NDA MATHS MOCK TEST - 138 (SOLUTION)

1. (B) Two dice are thrown

$n(S) = 36$

$E = \{(6, 4), (4, 6), (5, 5)\}$ [∵ Sum is 10.]

$n(E) = 3$

The required Probability = $\frac{3}{36} = \frac{1}{12}$

2. (C) $P\left(\frac{A}{(A^c \cup B)}\right) \Rightarrow \frac{P[A \cap (A^c \cup B)]}{P(A^c \cup B)}$

$\Rightarrow \frac{P(A \cup B)}{P(A^c) + P(B) - P(A^c \cap B)}$

$\Rightarrow \frac{P(B) - P(A^c \cap B)}{P(A^c) + P(B) - P(A^c \cap B)}$

$\Rightarrow \frac{0.6 - 0.4}{0.2 + 0.6 - 0.4}$

$\Rightarrow \frac{0.2}{0.4} = \frac{1}{2}$

3. (A) $\lim_{x \to 0} \frac{(8+x)^{1/3} - 2}{25 - (125+x)^{2/3}}$ $\left[\frac{0}{0}\right]$Form

by L-Hospital's Rule

$\Rightarrow \lim_{x \to 0} \frac{\frac{1}{3}(8+x)^{-2/3} - 0}{0 - \frac{2}{3}(125+x)^{-1/3}}$

$\Rightarrow \lim_{x \to 0} \frac{-(8+x)^{-2/3}}{2(125+x)^{-1/3}}$

$\Rightarrow \lim_{x \to 0} \frac{-(125+x)^{1/3}}{2(8+x)^{2/3}}$

$\Rightarrow \frac{-(125)^{1/3}}{2(8)^{2/3}} = \frac{-5}{8}$

4. (C) Equation of Plane

$$\begin{vmatrix} x-1 & y+2 & z-3 \\ 3 & 4 & -1 \\ 5 & -1 & 2 \end{vmatrix} = 0$$

$\Rightarrow (x-1)\times 7 - (y+2)\times 11 + (z-3)\times(-23) = 0$

$\Rightarrow 7x - 7 - 11y - 22 - 23z + 69 = 0$

$\Rightarrow 7x - 11y - 23z + 40 = 0$

$\Rightarrow 7x - 11y - 12z = -40$

$\Rightarrow \frac{x}{-40/7} + \frac{y}{40/11} + \frac{z}{10/3} = 1$

Sum of intercepts = $-\frac{-40}{7} + \frac{40}{11} + \frac{10}{3}$

$= \frac{-40 \times 33 + 40 \times 21 + 10 \times 77}{231} = \frac{290}{231}$

$= 1\frac{59}{231}$

5. (B) $x = \sqrt{3^{\sin^{-1} t}}$

$\frac{dx}{dt} = \frac{1}{2}(3^{\sin^{-1} t})^{-1/2} . 3^{\sin^{-1} t} .\log 3 \times \frac{1}{\sqrt{1-t^2}}$

$\frac{dx}{dt} = \frac{\log 3.\sqrt{3^{\sin^{-1} t}}}{2\sqrt{1-t^2}}$

$\frac{dx}{dt} = \frac{x \log 3}{2\sqrt{1-t^2}}$ ...(i)

and $y = \sqrt{3^{\cos^{-1} t}}$

$\frac{dy}{dt} = \frac{1}{2}(3^{\cos^{-1} t})^{-1/2}\ 3^{\cos^{-1} t} \log 3 \times \frac{-1}{\sqrt{1-t^2}}$

$\frac{dy}{dt} = \frac{-\log 3.\sqrt{3^{\cos^{-1} t}}}{2\sqrt{1-t^2}}$

$\frac{dx}{dt} = \frac{-y \log 3}{2\sqrt{1-t^2}}$ ...(ii)

from eq(i) and eq(ii)

$\frac{dy}{dx} = \frac{-y \log 3}{2\sqrt{1-t^2}} \times \frac{2\sqrt{1-t^2}}{x \log 3}$

$\frac{dy}{dx} = \frac{-y}{x}$

6. (D) $\frac{2b^2}{a} = 6 \Rightarrow b^2 = 3a$

and $a(1 - e) = \frac{5}{2}$

Now, $b^2 = a^2(1 - e^2)$

$\Rightarrow 3a = a(1 - e) \times a(1 + e)$

$\Rightarrow 3 = (1 + e) \times \frac{5}{2}$

$\Rightarrow 1 + e = \frac{6}{5} \Rightarrow e = \frac{1}{5}$

7. (C) $A = \begin{bmatrix} 1 & 0 & 0 \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix}$

$A^2 = \begin{bmatrix} 1 & 0 & 0 \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix}\begin{bmatrix} 1 & 0 & 0 \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 3 & 2 & 1 \end{bmatrix}$

$A^3 = \begin{bmatrix} 1 & 0 & 0 \\ 2 & 1 & 0 \\ 3 & 2 & 1 \end{bmatrix}\begin{bmatrix} 1 & 0 & 0 \\ 1 & 1 & 0 \\ 1 & 1 & 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 \\ 3 & 1 & 0 \\ 6 & 3 & 1 \end{bmatrix}$

$A^4 = \begin{bmatrix} 1 & 0 & 0 \\ 4 & 1 & 0 \\ 10 & 4 & 1 \end{bmatrix}$........so on

$A^{15} = \begin{bmatrix} 1 & 0 & 0 \\ 15 & 1 & 0 \\ 120 & 15 & 1 \end{bmatrix}$

Sum of the elements = 1 +15 +120 = 136

8. (B) $I = \int \frac{\cot x}{1+\cot x+\cot^2 x}\,dx$

$I = \int \left(1 - \frac{\text{cosec}^2 x}{1+\cot x+\cot^2 x}\right) dx$

$I = \int 1.dx - \int \frac{\text{cosec}^2 x}{1+\cot x+\cot^2 x}\,dx$

Let $\cot x = t \Rightarrow -\text{cosec}^2 x\,dx = dt$

$I = x + \int \frac{dt}{1+t+t^2}$

$I = x + \int \frac{1}{\left(t+\frac{1}{2}\right)^2 + \left(\frac{\sqrt{3}}{2}\right)^2}\,dt$

$I = x + \frac{1}{\sqrt{3}/2}\tan^{-1}\left(\frac{t+\frac{1}{2}}{\frac{\sqrt{3}}{2}}\right) + c$

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

9. (A) Given that $\vec{a} = 2\hat{i}+\hat{j}+3\hat{k}$, $\vec{c} = 3\hat{j}+4\hat{k}$

$\vec{a}.\vec{b} = 4$

Now, $\vec{a}\times\vec{b} = \vec{c}$

$\Rightarrow \vec{a}\times(\vec{a}\times\vec{b}) = \vec{a}\times\vec{c}$

$\Rightarrow (\vec{a}.\vec{b})\vec{a} - (\vec{a}.\vec{a})\vec{b} = \vec{a}\times\vec{c}$

$\Rightarrow 4\vec{a} - \vec{b} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 2 & 1 & 3 \\ 0 & 3 & 4 \end{vmatrix}$

$\Rightarrow 4(2\hat{i}+\hat{j}+3\hat{k}) - \vec{b} = -5\hat{i} - 8\hat{j} + 6\hat{k}$

$\Rightarrow \vec{b} = 13\hat{i}+12\hat{j}+6\hat{k}$

Now, $|\vec{b}| = \sqrt{13^2+12^2+6^2}$

$\Rightarrow \vec{b} = \sqrt{169+144+36} = \sqrt{349}$

10. (C) Prime numbers between 50 and 100 is 53, 59, 61, 67, 71, 73, 79, 83, 89, 97.
The required sum = 732

11. (A) Equation of y-axis

$\frac{x}{0} = \frac{y}{1} = \frac{z}{0}$

12. (B) $\{(x, y) : x < 0 \text{ and } y > 0\}$

13. (D) $(1-2\omega+\omega^2)^3 - (1+\omega-2\omega^2)^3$

$\Rightarrow (-2\omega-\omega)^3 - (-\omega^2-2\omega^2)^3$

$\Rightarrow -27\omega^3 + 27\omega^6$

$\Rightarrow -27 + 27 = 0$

14. (B)

2	715	1
2	357	1
2	178	0
2	89	1
2	44	0
2	22	0
2	11	1
2	5	1
2	2	0
2	1	1
	0	

Hence $(715)_{10} = (1011001011)_2$

15. (B) $I = \int \frac{2x-3}{(x-3)(x+4)}\,dx$

$I = \int \left(\frac{3}{7(x-3)} + \frac{11}{7(x+4)}\right) dx$

$I = \frac{3}{7}\log(x-3) + \frac{11}{7}\log(x+4) + c$

16. (B) The required no. of ways

$= {}^6C_3\times{}^4C_2\times{}^5C_0 + {}^6C_3\times{}^4C_1\times{}^5C_1 + {}^6C_3\times{}^4C_0\times{}^5C_2 + {}^6C_2\times{}^4C_3\times{}^5C_0 + {}^6C_2\times{}^4C_2\times{}^5C_1 + {}^6C_2\times{}^4C_1\times{}^5C_2 + {}^6C_2\times{}^4C_0\times{}^5C_3 + {}^6C_1\times{}^4C_0\times{}^5C_4 + {}^6C_1\times{}^4C_3\times{}^5C_1 + {}^6C_1\times{}^4C_2\times{}^5C_2 + {}^6C_1\times{}^4C_1\times{}^5C_3 + {}^6C_1\times{}^4C_0\times{}^5C_4 + {}^6C_0\times{}^4C_4\times{}^5C_1 + {}^6C_0\times{}^4C_3\times{}^5C_2 + {}^6C_0\times{}^4C_2\times{}^5C_3 + {}^6C_0\times{}^4C_1\times{}^5C_4 + {}^6C_0\times{}^4C_0\times{}^5C_5$

$= 20\times6\times1 + 20\times4\times5 + 20\times1\times10 + 20\times4\times1 + 15\times6\times5 + 15\times4\times10 + 15\times1\times10 + 6\times1\times1 + 6\times4\times5 + 6\times6\times10 + 6\times4\times10 + 6\times1\times5 + 1\times1\times5 + 1\times4\times10 + 1\times6\times10 + 1\times4\times5 + 1\times1\times1$

$= 120+400+200+80+450+600+150+6+120+360+240+30+5+40+60+20+1$

$= 2882$

17. (D) $\lim_{x\to0}\dfrac{\log(\sin 2x+\cos 2x)}{\tan 2x}$ $\left[\dfrac{0}{0}\right]$ Form

by L-Hospital's Rule

$$\Rightarrow \lim_{x\to0}\frac{\dfrac{2\cos 2x-2\sin 2x}{\sin 2x+\cos 2x}}{2\sec^2 2x}$$

$$\Rightarrow \lim_{x\to0}\frac{\cos 2x-\sin 2x}{\sec^2 2x(\sin 2x+\cos 2x)}$$

$$\Rightarrow \frac{1}{1(0+1)} = 1$$

18. (C) Hyperbola

$$\frac{x^2}{25}-\frac{y^2}{9} = 1$$

$$\Rightarrow \frac{2x}{25}-\frac{2y}{9}\times\frac{dy}{dx} = 0$$

$$\Rightarrow \frac{dy}{dx} = \frac{9x}{25y}$$

Slope of tangent at $\left(\dfrac{10}{\sqrt3},-\sqrt3\right) = \dfrac{9\times\dfrac{10}{\sqrt3}}{25(-\sqrt3)}$

$= \dfrac{-6}{5}$

Slope of normal at $\left(\dfrac{10}{\sqrt3},-\sqrt3\right) = \dfrac{-1\times5}{-6} = \dfrac{5}{6}$

Equation of normal

$$y+\sqrt3 = \frac{5}{6}\left(x-\frac{10}{\sqrt3}\right)$$

$$\Rightarrow 5\sqrt3\,x - 6\sqrt3\,y = 68$$

Point $\left(\dfrac{-4}{\sqrt3},\dfrac{-7}{\sqrt3}\right)$ does not lie on the normal to the hyperbola.

19. (D) $\vec{r_1} = (-1, 2, -3)$ and $\vec{r_2} = (2, -2, 1)$

$\vec{n_1} = (4, 3, -1)$ and $\vec{n_2} = (3, -4, 2)$

$\vec{r_1}-\vec{r_2} = (-3, 4, -4)$

Now, $\vec{n} = \vec{n_1}\times\vec{n_2}$

$$\vec{n} = \begin{vmatrix}\hat i & \hat j & \hat k\\ 4 & 3 & -1\\ 3 & -4 & 2\end{vmatrix}$$

$$\vec{n} = 2\hat i - 11\hat j - 25\hat k$$

The required distance $= \dfrac{\vec{n}.(\vec{r_1}-\vec{r_2})}{|\vec{n}|}$

$$= \frac{(2\hat i-11\hat j-25\hat k).(-3\hat i+4\hat j-4\hat k)}{\sqrt{2^2+11^2+(-25)^2}}$$

$$= \frac{-6-44+100}{\sqrt{750}}$$

$$= \frac{50}{5\sqrt{30}} = \sqrt{\frac{10}{3}}$$

20. (B) $\vec{a} = 3\hat i - \hat j + 7\hat k$, $\vec{b} = -\hat i + 2\hat j - 5\hat k$ and $\vec{c} = 2\hat i - \hat j + 6\hat k$

Volume of cuboid $= \vec{a}.(\vec{b}\times\vec{c})$

$$= \begin{vmatrix}3 & -1 & 7\\ -1 & 2 & -5\\ 2 & -1 & 6\end{vmatrix}$$

$= 3\times7 + 1\times4 + 7\times(-3)$

$= 21+4-21 = 4$ cu.unit

21. (A) $\dfrac{\sqrt2}{\cos 225}-\dfrac{1}{\sqrt3\sin 300}$

$$\Rightarrow \frac{\sqrt2}{\cos(180+45)}-\frac{1}{\sqrt3\sin(360-60)}$$

$$\Rightarrow \frac{\sqrt2}{-\cos 45}-\frac{1}{-\sqrt3\sin 60}$$

$$\Rightarrow \frac{\sqrt2\times\sqrt2}{-1}+\frac{1\times2}{\sqrt3\times\sqrt3}$$

$$\Rightarrow -2+\frac{2}{3} = \frac{-4}{3}$$

22. (C) $b^2 = a^2(1 - e^2)$

$\Rightarrow b^2 = a^2\left(1 - \frac{5}{9}\right) \Rightarrow b^2 = \frac{4a^2}{9}$

Equation of an ellipse

$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

$\Rightarrow \frac{x^2}{a^2} + \frac{9y^2}{4a^2} = 1$

On differentiating both side w.r.t.'x'

$\Rightarrow \frac{2x}{a^2} + \frac{18y}{4a^2} \times \frac{dy}{dx} = 0$

$\Rightarrow 2x + \frac{9y}{2} \times \frac{dy}{dx} = 0$

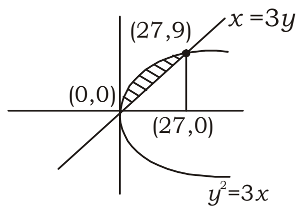
Hence Order = 1 and Degree = 1

23. (C) $a = 24,\ b = 36$

H.M. $= \frac{2ab}{a+b}$

H.M. $= \frac{2 \times 24 \times 36}{60} = \frac{144}{5}$

24. (B)



$y_1 \Rightarrow y^2 = 3x$

and $y_2 \Rightarrow y = \frac{x}{3}$

Area $= \int_0^{27} (y_1 - y_2)\, dx$

$= \int_0^{27} \left(\sqrt{3}\sqrt{x} - \frac{x}{3}\right) dx$

$= \left[\sqrt{3} \times 2 \times \frac{x^{3/2}}{3} - \frac{x^2}{3 \times 2}\right]_0^{27}$

$= \frac{2}{\sqrt{3}} \times (27)^{3/2} - \frac{(27)^2}{6} - 0$

$= 2 \times 81 - \frac{243}{2} = \frac{81}{2}$ sq.unit

25. (C) $(x + iy)^2 = 15 + 8i$

$\Rightarrow x + iy = (15 + 8i)^{1/2}$

and $x - iy = (15 - 8i)^{1/2}$

Now, $(15 + \sqrt{-64})^{1/2} + (15 - \sqrt{-64})^{1/2}$

$\Rightarrow (15 + 8i)^{1/2} + (15 - 8i)^{1/2}$

$\Rightarrow x + iy + x - iy = 2x$

26. (D) Differential equation

$\left(\frac{d^2y}{dx^2}\right)^{3/4} + \frac{dy}{dx} - y = 0$

$\left(\frac{d^2y}{dx^2}\right)^{3/4} = y - \frac{dy}{dx}$

$\left(\frac{d^2y}{dx^2}\right)^{3} = \left[y - \frac{dy}{dx}\right]^4$

Order = 2 and Degree = 3

27. (C) Let equation of ellipse

$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ ...(i)

Point $\left(-2, \frac{2}{\sqrt{3}}\right)$ and $\left(\frac{\sqrt{58}}{3}, \frac{-1}{3}\right)$ lie on the ellipse, then

$\frac{4}{a^2} + \frac{4}{3b^2} = 1$ ...(i)

$\frac{58}{9a^2} + \frac{1}{9b^2} = 1$ ...(ii)

On solving eq(i) and eq(ii)

$a^2 = \frac{20}{3}$ and $b^2 = \frac{10}{3}$

Now, $b^2 = a^2(1 - e^2)$

$\Rightarrow \frac{10}{3} = \frac{20}{3}(1 - e^2)$

$\Rightarrow \frac{1}{2} = 1 - e^2 \Rightarrow e = \frac{1}{\sqrt{2}}$

28. (B) $y = \left[x + \sqrt{x^2 - 1}\right]^7 + \left[x - \sqrt{x^2 - 1}\right]^7$ ...(i)

On differentiating both side w.r.t. 'x'

$\Rightarrow \frac{dy}{dx} = 7\left[x + \sqrt{x^2 - 1}\right]^6 \left[1 + \frac{1 \times 2x}{2\sqrt{x^2 - 1}}\right]$

$+7\left[x - \sqrt{x^2 - 1}\right]^6 \left[1 - \frac{1 \times 2x}{2\sqrt{x^2 - 1}}\right]$

$\Rightarrow \frac{dy}{dx} = 7\left[x + \sqrt{x^2 - 1}\right]^6 \left[\frac{\sqrt{x^2 - 1} + x}{\sqrt{x^2 - 1}}\right] +$

$7\left[x + \sqrt{x^2 - 1}\right]^6 \left[\frac{\sqrt{x^2 - 1} - x}{\sqrt{x^2 - 1}}\right]$

$\Rightarrow \frac{dy}{dx} = 7\frac{\left[x + \sqrt{x^2 - 1}\right]^7}{\sqrt{x^2 - 1}} - 7\frac{\left[x - \sqrt{x^2 - 1}\right]^7}{\sqrt{x^2 - 1}}$

$\Rightarrow \sqrt{x^2 - 1}\frac{dy}{dx} = 7\left[x + \sqrt{x^2 - 1}\right]^7 - 7\left[x - \sqrt{x^2 - 1}\right]^7$

Again, differentiating

$$\Rightarrow \sqrt{x^2-1}\,\frac{d^2y}{dx^2}+\frac{1\times 2x}{2\sqrt{x^2-1}}\times\frac{dy}{dx}$$

$$= 7\times 7\left[x+\sqrt{x^2-1}\right]^6\left[1+\frac{x}{\sqrt{x^2-1}}\right]$$

$$-\,7\times 7\left[x-\sqrt{x^2-1}\right]^6\left[1-\frac{x}{\sqrt{x^2-1}}\right]$$

$$\Rightarrow \sqrt{x^2-1}\,\frac{d^2y}{dx^2}+\frac{x}{\sqrt{x^2-1}}\,\frac{dy}{dx}$$

$$= \frac{49\left[x+\sqrt{x^2-1}\right]^7}{\sqrt{x^2-1}}+\frac{49\left[x-\sqrt{x^2-1}\right]^7}{\sqrt{x^2-1}}$$

$$\Rightarrow (x^2-1)\frac{d^2y}{dx^2}+x\frac{dy}{dx}$$

$$= 49\left[\left[x+\sqrt{x^2-1}\right]^7+\left[x-\sqrt{x^2-1}\right]\right]^7$$

$$\Rightarrow (x^2-1)\frac{d^2y}{dx^2}+x\frac{dy}{dx} = 49y \quad \text{[from eq(i)]}$$

29. (C) $x^2 - 16x + 28 > 0$
$(x-14)(x-4) > 0$
$x < 4$ and $x > 14$

30. (D) $n = 9$

No. of diagonals $= \frac{n(n-3)}{2}$

$= \frac{9\times 6}{2} = 27$

31. (B) tan750 – cot 390°
$\Rightarrow$ tan(2×360 + 30) – cot(360 + 30°)
$\Rightarrow$ tan30 – cot30

$\Rightarrow \frac{1}{\sqrt{3}} - \sqrt{3} = \frac{-2}{\sqrt{3}}$

32. (B) $\cos(3\cos^{-1}0.6)$
$\Rightarrow \cos(\cos^{-1}(4(0.6)^3 - 3\times 0.6)]$
$[\because 3\cos^{-1}x = \cos^{-1}(4x^3-3x)]$
$\Rightarrow 4(0.6)^3 - 3\times 0.6$
$\Rightarrow 0.864 - 1.8 = -0.936$

33. (B) Digits 0,1, 2, 3, 4, 6, 7, 9
(i) When last digit is '0'

| 5 | 1 | = 5

(ii) When last digit is '2'

| 5 | 1 | = 5

(ii) When last digits is '4'

| 4 | 1 | = 4

(iii) When last digit is '6'

| 4 | 1 | = 4

The required number = 5 + 5 + 4 + 4
= 18

34. (B) Equation of line

$\frac{x}{a}+\frac{y}{b} = 1$

$\Rightarrow bx + ay - ab = 0$ ...(i)
Length of perpendicular drawn from (0,0) to eq(i)

$$p = \left|\frac{b\times 0 + a\times 0 - ab}{\sqrt{b^2+a^2}}\right|$$

$$p = \left|\frac{-ab}{\sqrt{a^2+b^2}}\right|$$

$$p^2 = \frac{a^2b^2}{a^2+b^2} \Rightarrow \frac{1}{p^2}=\frac{1}{a^2}+\frac{1}{b^2}$$

35. (C) $(A\cap B)\cup(B\cap C)\cup(C\cap A) - (A\cap B\cap C)$

36. (C) In the expansion of $\left(3x^2-\frac{1}{2x^3}\right)^7$

$$T_{r+1} = {}^7C_r\,(3x^2)^{7-r}\left(\frac{-1}{2x^3}\right)^r$$

$$= {}^7C_r\,3^{7-r}\left(\frac{-1}{2}\right)^r x^{14-5r}$$

Here, $14 - 5r = 4 \Rightarrow r = 2$

Coefficient of $x^4 = {}^7C_2\,3^5\left(\frac{-1}{2}\right)^2$

$$= \frac{21\times 81}{4} = \frac{1701}{4}$$

37. (D) $\tan^{-1}(1+x) + \tan^{-1}(1-x) = \frac{\pi}{4}$

$$\Rightarrow \tan^{-1}\left[\frac{1+x+1-x}{1-(1-x^2)}\right]=\frac{\pi}{4}$$

$$\Rightarrow \frac{2}{x^2} = \tan\frac{\pi}{4}$$

$$\Rightarrow \frac{2}{x^2} = 1 \Rightarrow x = \sqrt{2}$$

38. (A) $\lim_{x\to 1}\frac{x^2+2x-3}{x^2-6x+5}$ $\left[\frac{0}{0}\right]$form

by L-Hospital's Rule

$$\Rightarrow \lim_{x\to 1}\frac{2x+2}{2x-6}$$

$$\Rightarrow \frac{2+2}{2-6} = -1$$

39. (C) Let equation of sphere

$x^2 + y^2 + z^2 + 2ux + 2vy + 2wz + d = 0$ ...(i)

It passes through the points (0,0,0), (4,0,0),(0, –2,0) and (0,0,5)

$d = 0,\ u = -2,\ v = 1,\ \omega = \frac{-5}{2}$

from eq(i)

$x^2 + y^2 + z^2 - 4x + 2y - 5z = 0$

40. (A) $8°45' = \left(8 + \frac{45}{60}\right)^{o}$

$\Rightarrow 8°45' = \left(\frac{35}{4}\right)^{o}$

$\Rightarrow 8°45' = \left(\frac{35}{4} \times \frac{\pi}{180}\right)^{c} = \left(\frac{7\pi}{144}\right)^{c}$

41. (B) $y = \log[x^a + a^x]$

On differential both side w.r.t. 'x'

$\Rightarrow \frac{dy}{dx} = \frac{1}{x^a + a^x}[ax^{a-1} + a^x \log a]$

$\Rightarrow \frac{dy}{dx} = \frac{ax^{a-1} + a^x \log a}{x^a + a^x}$

42. (C) Let numbers = $x-6, x-5, x-4, x-3, x-2, x-1, x, x+1, x+2, x+3, x+4, x+5, x+6$

A.T.Q.,

Sum = 1677

$13x = 1677 \Rightarrow x = 129$

9th term = $x + 2$

= 129 + 2 = 131

43. (B) There are 10 letters in the word "PERSISTENT".

Number of words can be formed form the letters of the word = $\frac{10!}{2!2!2!} = \frac{10!}{8}$

Now, if we begin with P and ending with T remaining 8 letters can be arranged in

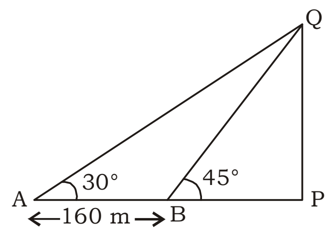
$\frac{8!}{2!2!} = \frac{8!}{4}$

44. (C) $\lim_{x\to\infty} \frac{x^2 + 2x^3 + 3x^4}{1 + x^3 - 5x^4}$ $\left[\frac{\infty}{\infty}\right]$ Form

$\Rightarrow \lim_{x\to\infty} \frac{x^4\left[\frac{1}{x^2} + \frac{2}{x} + 3\right]}{x^4\left[\frac{1}{x^4} + \frac{1}{x} - 5\right]}$

$\Rightarrow \lim_{x\to\infty} \frac{\frac{1}{x^2} + \frac{2}{x} + 3}{\frac{1}{x^4} + \frac{1}{x} - 5} = \frac{0+0+3}{0+0-5} = \frac{-3}{5}$

45. (C)



Let height of tower = h m

In ΔBPQ :-

$\tan 45° = \frac{PQ}{BP}$

$\Rightarrow 1 = \frac{h}{BP}$

$\Rightarrow BP = h$

In ΔAPQ :-

$\tan 30° = \frac{PQ}{AP}$

$\Rightarrow \frac{1}{\sqrt{3}} = \frac{h}{160 + BP}$

$\Rightarrow 160 + BP = h\sqrt{3}$

$\Rightarrow 160 + h = h\sqrt{3} \Rightarrow h = 80(\sqrt{3} + 1)$

Hence height of the tower = $80(\sqrt{3} + 1)$m

46. (D) In ΔABC, $a = 32,\ b = 9,\ \cos C = \frac{47}{72}$

Now, $\cos C = \frac{a^2 + b^2 - c^2}{2ab}$

$\Rightarrow \frac{47}{72} = \frac{(32)^2 + 9^2 - c^2}{2 \times 32 \times 9}$

$\Rightarrow 47 = \frac{1024 + 81 - c^2}{8}$

$\Rightarrow 376 = 1105 - c^2 \Rightarrow c = 27$

$s = \frac{a+b+c}{2} = \frac{32+9+27}{2} = 34$

$\Delta = \sqrt{s(s-a)(s-b)(s-c)}$

$\Delta = \sqrt{34 \times (34-32)(34-9)(34-28)}$

$\Delta = \sqrt{34 \times 2 \times 25 \times 7} = 10\sqrt{119}$

Now, $r = \frac{\Delta}{s}$

$\Rightarrow r = \frac{10\sqrt{119}}{34} = \frac{5\sqrt{119}}{17} = 5\sqrt{\frac{7}{17}}$

47. (C) Let A = $\begin{bmatrix} 2 & -1 & -4 \\ 1 & 1+\lambda & 0 \\ 3 & 1 & -4 \end{bmatrix}$

A is invertible,
then |A| = 0

$\Rightarrow \begin{vmatrix} 2 & -1 & -4 \\ 1 & 1+\lambda & 0 \\ 3 & 1 & -4 \end{vmatrix} = 0$

$\Rightarrow 2(-4-4\lambda)+1(-4-0)-4(1-3-3\lambda) = 0$
$\Rightarrow -8-8\lambda-4-4+12+12\lambda = 0 \Rightarrow \lambda = 1$

48. (B) Ratio of angles = 1 : 2 : 3
Let angles = x, $2x$, $3x$
Now, $x + 2x + 3x = 180$
$\Rightarrow 6x = 180 \Rightarrow x = 30°$
Angles = 30°, 60°, 90°
Sine Rule

$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

$\Rightarrow \frac{a}{\sin 30} = \frac{b}{\sin 60} = \frac{c}{\sin 90}$

$\Rightarrow \frac{a}{1/2} = \frac{b}{\sqrt{3}/2} = \frac{c}{1} \Rightarrow \frac{a}{1} = \frac{b}{\sqrt{3}} = \frac{c}{2}$

Hence $a : b : c = 1 : \sqrt{3} : 2$

49. (B) I = $\int_0^{\pi/4} \tan^4 x\, dx$

I = $\int_0^{\pi/4} \tan^2 x.\tan^2 x\, dx$

I = $\int_0^{\pi/4} (\sec^2 x - 1)\tan^2 x\, dx$

I = $\int_0^{\pi/4} \tan^2 x.\sec^2 x\, dx - \int_0^{\pi/4} \tan^2 x\, dx$

I = $\int_0^{\pi/4} \tan^2 x.\sec^2 x\, dx - \int_0^{\pi/4} (\sec^2 x - 1)\, dx$

I = $\left[\frac{(\tan x)^3}{3}\right]_0^{\pi/4} - [\tan x - x]_0^{\pi/4}$

I = $\left[\frac{\left(\tan\frac{\pi}{4}\right)^3}{3} - \frac{\tan 0}{3}\right] - \left[\left(\tan\frac{\pi}{4} - \frac{\pi}{4}\right) - (\tan 0 - 0)\right]$

I = $\left[\frac{1}{3} - 0\right] - \left[1 - \frac{\pi}{4} - 0\right]$

I = $\frac{1}{3} - 1 + \frac{\pi}{4} = \frac{\pi}{4} - \frac{2}{3}$

50. (A) $\sqrt{3}\,|\vec{a} \times \vec{b}| - |\vec{a}.\vec{b}| = 0$
$\Rightarrow \sqrt{3}\,|\vec{a}||\vec{b}|\sin\theta - |\vec{a}||\vec{b}|\cos\theta = 0$
$\Rightarrow |\vec{a}||\vec{b}|(\sqrt{3}\sin\theta - \cos\theta) = 0$
$\Rightarrow \sqrt{3}\sin\theta - \cos\theta = 0$
$\Rightarrow \tan\theta = \frac{1}{\sqrt{3}} = \theta = \frac{\pi}{6}$

51. (C) $y = \tan^{-1}\left[\frac{\sqrt{1+x} - \sqrt{1-x}}{\sqrt{1+x} + \sqrt{1-x}}\right]$

Let $x = \cos 2\theta = \theta = \frac{1}{2}\cos^{-1}x$

$y = \tan^{-1}\left[\frac{\sqrt{1+\cos 2\theta} - \sqrt{1-\cos 2\theta}}{\sqrt{1+\cos 2\theta} + \sqrt{1-\cos 2\theta}}\right]$

$y = \tan^{-1}\left[\frac{\sqrt{2}\cos\theta - \sqrt{2}\sin\theta}{\sqrt{2}\cos\theta + \sqrt{2}\sin\theta}\right]$

$y = \tan^{-1}\left[\frac{1-\tan\theta}{1+\tan\theta}\right]$

$y = \tan^{-1}\left[\tan\left(\frac{\pi}{4} - \theta\right)\right]$

$y = \frac{\pi}{4} - \theta$

$y = \frac{\pi}{4} - \frac{1}{2}\cos^{-1}x$

On differentiating both side w.r.t.'x'

$\frac{dy}{dx} = \frac{1}{2} \times \left(\frac{-1}{\sqrt{1-x^2}}\right) = \frac{1}{2\sqrt{1-x^2}}$

52. (D) I = $\int_0^1 \cos\left(2\cot^{-1}\sqrt{\frac{1+x}{1-x}}\right) dx$ ...(i)

Let $y = \cos\left(2\cot^{-1}\sqrt{\frac{1+x}{1-x}}\right)$ and $x = \cos 2\theta$

$\Rightarrow y = \cos\left(2\cot^{-1}\sqrt{\frac{1+\cos 2\theta}{1-\cos 2\theta}}\right)$

$\Rightarrow y = \cos\left(2\cot^{-1}\sqrt{\frac{2\cos^2\theta}{2\sin^2\theta}}\right)$

$\Rightarrow y = \cos(2\cos^{-1}(\cot\theta))$
$\Rightarrow y = \cos(2\theta) = x$
from eq(i)

I = $\int_0^1 x\, dx$

I = $\left(\frac{x^2}{2}\right)_0^1$

I = $\frac{1}{2} - 0 = \frac{1}{2}$

53. (C) $\frac{1}{r}-\left(\frac{1}{r_1}+\frac{1}{r_2}+\frac{1}{r_3}\right)$

$$\Rightarrow \frac{1}{\frac{\Delta}{s}}-\left(\frac{1}{\frac{\Delta}{s}}+\frac{1}{\frac{\Delta}{s-b}}+\frac{1}{\frac{\Delta}{s-c}}\right)$$

$$\Rightarrow \frac{s}{\Delta}-\left(\frac{s-a}{\Delta}+\frac{s-b}{\Delta}+\frac{s-c}{\Delta}\right)$$

$$\Rightarrow \frac{s}{\Delta}-\frac{s-a+s-b+s-c}{\Delta}$$

$$\Rightarrow \frac{s}{\Delta}-\frac{3s-(a+b+c)}{\Delta}$$

$$\Rightarrow \frac{s}{\Delta}-\frac{3s-2s}{\Delta}$$

$$\Rightarrow \frac{s}{\Delta}-\frac{s}{\Delta} = 0$$

54. (C) a^2, b^2 and c^2 are in A.P., then $2b^2 = a^2 + c^2$

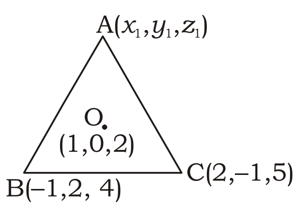
$$\Rightarrow \frac{2b^2}{abc}=\frac{a^2+c^2}{abc}$$

$$\Rightarrow \frac{2b}{ac}=\frac{a}{bc}+\frac{c}{ab}$$

Hence $\frac{a}{bc}$, $\frac{b}{ac}$ and $\frac{c}{ab}$ are also in A.P.

55. (B) The required number of ways = 8^6

56. (A)



Let co-ordinate of A = (x_1, y_1, z_1)
Now,

$$\frac{x_1-1+2}{3} = 1 \Rightarrow x_1 = 2$$

$$\frac{y_1+2-1}{3} = 0 \Rightarrow y_1 = -1$$

$$\frac{z_1+4+5}{3} = 2 \Rightarrow z_1 = -3$$

Hence co-ordinates of A = (2, –1, –3)

57. (C) Given that r_1 = 24 cm and r_2 = 7 cm
Radius of common circle

$$r = \frac{r_1 r_2}{\sqrt{r_1^2+r_2^2}}$$

$$\Rightarrow r = \frac{24\times 7}{\sqrt{24^2+7^2}}$$

$$\Rightarrow r = \frac{24\times 7}{25} \Rightarrow r = \frac{168}{25} \text{ cm}$$

58. (B)

Class	x	f	$f\times x$	$d=\lvert x-A\rvert$	$f\times d$
0-10	5	11	55	30	330
10-20	15	14	210	20	250
20-30	25	15	375	5	75
30-40	35	16	560	5	80
40-50	45	12	540	20	240
50-60	55	32	1760	30	960
		$\sum f = 100$	$\sum f\times x = 3500$		$\sum f\times d = 1965$

$$\text{Mean A} = \frac{\sum f\times x}{\sum f}$$

$$A = \frac{3500}{100} = 35$$

$$\text{Mean-Deviation} = \frac{\sum f\times d}{\sum f}$$

$$= \frac{1965}{100} = 19.65$$

59. (A) In the expansion of $\left(4\sqrt{x}+\frac{1}{2x}\right)^9$

$$T_{r+1} = {}^9C_r\,(4\sqrt{x})^{9-r}\left(\frac{1}{2x}\right)^r$$

$$= {}^9C_r 2^{18-3r}\, x^{\frac{9-3r}{2}}$$

Here, $\frac{9-3r}{2} = 0 \Rightarrow r = 3$

The value of constant term = ${}^9C_3 \times 2^9$

60. (C) $I = \int \frac{2^x}{\sqrt{4^x-1}}\,dx$

$$I = \int \frac{2^x}{\sqrt{(2^x)^2-1}}\,dx$$

Let $2^x = t$

$$2^x \log 2\, dx = dt \Rightarrow 2^x dx = \frac{1}{\log 2}\, dt$$

$$I = \frac{1}{\log 2}\int \frac{dt}{\sqrt{t^2-1}}$$

$$I = \frac{1}{\log 2}\log\left[t+\sqrt{t^2-1}\right] + c$$

$$I = \frac{1}{\log 2}\log\left[2^x+\sqrt{4^x-1}\right] + c$$

61. (B) **Statement I**

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

$\Rightarrow \tan^{-1}1 + \tan^{-1}(2+\sqrt{3}) = \tan^{-1}\left(\frac{3+\sqrt{3}}{-1-\sqrt{3}}\right)$

$\Rightarrow \tan^{-1}1 + \tan^{-1}(2+\sqrt{3}) = \tan^{-1}\left(\frac{\sqrt{3}(\sqrt{3}+1)}{-1(\sqrt{3}+1)}\right)$

$\Rightarrow \tan^{-1}1 + \tan^{-1}(2+\sqrt{3}) = \tan^{-1}(-\sqrt{3})$

Statement I is incorrect.

Statement II

$\sin^{-1}\frac{7}{25} + \sin^{-1}\frac{24}{25} = \sin^{-1}\frac{7}{25} + \cos^{-1}\frac{7}{25}$

$\Rightarrow \sin^{-1}\frac{7}{25} + \sin^{-1}\frac{24}{25} = \frac{\pi}{2}$

Statement II is correct.

62. (C) $\begin{vmatrix} x-y-z & 1-x & y+z \\ y-z-x & 1-y & z+x \\ z-x-y & 1-z & x+y \end{vmatrix}$

$C_1 \to C_1 + C_2 + C_3$

$\Rightarrow \begin{vmatrix} 1 & 1-x & y+z \\ 1 & 1-y & z+x \\ 1 & 1-z & x+y \end{vmatrix}$

$C_3 \to C_3 - C_2 + C_1$

$\Rightarrow \begin{vmatrix} 1 & 1-x & x+y+z \\ 1 & 1-y & x+y+z \\ 1 & 1-z & x+y+z \end{vmatrix}$

$\Rightarrow (x+y+z)\begin{vmatrix} 1 & 1-x & 1 \\ 1 & 1-y & 1 \\ 1 & 1-z & 1 \end{vmatrix}$

$\Rightarrow 0$ [$\because$ Two columns are indentical.]

63. (A) a, b, c are in G.P., then

$b^2 = ac$ ...(i)

p, q, r are in G.P., then

$q^2 = pr$ ...(ii)

from eq(i) and eq(ii)

$b^2q^2 = ac \times pr$

$(bq)^2 = ap \times cr$

Hence ap, bq, cr are in G.P.

64. (C) $I = \int \frac{1}{e^{-x}-1}\, dx$

$I = \int \frac{1}{\frac{1}{e^x}-1}\, dx$

$I = \int \frac{e^x}{1-e^x}\, dx$

Let $1 - e^x = t \Rightarrow -e^x\, dx = dt$

$I = -\int \frac{dt}{t}$

$I = -\log t + c$

$I = -\log(1-e^x) + c$

65. (D) $\frac{\sin 330°.\tan 150°.\cot 135°}{\sec 240°.\operatorname{cosec} 120°.\cos 225°}$

$\Rightarrow \frac{\sin(360°-30°).\tan(180°-30°).\cot(180°-45°)}{\sec(180°+60°).\operatorname{cosec}(180°-60°).\cos(180°+45°)}$

$\Rightarrow \frac{(-\sin 30)(-\tan 30)(-\cot 45)}{(-\sec 60)(\operatorname{cosec} 60)(-\cos 45)}$

$\Rightarrow \frac{-\frac{1}{2}\times\frac{1}{\sqrt{3}}\times 1}{2\times\frac{2}{\sqrt{3}}\times\frac{1}{\sqrt{2}}} = -\frac{1}{4\sqrt{2}}$

66. (C) $f(x) = \begin{cases} 1-2x, & x \le 1 \\ 3x-4, & x > 1 \end{cases}$

L.H.L. $= \lim_{x\to 1^-} f(x) = \lim_{h\to 0} f(1-h)$

$= \lim_{h\to 0} [1-2(1-h)] = -1$

R.H.L. $= \lim_{x\to 1^+} f(x) = \lim_{h\to 0} f(1+h)$

$= \lim_{h\to 0} [3(1+h)-4] = -1$

L.H.L. = R.H.L.

Hence function is continuous at $x = 1$.

L.H.D. $= \lim_{h\to 0} \frac{f(1-h)-f(1)}{-h}$

$= \lim_{h\to 0} \frac{1-2(1-h)-(-1)}{-h}$

$= \lim_{h\to 0} \frac{1-2+2h+1}{-h}$

$= \lim_{h\to 0} \frac{2h}{-h} = -2$

R.H.D. $= \lim_{h\to 0} \frac{f(1+h)-f(1)}{h}$

$= \lim_{h\to 0} \frac{3(1+h)-4-(-1)}{h}$

$= \lim_{h\to 0} \frac{3+3h-4+1}{h} = 3$

L.H.D. $\neq$ R.H.D.

$\therefore$ function is not differentiable at $x = 1$.

67. (B) Direction ratios (3, –1, –2) and (–1, 2,–3)

$\cos\theta = \dfrac{3\times(-1)+(-1)\times2+(-2)\times(-3)}{\sqrt{3^2+(-1)^2+(-2)^2}\sqrt{(-1)^2+2^2+(-3)^2}}$

$\cos\theta = \dfrac{1}{\sqrt{14}\sqrt{14}}$

$\cos\theta = \dfrac{1}{14} \Rightarrow \theta = \cos^{-1}\left(\dfrac{1}{14}\right)$

68. (A)

69. (C) $z = 3 + 2i$

Now, $\dfrac{1}{z^2} = \dfrac{1}{(3+2i)^2}$

$\Rightarrow \dfrac{1}{z^2} = \left(\dfrac{1}{3+2i}\times\dfrac{3-2i}{3-2i}\right)^2$

$\Rightarrow \dfrac{1}{z^2} = \dfrac{9+4i^2-12i}{(9-4i^2)^2}$

$\Rightarrow \dfrac{1}{z^2} = \dfrac{9-4-12i}{(9+4)^2}$

$\Rightarrow \dfrac{1}{z^2} = \dfrac{5-12i}{169}$

70. (B) Standard deviation of $x_1, x_2, x_3 \ldots, x_n = 10$
Standard deviation of $y_1, y_2, y_3 \ldots, y_n = 13$
Standard deviation of $x_1 - y_1, x_2 - y_2, \ldots\ldots, x_n - y_n = 13 - 10 = 3$

71. (C) Parabola $y^2 = 4ax$
On differentiating both side w.r.t.'x'

$\Rightarrow 2y\dfrac{dy}{dx} = 4a$

$\Rightarrow \dfrac{dy}{dx} = \dfrac{2a}{y}$

Slope of tangent at $(at^2, 2at) = \dfrac{2a}{2at} = \dfrac{1}{t}$

72. (B) Let two angles be x and y.
Now, $x - y = 2°$

$\Rightarrow x - y = 2 \times \dfrac{\pi}{180}$

$x - y = \dfrac{\pi}{90}$ ...(i)

and $x + y = 2$ ...(ii)

from eq(i) and eq(ii)

$x = 1 + \dfrac{\pi}{180}$ and $y = 1 - \dfrac{\pi}{180}$

Hence smallest angle $= 1 - \dfrac{\pi}{180}$

73. (C) $x + y = t + \dfrac{1}{t}$ and $x^2 + y^2 = t^2 + \dfrac{1}{t^2}$

On squaring

$\Rightarrow x^2 + y^2 + 2xy = t^2 + \dfrac{1}{t^2} + 2$

$\Rightarrow x^2 + y^2 + 2xy = x^2 + y^2 + 2$

$\Rightarrow 2xy = 2$

$\Rightarrow y = \dfrac{1}{x}$

On differentiating both side w.r.t. 'x'

$\Rightarrow \dfrac{dy}{dx} = \dfrac{-1}{x^2}$

74. (B) $I = \int \tan^3 x.\sec^4 x\, dx$

$I = \int \tan^3 x.\sec^2 x.\sec^2 x\; dx$

$I = \int \tan^3 x.(1+\tan^2 x).\sec^2 x\, dx$

$I = \int (\tan^3 x + \tan^5 x).\sec^2 x\, dx$

Let $\tan x = t \Rightarrow \sec^2 x.dx = dt$

$I = \int (t^3 + t^5)\, dt$

$I = \dfrac{t^4}{4} + \dfrac{t^6}{6} + c$

$I = \dfrac{\tan^4 x}{4} + \dfrac{\tan^6 x}{6} + c$

75. (C) $f(x) = x^3 + e^{3x}$

On differentiating both side w.r.t.'x'

$f'(x) = 3x^2 + 3e^{3x}$

Now, $f'(0) = 3 \times 0 + 3e^0$

$\Rightarrow f'(0) = 0 + 3 = 3$

76. (A) $4^x + 4^y = 2^{x+y}$

On differentiating both side w.r.t.'x'

$\Rightarrow 4^x \log 4 + 4^y \log 4 \dfrac{dy}{dx} = 2^{x+y}\log 2\left(1+\dfrac{dy}{dx}\right)$

$\Rightarrow 2^{2x} \times 2\log 2 + 2^{2y} \times 2\log 2 \dfrac{dy}{dx}$

$= 2^{x+y} \log 2 \left(1+\dfrac{dy}{dx}\right)$

$\Rightarrow 2^{2x+1} + 2^{2y+1}\dfrac{dy}{dx} = 2^{x+y} + 2^{x+y}\dfrac{dy}{dx}$

$\Rightarrow (2^{2y+1} - 2^{x+y})\dfrac{dy}{dx} = 2^{x+y} - 2^{2x+1}$

$\Rightarrow 2^y(2^{y+1} - 2^x)\dfrac{dy}{dx} = 2^x(2y - 2^{x+1})$

$\Rightarrow \dfrac{dy}{dx} = \dfrac{2^x(2^y - 2^{x+1})}{2^y(2^{y+1} - 2^x)}$

77. (C) We know that
The length of the intercept made on the y-axis by the circle $x^2 + y^2 + 2gx + 2fy + c = 0$

$= 2\sqrt{f^2 - c}$

Given circle $x^2 + y^2 + 4x + 6y + 1 = 0$

The required length $= 2\sqrt{(3)^2 - 1}$

$= 2\sqrt{8} = 4\sqrt{2}$

78. (C) $I = \int_0^1 (x-1)e^x \, dx$

$I = \int_0^1 xe^x dx - \int_0^1 e^x dx$

$I = \left[x.\int e^x dx - \int\left\{\frac{d}{dx}(x).\int e^x dx\right\}dx\right]_0^1 - \left[e^x\right]_0^1$

$I = \left[x.e^x - e^x\right]_0^1 - (e^1 - e^0)$

$I = (1.e^1 - e^1) - (0 - e^0) - e + 1$

$I = 0 + 1 - e + 1 = 2 - e$

79. (A) $\begin{bmatrix} -1 & 2 \\ 4 & 0 \end{bmatrix}$

$A^2 = \begin{bmatrix} -1 & 2 \\ 4 & 0 \end{bmatrix}\begin{bmatrix} -1 & 2 \\ 4 & 0 \end{bmatrix} = \begin{bmatrix} 9 & -2 \\ -4 & 8 \end{bmatrix}$

Given that $f(x) = x^2 + 3x + 5$

Now, $f(A) = A^2 + 3A + 5I$

$\Rightarrow f(A) = \begin{bmatrix} 9 & -2 \\ -4 & 8 \end{bmatrix} + 3\begin{bmatrix} -1 & 2 \\ 4 & 0 \end{bmatrix} + 5\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

$\Rightarrow f(A) = \begin{bmatrix} 11 & 4 \\ 8 & 13 \end{bmatrix}$

80. (C) $0.\overline{2} = 0.222222....$, $0.\overline{37} = 0.373737...$

and $0.4\overline{13} = 0.4131313......$

Now,
$$\begin{array}{r} 0.2222222 \\ 0.3737373 \\ 0.4131313 \\ \hline 1.0090908 \end{array}$$

Hence $0.\overline{2} + 0.\overline{37} + 0.4\overline{13} = 1.0\overline{09}$

81. (D) $2s = 40$ cm $\Rightarrow s = 20$ cm

Now, $a\cos^2\frac{B}{2} + b\cos^2\frac{A}{2}$

$\Rightarrow a \times \frac{s(s-b)}{ca} + b \times \frac{s(s-a)}{bc}$

$\Rightarrow \frac{s(s-b)}{c} + \frac{s(s-a)}{c}$

$\Rightarrow \frac{s}{c}(s - b + s - a)$

$\Rightarrow \frac{s}{c}(2s - a - b)$

$\Rightarrow \frac{s}{c} \times c \qquad [\because 2s = a + b + c]$

$\Rightarrow s = 20$ cm

82. (C) $I = \int \frac{e^x}{x}(x\log x + 1)\, dx$

$I = \int e^x\left(\log x + \frac{1}{x}\right) dx$

We know that

$\int e^x\left[f(x) + f'(x)\right]dx = e^x.f(x) + c$

$I = e^x.\log x + c$

83. (D) Let $y = \sin^{-1}x^2$

$\frac{dy}{dx} = \frac{1}{\sqrt{1-x^4}} \times 2x$

$\frac{dy}{dx} = \frac{2x}{\sqrt{1-x^4}}$

and $z = \sqrt{1-x^4}$

$\Rightarrow \frac{dz}{dx} = \frac{1}{2}\frac{1}{\sqrt{1-x^4}} \times (-4x^3)$

$\Rightarrow \frac{dz}{dx} = \frac{-2x^3}{\sqrt{1-x^4}}$

Now, $\frac{dy}{dz} = \frac{dy}{dx} \times \frac{dx}{dz}$

$\Rightarrow \frac{dy}{dz} = \frac{2x}{\sqrt{1-x^4}} \times \frac{\sqrt{1-x^4}}{-2x^3} = \frac{-1}{x^2}$

84. (C) $\lim_{x\to 0}\frac{3^x - 2^x}{x(2^x + 3^x)} \qquad \left[\frac{0}{0}\right]$ form

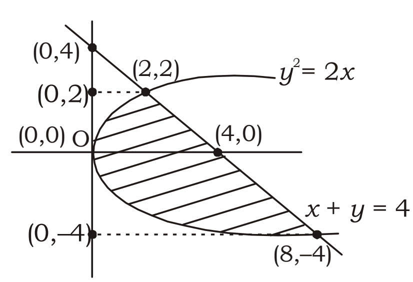
by L-Hospital's Rule

$\Rightarrow \lim_{x\to 0}\frac{3^x\log 3 - 2^x\log 2}{x.(2^x\log 2 + 3^x\log 3) + (2^x + 3^x).1}$

$\Rightarrow \frac{3^0.\log 3 - 2^0\log 2}{0 + (2^0 + 3^0).1}$

$\Rightarrow \frac{\log 3 - \log 2}{2} = \frac{1}{2}\log\frac{3}{2}$

85. (C)



$x_1 \Rightarrow x = 4 - y$ and $x_2 \Rightarrow x = \frac{y^2}{2}$

Area = $\int_{-4}^{2} (x_1 - x_2)\, dy$

$= \int_{-4}^{2}\left(4 - y - \frac{y^2}{2}\right) dy$

$= \left(4y - \frac{y^2}{2} - \frac{y^3}{6}\right)_{-4}^{2}$

$= \left(8 - 2 - \frac{4}{3}\right) - \left(-16 - 8 + \frac{32}{3}\right)$

$= \frac{14}{3} + \frac{40}{3} = \frac{54}{3} = 18$ sq.unit

86. (C) $\begin{vmatrix} 1 & 0 & 4 \\ 3 & \lambda+4 & 2 \\ -1 & -4 & -5 \end{vmatrix} = -42$

$\Rightarrow 1(-5\lambda - 20 + 8) + 0 + 4(-12 + \lambda + 4) = -42$
$\Rightarrow -5\lambda - 12 - 32 + 4\lambda = -42$
$\Rightarrow -\lambda - 44 = -42 \Rightarrow \lambda = -2$

87. (A) Given that $\frac{a+b}{2} = 12 \Rightarrow a + b = 24$ ...(i)

and $\sqrt{ab} = 8 \Rightarrow ab = 64$ ...(ii)

Now, H.M. = $\frac{2ab}{a+b}$

$\Rightarrow$ H.M. = $\frac{2 \times 64}{24} = \frac{16}{3}$

88. (A) $|\vec{a} + \vec{b}|^2 = |\vec{a}|^2 + |\vec{b}|^2 + 2|\vec{a}||\vec{b}|\cos 30°$

$|\vec{a} + \vec{b}|^2 = 1 + 1 + 2 \times 1 \times 1 \times \frac{\sqrt{3}}{2}$

$|\vec{a} + \vec{b}|^2 = 2 + \sqrt{3}$

Hence $|\vec{a} + \vec{b}| > 1$

89. (C) 23, 24, 21, 23, 24, 23, 24, 24
On arranging in ascending order
21, 23, 23, 23 ,24, 24, 24
Middle terms = 23, 24

Now, Median = $\frac{23+24}{2} = 23.5$

90. (C) $\frac{\log_3 81 \times \log_{16} 4}{\log_{\sqrt{3}} 9 \times \log_{64} 8}$

$\Rightarrow \frac{\log_3 3^4 \times \log_{16}(16)^{1/2}}{\log_{\sqrt{3}}(\sqrt{3})^4 \times \log_{64}(64)^{1/2}}$

$\Rightarrow \frac{4\log_3 3 \times \frac{1}{2}\log_{16} 16}{4\log_{\sqrt{3}} \sqrt{3} \times \frac{1}{2}\log_{64} 64}$

$\Rightarrow \frac{4 \times \frac{1}{2}}{4 \times \frac{1}{2}} = 1$

91. (A) $\tan^{-1}\frac{x}{y} + \tan^{-1}\frac{y-x}{y+x}$

$\Rightarrow \tan^{-1}\left[\frac{\frac{x}{y} + \frac{y-x}{y+x}}{1 - \frac{x}{y} \times \frac{y-x}{y+x}}\right]$

$\Rightarrow \tan^{-1}\left[\frac{xy + x^2 + y^2 - xy}{y^2 + xy - xy + x^2}\right]$

$\Rightarrow \tan^{-1}\left[\frac{x^2 + y^2}{x^2 + y^2}\right]$

$\Rightarrow \tan^{-1}(1) = \frac{\pi}{4}$

92. (B) Differential equation

$\frac{dy}{dx} + y.\text{cosec}x = \text{cosec}x - \cot x$

On comparing with general eqaution
P = cosec$x$, Q = cosec$x$ – cot$x$

I.F. = $e^{\int P\, dx}$

I.F. = $e^{\int \text{cosec}\, x\, dx}$

I.F. = $e^{\log(\text{cosec}x - \cot x)} = \text{cosec}x - \cot x$
Solution of differential equation

$y \times$ I.F. = $\int Q \times \text{I.F.}\ dx$

$\Rightarrow y(\text{cosec}x - \cot x)$
$= \int (\text{cosec}\, x - \cot x).(\text{cosec}\, x - \cot x)\, dx$

$\Rightarrow y(\text{cosec}x - \cot x) = \int (\text{cosec}\, x - \cot x)^2\, dx$

$\Rightarrow y(\text{cosec}x - \cot x)$
$= \int (\text{cosec}^2 x + \cot^2 x - 2\,\text{cosec}\, x.\cot x)\, dx$

$\Rightarrow y(\text{cosec}x - \cot x)$
$= \int (\text{cosec}^2 x + \text{cosec}^2 x - 1 - 2\,\text{cosec}\, x.\cot x)\, dx$

$\Rightarrow y(\text{cosec}x - \cot x) = -\cot x - \cot x - x + 2\text{cosec}x + c$

$\Rightarrow y(\text{cosec}x - \cot x) = 2\text{cosec}x - 2\cot x - x + c$

93. (B) $f(x) = \sqrt{\sin x + \sqrt{\sin x + \sqrt{\sin + ...\infty}}}$

$\Rightarrow f(x) = \sqrt{\sin x + f(x)}$

$\Rightarrow [f(x)]^2 = \sin x + f(x)$

On differentiating both side w.r.t. 'x'

$\Rightarrow 2f(x).f'(x) = \cos x + f'(x)$

$\Rightarrow f'(x)[2f(x) - 1] = \cos x$

$\Rightarrow f'(x) = \dfrac{\cos x}{2f(x) - 1}$

94. (A)

95. (A) $\dfrac{a\omega^9 + b\omega^7 + c\omega^5}{b\omega^{13} + c\omega^{17} + a\omega^{21}}$

$\Rightarrow \dfrac{a + b\omega + c\omega^2}{b\omega + c\omega^2 + a}$ $[\because \omega^3 = 1]$

$\Rightarrow 1$

96. (B) $\cos\left(\tan^{-1}\left(\tan\dfrac{13\pi}{4}\right)\right)$

$\Rightarrow \cos\left(\tan^{-1}\left(\tan\left(4\pi - \dfrac{3\pi}{4}\right)\right)\right)$

$\Rightarrow \cos\left(\tan^{-1}\left(-\tan\dfrac{3\pi}{4}\right)\right)$

$\Rightarrow \cos\left(\tan^{-1}\left(-\tan\left(\pi - \dfrac{\pi}{4}\right)\right)\right)$

$\Rightarrow \cos\left(\tan^{-1}\left(\tan\dfrac{\pi}{4}\right)\right)$

$\Rightarrow \cos\dfrac{\pi}{4} = \dfrac{1}{\sqrt{2}}$

97. (C) $y = 4 + 4^{1/3} + 4^{2/3}$

$\Rightarrow y - 4 = 4^{1/3} + 4^{2/3}$ ...(i)

$\Rightarrow (y-4)^3 = (4^{1/3} + 4^{2/3})^3$

$\Rightarrow y^3 - 64 - 12y(y-4) = 4 + 4^2 + 3 \times 4^{1/3} \times 4^{2/3}(4^{1/3} + 4^{2/3})$

$\Rightarrow y^3 - 64 - 12y^2 + 48y = 4 + 16 + 12(y-4)$ [from eq(i)]

$\Rightarrow y^3 - 64 - 12y^2 + 48y = 20 + 12y - 48$

$\Rightarrow y^3 - 12y^2 + 36y + 14 = 50$

98. (C) $[5x + 2y)^3]^4 + [(5x - 2y)^4]^3$

$(5x + 2y)^{12} + (5x - 2y)^{12}$

Hence total term of the expansion = 7

99. (D) $a = r\cos\theta$, $b = r\sin\theta.\cos\phi$, $c = r\sin\theta.\sin\phi$

Now, $a^2 + b^2 + c^2$

$\Rightarrow (r\cos\theta)^2 + (r\sin\theta.\cos\phi)^2 + (r\sin\theta.\sin\phi)^2$

$\Rightarrow r^2\cos^2\theta + r^2\sin^2\theta.\cos^2\phi + r^2\sin^2\theta.\sin^2\phi$

$\Rightarrow r^2\cos^2\theta + r^2\sin^2\theta(\cos^2\phi + \sin^2\phi)$

$\Rightarrow r^2\cos^2\theta + r^2\sin^2\theta.1$ $[\because \cos^2\phi + \sin^2\phi = 1]$

$\Rightarrow r^2(\cos^2\theta + \sin^2\theta) = r^2$

100. (C) $\sec^2(\tan^{-1}3) - \text{cosec}^2(\cot^{-1}\sqrt{5})$

$\Rightarrow 1 + \tan^2(\tan^{-1}3) - 1 - \cot^2(\cot^{-1}\sqrt{5})$

$\Rightarrow 1 + [\tan(\tan^{-1}3)]^2 - 1 - [\cot(\cot^{-1}\sqrt{5})]^2$

$\Rightarrow (3)^2 - (\sqrt{5})^2$

$\Rightarrow 9 - 5 = 4$

101. (D) Given line $2x - 5y = 12$

$\Rightarrow y = \dfrac{2}{5}x - \dfrac{12}{5}$

Slope of line $m_1 = \dfrac{2}{5}$

Slope of required line $m_2 = \dfrac{-1}{m_1} = \dfrac{-1 \times 5}{2} = \dfrac{-5}{2}$

Equation of line which passes through the point (–1, 2)

$y - 2 = \dfrac{-5}{2}(x + 1)$

$\Rightarrow 2y - 4 = -5x - 5$

$\Rightarrow 5x + 2y + 1 = 0$

102. (C) $I = \int_{-3}^{3}(ax^3 + cx^2 + b)\,dx$

$I = \int_{-3}^{3} ax^3\,dx + \int_{-3}^{3} cx^2\,dx + \int_{-3}^{3} b\,dx$

$I = 0 + 2\int_0^3 cx^2\,dx + 2\int_0^3 b\,dx$

$I = 2c\left[\dfrac{x^3}{3}\right]_0^3 + 2b[x]_0^3$

$I = 2c\left[\dfrac{27}{3} - 0\right] + 2b[3 - 0]$

$I = 18c + 6b$

Hence it depends on values of b and c.

103. (B) $\begin{vmatrix} 1+i & \omega^2 & -\omega \\ \omega^2 + i & \omega & i \\ 1 + 2i + \omega^2 & \omega^2 + \omega & i - \omega \end{vmatrix}$

$R_2 \to R_2 - R_3$

$\Rightarrow \begin{vmatrix} 1+i & \omega^2 & -\omega \\ -1-i & -\omega^2 & \omega \\ 1 + 2i + \omega^2 & \omega^2 + \omega & i - \omega \end{vmatrix}$

$\Rightarrow -\begin{vmatrix} 1+i & \omega^2 & -\omega \\ 1+i & \omega^2 & -\omega \\ 1 + 2i + \omega^2 & \omega^2 + \omega & i - \omega \end{vmatrix}$

$\Rightarrow 0$ [$\because$ Two rows are identical.]

104. (D) $\begin{vmatrix} 2a & p & -x \\ 6b & 3q & -3y \\ 2c & r & -z \end{vmatrix} = \lambda \begin{vmatrix} x & -a & 2p \\ y & -b & 2q \\ z & -c & 2r \end{vmatrix}$

$\Rightarrow 2\times3\times(-1)\begin{vmatrix} a & p & x \\ b & q & y \\ c & r & z \end{vmatrix} = \lambda\times(-1)\times2\begin{vmatrix} x & a & p \\ y & b & q \\ z & c & r \end{vmatrix}$

$\Rightarrow -6\begin{vmatrix} a & p & x \\ b & q & y \\ c & r & z \end{vmatrix} = -2\lambda\begin{vmatrix} a & p & x \\ b & q & y \\ c & r & z \end{vmatrix}$

$\Rightarrow -6 = -2\lambda \Rightarrow \lambda = 3$

105. (B) $\dfrac{\sin 40 - \cos 40}{\sin 40 + \cos 40}$

$\Rightarrow \dfrac{\sin 40 - \sin 50}{\sin 40 + \sin 50}$

$\Rightarrow \dfrac{2\cos\dfrac{40+50}{2}.\sin\dfrac{40-50}{2}}{2\sin\dfrac{40+50}{2}.\cos\dfrac{40-50}{2}}$

$\Rightarrow \dfrac{2\cos 45.(-\sin 5)}{2\sin 45.\cos 5}$

$\Rightarrow \dfrac{-2\times\dfrac{1}{\sqrt{2}}.\sin 5}{2\times\dfrac{1}{\sqrt{2}}.\cos 5} = -\tan 5$

106. (C) $\lim_{x\to0}\dfrac{\sqrt{a+x}-\sqrt{a-x}}{2}$ $\left[\dfrac{0}{0}\right]$ from

$\Rightarrow \lim_{x\to0}\dfrac{\dfrac{1}{2\sqrt{a+x}}+\dfrac{1}{2\sqrt{a-x}}}{2}$

$\Rightarrow \dfrac{\dfrac{1}{2\sqrt{a}}+\dfrac{1}{2\sqrt{a}}}{2} = \dfrac{1}{2\sqrt{a}}$

107. (C) $y = \cos^{-1}\left(\dfrac{t}{\sqrt{1+t^2}}\right)$

Let $t = \tan\theta$

$y = \cos^{-1}\left(\dfrac{\tan\theta}{\sqrt{1+\tan^2\theta}}\right)$

$y = \cos^{-1}\left(\dfrac{\tan\theta}{\sec\theta}\right)$

$y = \cos^{-1}(\sin\theta)$

$y = \cos^{-1}\left[\cos\left(\dfrac{\pi}{2}-\theta\right)\right]$

$y = \dfrac{\pi}{2}-\theta$

On differentiating both side w.r.t. 'θ'

$\dfrac{dy}{d\theta} = -1$

and $z = \sin^{-1}\left(\dfrac{1}{\sqrt{1+t^2}}\right)$

$\Rightarrow z = \sin^{-1}\left(\dfrac{1}{\sqrt{1+\tan^2\theta}}\right)$

$\Rightarrow z = \sin^{-1}\left(\dfrac{1}{\sec\theta}\right)$

$\Rightarrow z = \sin^{-1}(\cos\theta)$

$\Rightarrow z = \sin^{-1}\left[\sin\left(\dfrac{\pi}{2}-\theta\right)\right]$

$\Rightarrow z = \dfrac{\pi}{2}-\theta$

$\Rightarrow \dfrac{dz}{d\theta} = -1$

Now, $\dfrac{dy}{dz} = \dfrac{dy}{d\theta}\times\dfrac{d\theta}{dz}$

$\Rightarrow \dfrac{dy}{dz} = -1\times -1 = 1$

108. (C) $\tan^{-1}\left(\dfrac{x}{a}\right)+\tan^{-1}\left(\dfrac{x}{b}\right) = \dfrac{\pi}{2}$

$\Rightarrow \tan^{-1}\dfrac{x}{a} = \dfrac{\pi}{2} - \tan^{-1}\dfrac{x}{b}$

$\Rightarrow \tan^{-1}\dfrac{x}{a} = \cot^{-1}\dfrac{x}{b}$

$\Rightarrow \tan^{-1}\dfrac{x}{a} = \tan^{-1}\dfrac{b}{x}$

$\Rightarrow \dfrac{x}{a} = \dfrac{b}{x}$

$\Rightarrow x^2 = ab \Rightarrow x = \sqrt{ab}$

109. (B)

110. (C) $i^{51} + i^{52} + i^{53} + i^{54}$

$\Rightarrow i^{51}(1 + i + i^2 + i^3)$

$\Rightarrow i^{51}(1 + i - 1 - i) = 0$

111. (A) $I = \int_2^7 |x-4|\,dx$

$I = \int_2^4 -(x-4)\,dx + \int_4^7 (x-4)\,dx$

$I = \left[\frac{-x^2}{2}+4x\right]_2^4 + \left[\frac{x^2}{2}-4x\right]_4^7$

$I = [(-8+16)-(-2+8)] + \left[\left(\frac{49}{2}-28\right)-(8-16)\right]$

$I = 2 + \frac{49}{2} - 20$

$I = \frac{49}{2} - 18 = \frac{13}{2}$

112. (C) $P = e^{2x}\sin 3x$

$\frac{dP}{dx} = e^{2x} \times 3\cos 3x + \sin 3x \times 2e^{2x}$

$\frac{dP}{dx} = e^{2x}(3\cos 3x + 2\sin 3x)$

and $Q = e^{2x}\cos 3x$

$\Rightarrow \frac{dQ}{dx} = e^{2x} \times (-3\sin 3x) + \cos 3x \times (2e^{2x})$

$\Rightarrow \frac{dQ}{dx} = e^{2x}(-3\sin 3x + 2\cos 3x)$

Now, $P\frac{dP}{dx} + Q\frac{dQ}{dx}$

$\Rightarrow e^{2x}\sin 3x . e^{2x}(3\cos 3x + 2\sin 3x) + e^{2x}\cos 3x . e^{2x}(-3\sin 3x + 2\cos 3x)$

$\Rightarrow e^{4x}(3\sin 3x . \cos 3x + 2\sin^2 3x - 3\sin 3x . \cos 3x + 2\cos^2 3x)$

$\Rightarrow e^{4x}[2(\sin^3 3x + \cos^3 3x)] = 2e^{4x}$

113. (A) 1 1 1 1

$1\times2^0 = 1$
$1\times2^1 = 2$
$1\times2^2 = 4$
$1\times2^3 = 8$
15

0.10011

$\frac{1}{2} = 1\times2^{-1}$
$0 = 0\times2^{-2}$
$0 = 0\times2^{-3}$
$\frac{1}{16} = 1\times2^{-4}$
$\frac{1}{32} = 1\times2^{-5}$

$\frac{1}{2}+\frac{1}{16}+\frac{1}{32} = \frac{19}{32} = 0.59375$

Hence $(1111.10011)_2 = (15.59375)_{10}$

114. (A) $a = 94°$, $d = 7°$

A.T.Q.

$(2n-4) \times 90 = \frac{n}{2}[2\times94 + (n-1)\times7]$

$\Rightarrow 180n - 360 = \frac{n}{2}[188 + 7n - 7]$

$\Rightarrow 360n - 720 = n(181 + 7n)$

$\Rightarrow 7n^2 + 181n - 360n + 720 = 0$

$\Rightarrow 7n^2 - 35n - 144n + 720 = 0$

$\Rightarrow 7n(n-5) - 144(n-5) = 0$

$\Rightarrow (n-5)(7n-144) = 0$

Hence no. of sides of polygon = 5

115. (C) In the expansion of $\left(\frac{4y}{\sqrt{x}} - \frac{x}{4\sqrt{y}}\right)^{10}$

Total term = 10 +1 = 11

Middle term = $\left(\frac{10}{2}+1\right) = 5^{th}$

$T_5 = T_{4+1} = {}^{10}C_4\left(\frac{4y}{\sqrt{x}}\right)^6\left(\frac{-x}{4\sqrt{y}}\right)^4$

$= 210 \times 4^2 \times y^4 \times x$

$= 3360xy^4$

116. (D) $S = \frac{1}{2} - \frac{1}{4} + \frac{1}{8} - \frac{1}{16} + \ldots\ldots\infty$

$S = \frac{\frac{1}{2}}{1-\left(\frac{-1}{2}\right)}$

$S = \frac{\frac{1}{2}}{1+\frac{1}{2}}$

$S = \frac{\frac{1}{2}}{\frac{3}{2}} = \frac{1}{3}$

117. (A) Let $y = 4^{73}$

$\Rightarrow y = 2^{146}$

taking log both side

$\Rightarrow \log y = 146 \log 2$

$\Rightarrow \log y = 146 \times 0.3010 = 43.946$

Hence no. of digits = 43 +1= 44

118. (C) $\sin^{-1}\frac{x}{\sqrt{1+x^2}} = \tan^{-1}x$

119. (D) $I = \int \tan^{-1}x\,dx$

$I = \tan^{-1}x\int 1.\,dx - \int\left\{\frac{d}{dx}(\tan^{-1}x).\int 1.\,dx\right\}$

$I = x.\tan^{-1}x - \int \frac{1}{1+x^2}.x\,dx$

Let $1 + x^2 = t \Rightarrow 2x\,dx = dt$

$I = x.\tan^{-1}x - \frac{1}{2}\int\frac{1}{t}\,dt$

$I = x.\tan^{-1}x = \frac{1}{2}\log t + c$

$I = x.\tan^{-1}x - \frac{1}{2}\log(1+x^2) + c$

120. (C) $I = \int e^x(\tan x + \sec^2 x)\,dx$

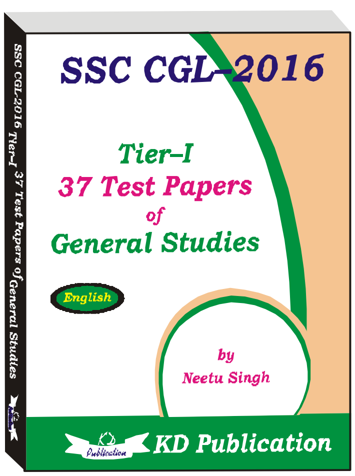
We know that

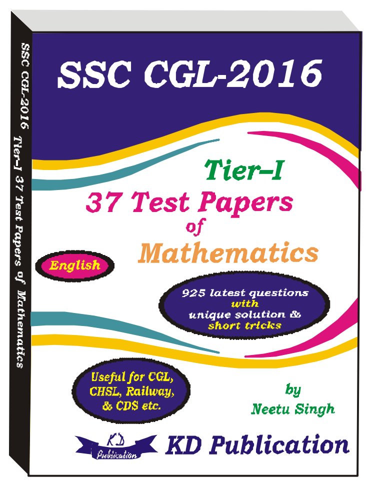
$\int e^x[f(x) + f'(x)]\,dx = e^x . f(x) + c$

$I = e^x.\tan x + c$

NDA (MATHS) MOCK TEST - 138 (Answer Key)

1.	(B)	21.	(A)	41.	(B)	61.	(B)	81.	(D)	101.	(D)
2.	(C)	22.	(C)	42.	(C)	62.	(C)	82.	(C)	102.	(C)
3.	(A)	23.	(C)	43.	(B)	63.	(A)	83.	(D)	103.	(B)
4.	(C)	24.	(B)	44.	(C)	64.	(C)	84.	(C)	104.	(D)
5.	(B)	25.	(C)	45.	(C)	65.	(D)	85.	(C)	105.	(B)
6.	(D)	26.	(D)	46.	(D)	66.	(C)	86.	(C)	106.	(C)
7.	(C)	27.	(C)	47.	(C)	67.	(B)	87.	(A)	107.	(C)
8.	(B)	28.	(B)	48.	(B)	68.	(A)	88.	(A)	108.	(C)
9.	(A)	29.	(C)	49.	(B)	69.	(C)	89.	(C)	109.	(B)
10.	(C)	30.	(D)	50.	(A)	70.	(B)	90.	(C)	110.	(C)
11.	(A)	31.	(B)	51.	(C)	71.	(C)	91.	(A)	111.	(A)
12.	(B)	32.	(B)	52.	(D)	72.	(B)	92.	(B)	112.	(C)
13.	(D)	33.	(B)	53.	(C)	73.	(C)	93.	(B)	113.	(A)
14.	(B)	34.	(B)	54.	(C)	74.	(B)	94.	(A)	114.	(A)
15.	(B)	35.	(C)	55.	(B)	75.	(C)	95.	(A)	115.	(C)
16.	(B)	36.	(C)	56.	(A)	76.	(A)	96.	(B)	116.	(D)
17.	(D)	37.	(D)	57.	(C)	77.	(C)	97.	(C)	117.	(A)
18.	(C)	38.	(A)	58.	(B)	78.	(C)	98.	(C)	118.	(C)
19.	(D)	39.	(C)	59.	(A)	79.	(A)	99.	(D)	119.	(D)
20.	(B)	40.	(A)	60.	(C)	80.	(C)	100.	(C)	120.	(C)





Note:- If your opinion differs regarding any answer, please message the mock test and question number to 8860330003

Note:- Whatsapp with Mock Test No. and Question No. at 7053606571 for any of the doubts, also share your suggestions and experience of Sunday Mock

Note:- If you face any problem regarding result or marks scored, please contact 9313111777