. units

D) 81 sq. units

Answer: Option A

Explanation: Area = $\int_{x=a}^{x=b} y\ dx$

50. Find the area bounded by the $y = x$, $x - axis$ and the ordinates $x = 0$ to $x = 4$.

A) 16 sq. units

B) 8 sq. units

C) 64 sq. units

D) 32 sq. units

Answer: Option B

Explanation: Area = $\int_{x=a}^{x=b} y\ dx$

51. Find the area between the lines $\mathbf{y = 3x}$, $\mathbf{x - axis}$ and the ordinates $\mathbf{x = 1}$ and $\mathbf{x = 5}$.

A) 36 sq. units B) 8 sq. units

C) 64 sq. units D) 72 sq. units

Answer: Option A

Explanation: Area = $\int_{x=a}^{x=b} y\, dx$

52. Find the area bounded by the $\mathbf{y = 3x^2}$, $\mathbf{x - axis}$ and the ordinates $\mathbf{x = 1}$ to $\mathbf{x = 3}$.

A) 8 sq. units B) 26 sq. units

C) 4 sq. units D) 27 sq. units

Answer: Option B

Explanation: Area = $\int_{x=a}^{x=b} y\, dx$

53. Find the area under the parabola $\mathbf{y^2 = 4x}$, bounded by the lines $\mathbf{x = 0}$, $\mathbf{y = 0}$ and $\mathbf{x = 4}$.

A) $\frac{81}{4}$ sq. units B) $\frac{27}{3}$ sq. units

C) 27 sq. units D) $\frac{32}{3}$ sq. units

Answer: Option D

Explanation: Area = $\int_{x=a}^{x=b} y\, dx$

54. Find the area under the curve $\mathbf{y = e^x}$, $\mathbf{x - axis}$ and the ordinates $\mathbf{x = 0}$ to $\mathbf{x = 1}$.

A) $e - 1$ sq. units B) e sq. units

C) 1 sq. units D) 0 sq. units

Answer: Option A

Explanation: Area = $\int_{x=a}^{x=b} y\, dx$

55. Using integration find the area of the circle $\mathbf{x^2 + y^2 = 9}$.

A) 9 sq. units B) 3 sq. units

C) 9π sq. units D) 3π sq. units

Answer: Option C

Explanation: Area = $\int_{x=a}^{x=b} y\, dx$

56. Using integration find the area of the circle $\mathbf{x^2 + y^2 = 16}$ enclosed in the first quadrant.

A) 16 sq. units B) 4 sq. units

C) 16π sq. units D) 4π sq. units

Answer: Option D

Explanation: Area = $\int_{x=a}^{x=b} y\, dx$

57. Using integration find the area of the circle $x^2 + y^2 = r^2$ enclosed in the first quadrant.

A) r^2 sq. units

B) r sq. units

C) $r^2\pi$ sq. units

D) $r\pi$ sq. units

Answer: Option D

Explanation: Area = $\int_{x=a}^{x=b} y\,dx$

58. Using integration find the area of the ellipse $b^2x^2 + a^2y^2 = a^2b^2$.

A) $a\pi$ sq. units

B) $b\pi$ sq. units

C) $ab\pi$ sq. units

D) $a\pi$ sq. units

Answer: Option C

Explanation: Area = $\int_{x=a}^{x=b} y\,dx$

59. Using integration find the area of the ellipse $9x^2 + 4y^2 = 36$.

A) 6π sq. units

B) 9π sq. units

C) 2π sq. units

D) 4π sq. units

Answer: Option A

Explanation: Area = $\int_{x=a}^{x=b} y\,dx$

60. Using integration find the area of the ellipse $36\,x^2 + 4y^2 = 144$ above x-axis.

A) 6π sq. units

B) 12π sq. units

C) 3π sq. units

D) 4π sq. units

Answer: Option A

Explanation: Area = $\int_{x=a}^{x=b} y\,dx$

61. Using integration find the area of the ellipse $36\,x^2 + 4y^2 = 144$ enclosed in the first quadrant.

A) 6π sq. units

B) 12π sq. units

C) 3π sq. units

D) 4π sq. units

Answer: Option C

Explanation: Area = $\int_{x=a}^{x=b} y\,dx$

62. Find the volume of the solid generated when the triangle bounded by the lines $y = 0$, $y = x$ & $x = 4$ is revolved about x-axis.

A) $\frac{64\pi}{3}$ cubic units

B) 64π cubic units

C) 32π cubic units

D) $\frac{32\pi}{3}$ cubic units

Answer: Option A

Explanation: Area = $\pi\int_{x=a}^{x=b} y^2\,dx$

Question Bank for Multiple Choice Questions

Program: Diploma in Computer Engineering	Program Code:-CO
Scheme:-I	Semester:-II
Course:- Applied Mathematics	Course Code:-22224

04 – First Order First Degree Differential Equations	Marks: - 08

Content of Chapter: -

4.1 Concept of differential equation

4.2 Order, degree and formation ofdifferential equation.

4.3 Solution of differential equation

a) Variable separable form.

b) Linear differential equation.

4.4 Application of differential equations and related engineering problems.

1. Which of the following is the first order and first-degree differential equation.

$\mathbf{a)}\ \frac{dy}{dx} = f(x, y)$ $\quad$ $\mathbf{b)}\ M(x, y)\, dx + N(x, y) dy = 0$

A) only a) $\quad$ B) only b)

C) both a) & b) $\quad$ D) none of these

Answer: Option C

Explanation: By definition of Differential equation and Degree and order

2. Compute the order and degree of the differential equation: $\frac{d^2y}{dx^2} = \left(1 + \left(\frac{dy}{dx}\right)^2\right)^3$

A) $\text{order} = 3,\ \text{degree} = 2$ $\quad$ B) $\text{order} = 2,\ \text{degree} = 2$

C) $\text{order} = 1,\ \text{degree} = 3$ $\quad$ D) $\text{order} = 2,\ \text{degree} = 1$

Answer: Option D

Explanation: By definition of degree and order of differential equation.

3. Compute the order and degree of the differential equation: $\sqrt[3]{\frac{d^2y}{dx^2}} = \sqrt{\frac{dy}{dx}}$

A) $\text{order} = 3,\ \text{degree} = 2$ $\quad$ B) $\text{order} = 2,\ \text{degree} = 2$

C) $\text{order} = 1,\ \text{degree} = 3$ $\quad$ D) $\text{order} = 2,\ \text{degree} = 1$

Answer: Option B

Explanation: By definition of degree and order of differential equation.

4. Compute the order and degree of the differential equation: $\sqrt{1 + \left(\frac{dy}{dx}\right)^2} = 5\frac{d^2y}{dx^2}$

A) $\text{order} = 3,\ \text{degree} = 2$
B) $\text{order} = 2,\ \text{degree} = 2$
C) $\text{order} = 1,\ \text{degree} = 3$
D) $\text{order} = 2,\ \text{degree} = 1$

Answer: Option B

Explanation: By definition of degree and order of differential equation.

5. Compute the order and degree of the differential equation: $\left[1 + \left(\frac{dy}{dx}\right)^2\right]^{\frac{3}{2}} = k\frac{d^2y}{dx^2}$

A) $\text{order} = 3,\ \text{degree} = 2$
B) $\text{order} = 2,\ \text{degree} = 2$
C) $\text{order} = 1,\ \text{degree} = 3$
D) $\text{order} = 2,\ \text{degree} = 1$

Answer: Option B

Explanation: By definition of degree and order of differential equation.

6. Compute the order and degree of the differential equation: $\frac{d^3y}{dx^3} = \left[k + \left(\frac{dy}{dx}\right)^2\right]^{\frac{3}{2}}$

A) $\text{order} = 3,\ \text{degree} = 2$
B) $\text{order} = 2,\ \text{degree} = 2$
C) $\text{order} = 1,\ \text{degree} = 3$
D) $\text{order} = 2,\ \text{degree} = 1$

Answer: Option B

Explanation: By definition of degree and order of differential equation.

7. Compute the order and degree of the differential equation $\frac{d^2y}{dx^2} + 3\left(\frac{dy}{dx}\right)^3 - 6y = 0$

A) $\text{order} = 3,\ \text{degree} = 1$
B) $\text{order} = 2,\ \text{degree} = 3$
C) $\text{order} = 1,\ \text{degree} = 3$
D) $\text{order} = 2,\ \text{degree} = 1$

Answer: Option D

Explanation: By definition of degree and order of differential equation.

8. The order of differential equation formed by eliminating arbitrary constants from $y = Ae^{2x} + Be^{3x}$ **is______.**

A) 1
B) 2
C) 3
D) it can be 2 or 1.

Answer: Option B

Explanation: Order of differential equation is qual to the number of arbitrary constants exist in the general solution.

9. The order of differential equation formed by eliminating arbitrary constants from $y^2 = 4\,ax$ **is___.**

A) 1
B) 2
C) 3
D) it can be 2 or 1.

Answer: Option A

Explanation: By eliminating arbitrary constants

10. The order of differential equation formed by eliminating arbitrary constants from $\mathbf{y = A(x - A)^2}$ is___.

A) 2
B) 1
C) 3
D) it can be 2 or 1.

Answer: Option C

Explanation: By eliminating arbitrary constants

11. The correct differential equation formed by eliminating arbitrary constants from $\mathbf{y = Ae^x + Be^{-x}}$ is_____.

A) $\frac{d^2y}{dx^2} + y = 0$
B) $\frac{d^2y}{dx^2} = -y$
C) $\frac{d^2y}{dx^2} - y = 0$
D) None of these

Answer: Option C

Explanation: By eliminating arbitrary constants

12. The correct differential equation formed by eliminating arbitrary constants from

$\mathbf{y = A\sin mx + B\cos mx}$ is______. (Where mis not arbitrary constant)

A) $\frac{d^2y}{dx^2} + m^2y = 0$
B) $\frac{d^2y}{dx^2} + y = 0$
C) $\frac{d^2y}{dx^2} - m^2y = 0$
D) None of these

Answer: Option A

Explanation: By eliminating arbitrary constants

13. The correct differential equation formed by eliminating arbitrary constants from

$\mathbf{y = a\sin x + b\cos x}$ is______.

A) $\frac{d^2y}{dx^2} - y = 0$
B) $\frac{d^2y}{dx^2} + y = 0$
C) $\frac{d^2y}{dx^2} = y$
D) None of these

Answer: Option B

Explanation: By eliminating arbitrary constants

14. The correct differential equation formed by eliminating arbitrary constants from $\mathbf{y^2 = 4\,ax}$ is____.

A) $2x\frac{dy}{dx} + y = 0$
B) $2x\frac{dy}{dx} - y = 0$
C) $\frac{dy}{dx} = \frac{2x}{y}$
D) None of these

Answer: Option B

Explanation: By eliminating arbitrary constants

15. The particular solution of differential equation is obtained from its _______________.

A) Particular solution

B) Singular solution

C) General solution

D) None of these

Answer: Option C

Explanation: By definition of particular solution

16. The number of arbitrary constants appear in the general solution of differential equation are equal to the ______.

A) degree of differential equation

B) order of differential equation

C) order and degree both

D) None of these

Answer: Option B

Explanation: By concept of general solution of differential equation

17. The order of differential equation is equal to the _____________exist in the solution.

A) no. of arbitrary constants

B) no. of pure constants

C) no. of variables

D) None of these

Answer: Option A

Explanation: By concept of general solution of differential equation

18. The order of differential equation is equal to the no. of arbitrary constants exist in the ________solution.

A) Particular

B) General

C) Singular

D) None of these

Answer: Option B

Explanation: By concept of general solution of differential equation

19. The general solution of differential equation $\frac{dy}{dx} - \cos x = 0$ is___________.

A) $y = \sin x$

B) $y = \cos x$

C) $y = \cos x + c$

D) $y = \sin x + c$

Answer: Option D

Explanation: By variable separation method

20. The particular solution of differential equation $\frac{dy}{dx} + \sin x = 0$ is___________.

A) $y = \sin x$

B) $y = \cos x$

C) $y = \cos x + c$

D) $y = \sin x + c$

Answer: Option C

Explanation: By variable separation method

21. Solve: $(\mathbf{x}+\mathbf{1})\,\mathbf{dy}+(\mathbf{y}+\mathbf{1})\,\mathbf{dx}=\mathbf{0}$

A) $(x+1)(y+1)=c$

B) $(x+1)=c-(y+1)$

C) $(y+1)=c+(x+1)$

D) $(x+1)+(y+1)=c$

Answer: Option A

Explanation: By variable separation method

22. Solve: $\mathbf{x\,dy-y\,dx=0}$

A) $y=cx$

B) $y=x+c$

C) $x=y+c$

D) $xy=c$

Answer: Option A

Explanation: By variable separation method

23. Solve: $(\mathbf{1}+\mathbf{x}^{\mathbf{2}})\mathbf{dy}-(\mathbf{1}+\mathbf{y}^{\mathbf{2}})\mathbf{dx}=\mathbf{0}$

A) $\tan^{-1}y=\tan^{-1}x+c$

B) $(y-x)=(1-xy)c$

C) $\tan^{-1}y-\tan^{-1}x=\tan^{-1}c$

D) All above

Answer: Option A

Explanation: By variable separation method

24. Solve: $\mathbf{e^{y}\frac{dy}{dx}=x^{2}}$

A) $3e^{y}+x^{3}=c$

B) $3e^{y}-x^{3}=c$

C) $3e^{y}=x^{3}c$

D) All above

Answer: Option B

Explanation: By variable separation method

25. Solve: $\sqrt{\mathbf{1-x^{2}}}\,\mathbf{dy}+\sqrt{\mathbf{1-y^{2}}}\,\mathbf{dx}=\mathbf{0}$.

A) $\sin^{-1}y=\sin^{-1}x+c$

B) $(y-x)=(1-xy)c$

C) $\sin^{-1}y+\sin^{-1}x=c$

D) None of these

Answer: Option C

Explanation: By variable separation method

26. Solve: $\mathbf{x\,(1+y^{2})\,dx+y\,(1+x^{2})\,dy=0}$

A) $(1+x^{2})(1+y^{2})=c$

B) $(1+x^{2})+(1+y^{2})=c$

C) $(1+x^{2})-(1+y^{2})=c$

D) None of these

Answer: Option A

Explanation: By variable separation method

27. Solve: $\mathbf{\cos x\cos y\;dx-\sin x\sin y\;dy=0}$

A) $\sin y\cos x=c$

B) $\sin y+\cos x=c$

C) $\sin y-\cos x=c$

D) $\sin x\cos y=c$

Answer: Option D

Explanation: By variable separation method

28. Solve: $(e^y + 1)\cos x\ dx + e^y \sin x\ dy = 0$

A) $(e^y + 1) = \frac{c}{\cos x}$

B) $\cos x = \frac{c}{(e^y+1)}$

C) $(e^y + 1) = \frac{c}{\sin x}$

D) $\sin x + (e^y + 1) = c$

Answer: Option C

Explanation: By variable separation method

29. Find the Integrating Factor of $(1 + x^2)\ \frac{dy}{dx} + y = e^{\tan^{-1} x}$

A) $e^{\tan^{-1} x}$

B) $\tan^{-1} x$

C) $1 + x^2$

D) None of these

Answer: Option C

Explanation: By method of solution of linear differential equation

30. The Integrating Factor of: $x\frac{dy}{dx} + y = x^3$

A) e^y

B) x

C) e^x

D) None of these

Answer: Option B

Explanation: By using formula $I.F = e^{\int P(x)dx}$

31. The Integrating Factor of: $x \log x \frac{dy}{dx} + y = 2 \log x$

A) $e^{\log x}$

B) x

C) $\log x$

D) None of these

Answer: Option C

Explanation: By using formula $I.F = e^{\int P(x)dx}$

32. The Integrating Factor of: $\frac{dy}{dx} + y \cot x = \operatorname{cosec} x$

A) $e^{\cot x}$

B) $\sin x$

C) $e^{\sin x}$

D) None of these

Answer: Option B

Explanation: By using formula $I.F = e^{\int P(x)dx}$

33. The general solution of Linear differential equation $\frac{dy}{dx} + Py = Q$ **is__________.**

A) $y \times I.F. = \int I.F.\times Q\ dx + c$

B) $y = \int I.F.\times Q\ dx + c$

C) $y \times I.F. = \int Q\ dx + c$

D) None of these

Answer: Option A

Explanation:----------

34. Solve: $\frac{dy}{dx} + y\cot x = \operatorname{cosec} x$

A) $y + \sin x = c$

B) $y - \sin x = x + c$

C) $x + \sin x = y + c$

D) $y.\sin x = x + c$

Answer: Option D

Explanation: By method of solution of linear differential equation and using formula

$$y \times I.F. = \int I.F. \times Q\, dx + c$$

35. The Integrating Factor of: $\frac{dy}{dx} + y\tan x = \cos^2 x$

A) $e^{\tan x}$

B) $\sec x$

C) $e^{\log(\tan x)}$

D) None of these

Answer: Option B

Explanation: By using formula $I.F = e^{\int P(x)dx}$

36. The differential equation of L-R series circuit is____________.

A) $L\frac{di}{dt} + Ri = 0$

B) $\frac{di}{dt} + Ri = L$

C) $\frac{di}{dt} + Ri = 0$

D) $L\frac{di}{dt} + Ri = E$

Answer: Option D

Explanation: ---------

37. The differential equation of L-R-C series circuit is____________.

A) $L\frac{di}{dt} + Ri + \frac{q}{c} = E$

B) $L\frac{di}{dt} + Ri + \frac{q}{c} = 0$

C) $\frac{di}{dt} + Ri + \frac{q}{c} = E$

D) $L\frac{di}{dt} + Ri + c = E$

Answer: Option D

Explanation: --------

38. The $y = e^{-x}$ **is solution of the differential equation________________.**

A) $\frac{d^2y}{dx^2} - y = 0$

B) $\frac{d^2y}{dx^2} + y = 0$

C) $\frac{d^2y}{dx^2} = 0$

D) $\frac{dy}{dx} - y = 0$

Answer: Option D

Explanation: --------

Question Bank for Multiple Choice Questions

Program: Diploma in Computer Engineering	Program Code:-CO
Scheme:-I	Semester:-II
Course:- Applied Mathematics	Course Code:-22224

05- Numerical Methods	Marks:-14

Content of Chapter: -

5.1: Solutions of algebraic equations.

a) Bisection Method.
b) Regula falsi Method.
c) Newton Raphson Method.

5.2: Numerical solutions of simultaneous equations.

a) Gauss Elimination Method.
b) Jacobi's Method.
c) Gauss Seidal Method.

1. Numerical techniques more commonly involve _______

A) Elimination method
B) Reduction method
C) Iterative method
D) Direct method

Answer: Option C

Explanation: ……..

2. If approximate solution of the set of equations,

2x+2y-z = 6,

x+y+2z = 8 and

-x+3y+2z = 4, is given by x = 2.8 y = 1 and z = 1.8. Then, what is the exact solution?

A) x = 1, y = 3, z = 2
B) x = 2, y = 3, z = 1
C) x = 3, y = 1, z = 2
D) x = 1, y = 2, z = 2

Answer: Option C

Explanation: Substituting the approximate values x' = 2.8, y' = 1 z' = 1.8 in the given equations.

3. Solve the following equations by Gauss Elimination Method.

x+4y-z = -5

x+y-6z = -12

3x-y-z = 4

A) x = 1.64491, y = 1.15085, z = 2.09451

B) x = 1.64691, y = 1.14095, z = 2.08461

C) x = 1.65791, y = 1.14185, z = 2.08441

D) x = 1.64791, y = 1.14085, z = 2.08451

Answer: Option D

Explanation: By Gauss Elimination method

4 Apply Gauss Elimination method to solve the following equations.

2x – y + 3z = 9

x + y + z = 6

x – y + z = 2

A) X = -13, y = 1, z = -8

B) X = 13, y = 1, z = -8

C) X = -13, y = 4, z = 15

D) X = 5, y = 14, z = 5

Answer: Option D

Explanation: By Gauss Elimination method

5 Solve the following equation by Gauss Seidal Method up to 2 iterations and find the value of z.

27x + 6y - z = 85

6x + 15y + 2z = 72

x + y + 54z = 110

A) 0

B) 1.92

C) 1.88

D) 1.22

Answer: Option B

Explanation: From the given set of equations-

x=(85−6y+z)/27

y=(72−6x−2z)/15

y=(110−x−y)/54

5 Which of the following is an assumption of Jacobi's method?

A) The coefficient matrix has zeroes on its main diagonal

B) The coefficient matrix has no zeros on its main diagonal

C) The rate of convergence is quite slow compared with other methods

D) Iteration involved in Jacobi's method converges

Answer: Option B

Explanation: ……..

7 Find the approximated value of x till 6 iterations for x^3-4x+9=0 using Bisection Method. Take a = -3 and b = -2.

A) -0.703125 B) -3.903125

C) -1.903125 D) -2.703125

Answer: Option D

Explanation: Follow Iteration table.

8 Find the positive root of the equation $x^3 – 4x – 9 = 0$ using Regula Falsi method and correct to 4 decimal places.

A) 2.7506 B) 2.6570

C) 2.7065 D) 2.7605

Answer: Option C

Explanation: f(2) = -9 and f(3) = 6. Therefore, root lies between 2 and 3.

9 The equation f(x) is given as $x^3+4x+1=0$. Considering the initial approximation at x=1 then the value of x_1 is given as _______________

A) 1.85 B) 1.86

C) 1.87 D) 1.67

Answer: Option B

Explanation: Iterative formula for Newton Raphson method is given by

$x(1) = x(0)+\frac{f(x(0))}{f'\mathrm{x}(\mathrm{x}(0))}$

10 In Newton Raphson method if the curve f(x) is constant then __________

A) f(x)=0 B) f'(x)=c

C) f''(x)=0 D) f'(x)=0

Answer: Option D

Explanation: If the curve f(x) is constant then the slope of the tangent drawn to the curve at an initial point is zero. Hence the value of f'(x) is zero.

11 Gauss Seidel method is similar to which of the following methods?

A) Iteration method B) Newton Raphson method

C) Jacobi's method D) Regula-Falsi method

Answer: Option C

Explanation:

12 What is the main difference between Jacobi's and Gauss-Seidel?

A) Computations in Jacobi's can be done in parallel but not in Gauss-Seidel

B) Convergence in Jacobi's method is faster

C) Gauss Seidel cannot solve the system of linear equations in three variables whereas Jacobi cannot

D) Deviation from the correct answer is more in gauss Seidel

Answer: Option A

Explanation:

13 While solving by Gauss Seidel method, which of the following is the first Iterative solution system; x – 2y = 1 and x + 4y = 4?

A) (1, 0.75) B) (0.25,1)

C) (0,0) D) (1,0.65)

Answer: Option A

Explanation: Here,

$x - 2y = 1$

$x + 4y = 4$

For first iteration we put n = 0 in the following equations,

$x_{n+1} = 1 - 2y_n$

$y_{n+1} = (1/4)(4 - x_{n+1})$

14 The Gauss-Seidel method is applicable to strictly diagonally dominant or symmetric________ definite matrices.

A) Positive B) Negative

C) Zero D) Equal

Answer: Option A

Explanation:

15 Solve the following equation by Gauss Seidel Method up to 3 iterations and find the value of x.

4x - 3y - z = 40

x - 6y + 2z = -28

x - 2y + 12z = -86

A) x=11.11 B) x=13.28

C) x=11.51 D) x=9.86

Answer: Option C

Explanation: From the given set of equations-

$x = \frac{(40+3y+z)}{4}$

$y = \frac{(28+x+2z)}{6}$

$z = \frac{(-86-x+2y)}{2}$

16 Find the values of x, y, z in the following system of equations by gauss Elimination Method.

$2x + y - 3z = -10$

$-2y + z = -2$

$z = 6$

A) 2, 4, 6 B) 2, 7, 6

C) 3, 4, 6 D) 2, 4, 5

Answer: - Option A

Explanation: Solve by Gauss Elimination method.

17 The aim of elimination steps in Gauss elimination method is to reduce the coefficient matrix to ___.

A) diagonal B) identity

C) lower triangular D) upper triangular

Answer: - Option D

Explanation: ....

18 The Jacobi's method is a method of solving a matrix equation on a matrix that has no zeroes along _.

A) Leading diagonal B) Last column

C) Last row D) Non-leading diagonal

Answer: - Option A

Explanation: ....

19 How many assumptions are there in Jacobi's method?

A) 2 B) 3

C) 4 D) 5

Answer: - Option A

Explanation: There are two assumptions in Jacobi's method.

20 Solve the system of equations by Jacobi's iteration method.

$20x + y - 2z = 17$

$3x + 20y - z = -18$

$2x - 3y + 20z = 25$

A) x = 1, y = -1, z = 1 B) x = 2, y = 1, z = 0

C) x = 2, y = 1, z = 0 D) x = 1, y = 2, z = 1

Answer: - Option A

Explanation: ....

21 Find the positive root of the equation 3x-cosx-1 using Regula Falsi method and correct up to 4 decimal places.

A) 0.6701 B) 0.5071

C) 0.6071 D) 0.5701

Answer: - Option C

Explanation: ....

22 Find the positive root of the equation $x^3 + 2x^2 + 10x – 20$ using Regula Falsi method and correct up to 4 decimal places.

A) 1.3688 B) 1.3866

C) 1.4688 D) 1.6488

Answer: - Option A

Explanation: ....

23 Find the positive root of the equation $e^x = 3x$ using Regula Falsi method and correct to 4 places.

A) 0.6190 B) 0.7091

C) 0.7901 D) 0.6910

Answer: - Option A

Explanation: f (0) = 1

f (1) = -0.281718171

Therefore, root lies between 0 and 1.

24 The value of y'/x' in terms of the angle 0 is given by _____________

A) tan θ B) sec θ

C) cot θ D) cosec θ

Answer: - Option A

Explanation: ....

25 The equation f(x) is given as $x^2-4=0$. Considering the initial approximation at x=6 then the value of x_1 is given as ____________

A) $\frac{10}{3}$ B) $\frac{4}{3}$

C) $\frac{7}{3}$ D) $\frac{13}{3}$

Answer: - Option A

Explanation: Solve by Iterative formula for Newton Raphson method.

26 For decreasing the number of iterations in Newton Raphson method:

A) The value of f'(x) must be increased

B) The value of f''(x) must be decreased

C) The value of f'(x) must be decreased

D) The value of f''(x) must be increased

Answer: - Option A.

Explanation: ....

27 The convergence of which of the following method depends on initial assumed value?

A) False position

B) Gauss Seidel method

C) Newton Raphson method

D) Euler method

Answer: - Option C

Explanation: ....

28 The equation f(x) is given as $x^3+4x+1=0$. Considering the initial approximation at x=1 then the value of x_1 is given as _______________

A) 1.67

B) 1.87

C) 1.86

D) 1.85

Answer: - Option C

Explanation: ....

29 Using Bisection method find the root of $3x^2 = 5x+2$ in the interval [0,3].

A) 0.617

B) 0.527

C) 0.517

D) 0.717

Answer: - Option C

Explanation: Function $f(x) = 3x^2 – 5x – 2 = 0$. Then follow Iteration table.

30 Find the root of $xe^{-x} -0.3 = 0$ using Bisection Method in the interval [1,5].

A) 1.68

B) 1.86

C) 1.88

D) 1.66

Answer: - Option B

Explanation: By Iteration table.

31 What is the percentage decrease in an interval containing root after iteration is applied by Bisection Method?

A) 20%

B) 30%

C) 40%

D) 50%

Answer: - Option D

Explanation: The Bisection Method employs the reduction of any interval by 50% after each iteration. Hence it is also called as Binary Reduction method.

32 The algorithm provided to find the roots of the function using Bisection Method is given by ______.

A) Bolzano's theorem
B) Mean Value theorem
C) Bisection theorem
D) Secant theorem

Answer: - Option A.

Explanation: ....

33 The Bisection method has which of the following convergences?

A) Linear
B) Quadratic
C) Cubic
D) Quaternary

Answer: - Option A

Explanation: ....

34 Which of the following step is not involved in Gauss Elimination Method?

A) Elimination of unknowns
B) Reduction to an upper triangular system
C) Finding unknowns by back substitution
D) Evaluation of cofactors

Answer: - Option D.

Explanation: ....

35 How the transformation of coefficient matrix A to upper triangular matrix is done?

A) Elementary row transformations
B) Elementary column transformations
C) Successive multiplication
D) Successive division

Answer: - Option A.

Explanation: ....

36 How many types of pivoting are there?

A) 2
B) 3
C) 4
D) 5

Answer: - Option A

Explanation: There are two types of pivoting, namely, partial and complete pivoting.

37 Why Gauss Elimination is preferred over other methods?

A) Less number of operations are involved
B) Back substitution needed
C) Elimination of unknowns
D) Forms diagonal matrix form

Answer: - Option A.

Explanation: ....

38 In solving simultaneous equations by Gauss Jordan method, the coefficient matrix is reduced to ______ matrix.

A) Identity
B) Diagonal
C) Upper triangular
D) Lower triangular

Answer: - Option B.

Explanation: ....

39 While using Gauss Jordan's method, after all the elementary row operations if there are zeroes left on the main diagonal, then which of the following is correct?

A) System may have unique solution B) System has no solution

C) System may have multiple no. of finite sol. D) System may have infinitely many sol.

Answer: - Option D

Explanation: ....

40 In which of the following both sides of equation are multiplied by non-zero constant?

A) Gauss Elimination Method B) Gaussian Inconsistent procedure

C) Gaussian consistent procedure D) Gaussian substitute procedure

Answer: - Option A

Explanation: ....

41 If it is provided that f(3) = 4 is one of the initial points. What can be the choice of second point for solving by Bisection Method?

A) -5 such that f(-5) = -26 B) 0 such that f(0) = 5

C) -3 such that f(-3) = -2 D) 13 such that f(13) = 2

Answer: - Option C

Explanation: ....

42 A function is defined as $f(x) = x^3 - x - 11 = 0$. Between the interval [2,3] find the root of the function by Bisection Method up to 8 iterations?

A) 1.7334 B) 1.7364

C) 1.7354 D) 1.7344

Answer: - Option D

Explanation: ....

43 Find the positive root of the equation $3x+\sin x-e^x$ using Regula falsi method and correct up to 4 decimal places.

A) 0.4604 B) 0.4306

C) 0.3604 D) 0.4304

Answer: - Option C

Explanation: ....

44 Find the positive root of the equation xlogx = 1.2 using Regula Falsi method and correct to 4 decimal places.

A) 2.7406 B) 2.4760

C) 2.5760 D) 2.4706

Answer: - Option A

Explanation: ....

45 Find the positive root of the equation e^{-x} = sinx using Regula Falsi method and correct up to 4 decimal places.

A) 0.585 B) 0.6685

C) 0.5885 D) 0.6885

Answer: - Option C

Explanation: ....

46 Find the positive root of the equation $x^3 + 2x^2 + 50x + 7 = 0$ using Regula Falsi method and correct to 4 decimal places.

A) 0.14073652 B) 0.24073652

C) 0.42076352 D) doesn't have any positive root

Answer: - Option D

Explanation: ....

47 Find the positive root of the equation $e^x = 3x$ using Regula Falsi method and correct to 4 places.

A) 0.6190 B) 0.7091

C) 0.7901 D) 0.6910

Answer: - Option D

Explanation: ....

48 The equation f(x) is given as $x^2-4=0$. Considering the initial approximation at x=6 then the value of next approximation corrects up to 2 decimal places is given as __________

A) 3.33 B) 1.33

C) 2.33 D) 4.33

Answer: - Option A

Explanation: ....

49 The Newton Raphson method fails if __________

A) $f'(x_0)=0$ B) $f''(x_0)=0$

C) $f(x_0)=0$ D) $f'''(x_0)=0$

Answer: - Option A

Explanation: ....

50 Find the positive root of the equation $x^3 – 4x + 9 = 0$ using Regula Falsi method and correct to 4 decimal places.

A) 3.706698931 B) 2.706698931

C) 3.076698931 D) no positive roots

Answer:- Option B

Explanation: ....

51. The approximate root of the equation $x^2 + x - 3 = 0$ in (1,2) by using Bisection method

A) 0.875
B) 0.75
C) 0.587
D) None of the above

Answer : Option A

Explanation: If f(x) is continuous in the interval (a, b) such that f(a) and f(b) are of opposite sign then root lies in between them.

52. A real root of the equation $x^3 + 4x - 9 = 0$ in the interval (1,2) by using Bisection method is-----

A) 0.587
B) 0.759
C) 0.875
D) None of the above

Answer : Option C

Explanation: If f(x) is continuous in the interval (a, b) such that f(a) and f(b) are of opposite sign then root lies in between them.

53. A The approximate root of the equation $x^2 - 2x - 1 = 0$ in the interval (-1,0) by using Bisection Method is----

A) 0.375
B) -0.375
C) 0.365
D) None of the above

Answer : Option B

Explanation: If f(x) is continuous in the interval (a, b) such that f(a) and f(b) are of opposite sign then root lies in between them.

54. By using Bisection method the root of $x^3 - 9x + 1 = 0$ lies between 2 and 3 is----

A)3.75
B) 4.75
C) 2.75
D) None of the above

Answer : Option C

Explanation: If f(x) is continuous in the interval (a, b) such that f(a) and f(b) are of opposite sign then root lies in between them.

55. By Using Newton Raphson method the approximate root of the equation $x^2 + x - 5 = 0$ is---

A) 1.7914
B) 1.8914
C) 1.6914
D) None of the above

Answer : Option A

Explanation: Use formula $x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$

56. By Using Newton Raphson method the approximate root of the equation $x^4 - x - 10 = 0$ is---

A) 1.714
B) 1.854
C) 1.589
D) 1.785

Answer : Option D

Explanation: Use formula $x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$

57. By Using Newton Raphson method the approximate root of the equation $x^3 - 2x - 5 = 0$ is---

A) 0.256 B) 0.456

C) 0.369 D) 0.258

Answer : Option A

Explanation: Use formula $x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$

58. The solution of following system by using Gauss elimination method are----

$$x + 2y + 3z = 14, \quad 3x + y + 2z = 11, \quad 2x + 3y + z = 11$$

A) 1,5,1 B) 2,4,3

C) 1,4,3 D) 4,2, -2

Answer : Option C

Explanation : Eliminate x from 2 and 3 equation and then find out the values of y and z , put these value in 1 to get value of x.

59. The solution of following system by using Gauss elimination method are----

$$10x + 2y + z = 9, \quad 2x + 20y - 2z = -44, -2x + 3y + 10z = 22$$

A) 3,2,1 B) 2,1,3

C) 1, -2,3 D) 1,3,2

Answer : Option C

Explanation : Eliminate x from 2 and 3 equation and then find out the values of y and z , put these value in 1 to get value of x.

60. The solution of following system by using Gauss elimination method are----

$$2x + y + z = 10, \quad 3x + 2y + 3z = 18, \quad x + 4y + 9z = 16$$

A) 3,8,9 B) 7,-9,5

C) 2,9,8 D) 1,3,2

Answer : Option B

Explanation : Eliminate x from 2 and 3 equation and then find out the values of y and z , put these value in 1 to get value of x.

61. The solution of following system by using Gauss elimination method are----

$$x + y + z = 6, \quad 3x + 3y + 4z = 20, \quad 2x + y + 3z = 13$$

A) 4,2,1 B) 1,2,3

C) 3,2,1 D) 3,1,2

Answer : Option D

Explanation : Eliminate x from 2 and 3 equation and then find out the values of y and z , put these value in 1 to get value of x.

62. The solution of following system by using Gauss elimination method are----

$$3x + y - z = 3,\ \ 2x - 8y + z = -5,\ \ \ x - 2y + 9z = 8$$

A) 2,2,2 B) 3,3,3

C) 1,1,1 D) 3,1,2

Answer : Option C

Explanation : Eliminate x from 2 and 3 equation and then find out the values of y and z , put these value in 1 to get value of x.

63. The solution of following system by using Gauss elimination method are----

$$10x + y + z = 12,\ \ 2x + 10y + z = 13,\ \ \ 2x + 2y + 10z = 14$$

A) 2,2,2 B) 3,3,3

C) 1,1,1 D) 3,1,2

Answer : Option C

Explanation : Eliminate x from 2 and 3 equation and then find out the values of y and z , put these value in 1 to get value of x.

64. The solution of following system by using Gauss elimination method are----

$$3x + 4y - z = 8,\ \ -2x + y + z = 3,\ \ \ x + 2y - z = 2$$

A) x = 1,y=1,z=1 B) x = 2,y=2,z=2

C) x = 3, y=3, z=3 D) x = 1, y=2, z=3

Answer : Option D

Explanation : Eliminate x from 2 and 3 equation and then find out the values of y and z , put these value in 1 to get value of x.

65. The solution of following system by using Gauss elimination method are----

$$2x + y + z = 10,\ \ 3x + 2y + 3z = 18,\ \ \ x + 4y + 9z = 16$$

A) x=7,y=-9,z=5 B) x=7,y=6,z=5

C) x=3, y=4, z=5 D) x=6, y=6, z=6

Answer : Option A

Explanation : Eliminate x from 2 and 3 equation and then find out the values of y and z , put these value in 1 to get value of x.

66. The solution of following system by using Gauss elimination method are----

$$2x - y + 2z = 2,\ \ x + 10y - 3z = 5,\ \ \ x - y - z = 3$$

A) x=2,y=0,z=-1 B) x=1,y=2,z=3

C) x=1, y=-1, z=3 D) x=-1, y=-2, z=-3

Answer : Option A

Explanation : Eliminate x from 2 and 3 equation and then find out the values of y and z , put these value in 1 to get value of x.

67. The solution of the following equations by using Gauss seidel method are----

$$10x + y + 2z = 13, \; 3x + 10y + z = 14, \; 2x + 3y + 10z = 15$$

A) x=1.0003512, y=1.0002112,z=0.999

B) x=1.00021,y=1.000232,z=3.000021

C) x=3.00012,y=2.00036,z=3.000258

D) None of the above

Answer : Option A

Explanation : First put y=z=0, and x=$\frac{d_1}{a_1}$ then in second iteration put x and z=0 we get value of y and in third iteration use the values of x and y to get z. Repeat this procedure.

68. The solution of the following equations by using Gauss seidel method are----

$$15x + 2y + z = 18, \; 2x + 20y - 3z = 19, \; 3x - 6y + 25z = 22$$

A) x=1.0003512, y=1.0002112,z=0.999

B) x=1.00021,y=1.000232,z=3.000021

C) x=3.00012,y=2.00036,z=3.000258

D) None of the above

Answer : Option C

Explanation : First put y=z=0, and x=$\frac{d_1}{a_1}$ then in second iteration put x and z=0 we get value of y and in third iteration use the values of x and y to get z. Repeat this procedure.

69. The solution of the following equations by using Gauss seidel method are----

$$x + 7y - 3z = 22, \; 5x - 2y + 3z = 18, \; 2x - y + 6z = 22$$

A) x=1

B) x=2

C) x=3

D) x=0

Answer : Option C

Explanation : First put y=z=0, and x=$\frac{d_1}{a_1}$ then in second iteration put x and z=0 we get value of y and in third iteration use the values of x and y to get z. Repeat this procedure.

70. The solution of the following equations by using Gauss seidel method are----

$$20x + y - 2z = 17, \; 3x + 20y - z = -18, \; 2x - 3y + 20z = 25$$

A) x=1,y=1,z=1

B) x=1,y=-1,z=1

C) x=1,y=2,z=1

D) x=1,y=1,z=3

Answer : Option B

Explanation : First put y=z=0, and x=$\frac{d_1}{a_1}$ then in second iteration put x and z=0 we get value of y and in third iteration use the values of x and y to get z. Repeat this procedure.

71. The solution of the following equations by using Gauss seidel method are----

$$10x + y + z = 12, \; 2x + 20y + z = 13, \; 2x + 2y + 10z = 14$$

A) x=1, y=1, z=1

B) x=1, y=-1, z=1

C) x=1, y=2, z=1

D) x=1, y=1, z=3

Answer : Option A

Explanation : First put y=z=0, and x=$\frac{d_1}{a_1}$ then in second iteration put x and z=0 we get value of y and in third iteration use the values of x and y to get z. Repeat this procedure.

72. The solution of the following equations by using Gauss seidel method are----

$$54x + y + z = 110, \; 2x + 15y + 6z = 72, \; -x + 6y + 27z = 85$$

A) x =1.926, y=3.573, z=2.425 B) x=1, y=-1, z=1

C) x=1, y=2, z=1 D) x=1, y=1, z=3

Answer : Option A

Explanation: First put y=z=0, and x=$\frac{d_1}{a_1}$ then in second iteration put x and z=0 we get value of y and in third iteration use the values of x and y to get z. Repeated this procedure

73. The solution of the following equations by using Gauss seidel method are----

$$4x - 3y + 5z = 34, \; 2x - y - z = 6, \; x + y + 4z = 15$$

A) x=4,y=-1,z=3 B) x=1,y=-1,z=1

C) x=1,y=2,z=1 D) x=1,y=1,z=3

Answer : Option A

Explanation: First put y=z=0, and x=$\frac{d_1}{a_1}$ then in second iteration put x and z=0 we get value of y and in third iteration use the values of x and y to get z. Repeat this procedure

74. The solution of the following equations by using Gauss seidel method are----

$$2x - y + 5z = 15, \; 2x + y + z = 10, \; x + 3y + z = 10$$

A) x=1,y=2,z=3 B) x=1,y=-1,z=1

C) x=1,y=2,z=1 D) x=1,y=1,z=3

Answer : Option A

Explanation: First put y=z=0, and x=$\frac{d_1}{a_1}$ then in second iteration put x and z=0 we get value of y and in third iteration use the values of x and y to get z. Repeat this procedure

75. The solution of the following equations by using Gauss seidel method are----

$$15x + 3y - 25z = 85, \; 2x + 10y + z = 51, \; x - 2y + 8z = 5$$

A) x=5,y=4,z=1 B) x=1,y=2,z=3

C) x=2,y=-3,z=1 D) x=1,y=1,z=3

Answer : Option A

Explanation: First put y=z=0, and x=$\frac{d_1}{a_1}$ then in second iteration put x and z=0 we get value of y and in third iteration use the values of x and y to get z. Repeat this procedure

76. By using Jacobi method the solution of the system of equations are---

$$5x + 2y + z = 12 \ , x + 4y + 2z = 15 \ , x + 2y + 5z = 20$$

A) x=2.4,y=3.75,z=4

B) x=3.4,y=4.75,z=4

C) x=3.5,y=4.75,z=4

D) None of the above

Answer : Option A

Explanation : First put x=y=z=0,then $x_1 = \frac{d_1}{a_1}, y_1 = \frac{d_2}{b_2}, z_1 = \frac{d_3}{a_3}$ Repeat the iterations

77. By using Jacobi method the solution of the system of equations are---

$$2x - y + 5z = 15 \ , 2x + y + z = 7 \ , x + 3y + z = 10$$

A) 1,4,7

B) 1,2,3

C) 2,3,2

D) None of the above

Answer : Option B

Explanation : First put x=y=z=0,then $x_1 = \frac{d_1}{a_1}, y_1 = \frac{d_2}{b_2}, z_1 = \frac{d_3}{a_3}$ Repeat the iterations

78. By using Jacobi method the solution of the system of equations are---

$$5x + 2y + z = 12 \ , x + 4y + 2z = 15 \ , x + 2y + 5z = 20$$

A) x=1.236,y=2.3669,z=3.366

B) x=1.236,y=2.369,z=123

C) x=1.084,y=1.95,z=3.164

D) None of the above

Answer : Option C

Explanation : First put x=y=z=0,then $x_1 = \frac{d_1}{a_1}, y_1 = \frac{d_2}{b_2}, z_1 = \frac{d_3}{a_3}$ Repeat the iterations

79. By using Jacobi method the solution of the system of equations are---

$$10x - y + 2z = 6 \ , -x + 11y + z = 22 \ , 2x - y + 10z = -10$$

A) x=1,y=2,z=1

B) x=1,y=1,z=1

C) x=1,y=-2,z=-1

D) x=1,y=2,z=-1

Answer : Option D

Explanation : First put x=y=z=0,then $x_1 = \frac{d_1}{a_1}, y_1 = \frac{d_2}{b_2}, z_1 = \frac{d_3}{a_3}$ Repeat the iterations

80. The solution of the system of equations by using Jacobi method are---

$$8x + 2y - 2z = 8 \ , x - 8y + 3z = -4 \ , 2x + y + 9z = 12$$

A) x=1,y=2,z=1

B) x=1,y=1,z=1

C) x=1,y=-2,z=-1

D) x=1,y=2,z=-1

Answer : Option C

Explanation : First put x=y=z=0,then $x_1 = \frac{d_1}{a_1}, y_1 = \frac{d_2}{b_2}, z_1 = \frac{d_3}{a_3}$ Repeate the iteration

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