NDA MATHS MOCK TEST - 136 (SOLUTION)

1. (C) $I = \int \sqrt{x}.e^{\sqrt{x}}\ dx$

$I = 2\int x.\dfrac{e^{\sqrt{x}}}{2\sqrt{x}}\ dx$

Let $\sqrt{x} = t \Rightarrow x = t^2$

$\dfrac{1}{2\sqrt{x}}\ dx = dt$

$I = 2\int t^2.e^t\ dt$

$I = 2\left[t^2\int e^t dt - \int\left\{\dfrac{d}{dt}(t^2).\int e^t dt\right\}dt\right]$

$I = 2\ \left[t^2.e^t - \int 2t.e^t dt\right] + c$

$I = 2t^2.e^t - 4\int t.e^t.dt + c$

$I = -\ 2t^2.e^t - 4\left[t.e^t - \int 1.e^t dt\right] + c$

$I = -\ 2t^2.e^t - 4t.e^t + 4\int e^t dt + c$

$I = 2t^2.\ e^t - 4t.e^t + 4e^t + c$

$I = 2x\ e^{\sqrt{x}} - 4\sqrt{x}\ .\ e^{\sqrt{x}} + 4\,e^{\sqrt{x}} + c$

2. (B) $\dfrac{a+b\omega+c\omega^2}{c+a\omega+b\omega^2} + \dfrac{c+a\omega+b\omega^2}{a+b\omega+c\omega^2}$

$\Rightarrow \dfrac{\omega^2(a+b\omega+c\omega^2)}{\omega^2(c+a\omega+b\omega^2)} + \dfrac{\omega(c+a\omega+b\omega^2)}{\omega(a+b\omega^2+c\omega^2)}$

$\Rightarrow \dfrac{\omega^2(a+b\omega+c\omega^2)}{c\omega^2+a\omega^3+b\omega^4} + \dfrac{\omega(c+a\omega+b\omega^2)}{a\omega+b\omega^2+c\omega^3}$

$\Rightarrow \dfrac{\omega^2(a+b\omega+c\omega^2)}{a+b\omega+c\omega^2} + \dfrac{\omega(c+a\omega+b\omega^2)}{c+a\omega+b\omega^2}$

$\Rightarrow \omega^2 + \omega = -1$ $\quad [\because 1+\omega+\omega^2 = 0]$

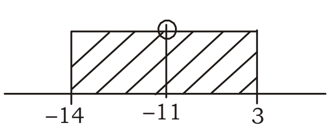
3. (C) $f(x) = \dfrac{\sqrt{\log_e(43-11x-x^2)}}{x+11}$

Now, $\log_e(43 - 11x - x^2) \geq 0$ and $x + 11 \neq 0$

$\Rightarrow 43 - 11x - x^2 \geq 1\ ,\quad x \neq -11$

$\Rightarrow x^2 + 11x - 42 \leq 0$

$\Rightarrow (x + 14)(x - 3) \leq 0$



Domain = [–14, 3] – {–11}

4. (D) $f(x) = |2x^2 - 11|$ and $g(x) = 2x - 1$

Now, $fog(x) = f[g(x)]$

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

$\Rightarrow fog(x) = |2(2x-1)^2 - 11|$

$\Rightarrow fog(x) = |2(4x^2 + 1 - 4x) - 11|$

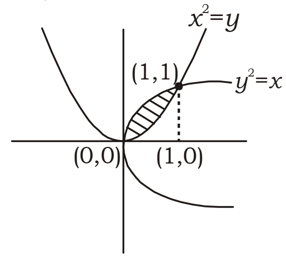
$\Rightarrow fog(x) = |8x^2 + 2 - 8x - 11|$

$\Rightarrow fog(x) = |8x^2 - 8x - 9|$

Now, $fog(-1) = |8(-1)^2 - 8(-1) - 9|$

$\Rightarrow fog(-1) = |8 + 8 - 9| = 7$

5. (C)



$y_1 \Rightarrow y^2 = x$ and $y_2 \Rightarrow x^2 = y$

Area $= \int_0^1 (y_1 - y_2)\ dx$

Area $= \int_0^1 \left(\sqrt{x} - x^2\right)\ dx$

Area $= \left[2\times\dfrac{x^{3/2}}{3} - \dfrac{x^3}{3}\right]_0^1$

Area $= \left[\dfrac{2}{3} - \dfrac{1}{3} - 0\right]$

Area $= \dfrac{1}{3}$ sq.unit

6. (D) The required no. of ways = ${}^5C_2 \times {}^{11}C_9$

7. (C) Given that X = $\{9(n - 1) : n \in \mathbb{N}\}$

$n = 1, 2, 3, 4, \ldots\ldots..$

X = {0, 9, 18, 27, ………}

Y = $\{4^n - 3n - 1 : n \in \mathbb{N}\}$

$n = 1, 2, 3, 4, \ldots\ldots\ldots$

Y = {0, 9, 54, 243,……}

$(X \cap Y)$ = {0, 9, 54, 243} = Y

8. (C) Differential equation

$x\,dy - y\,dx = x^2y\,dx$

$\Rightarrow \dfrac{xdy - ydx}{xy} = x\,dx$

$\Rightarrow \dfrac{dy}{y} - \dfrac{dx}{y} = x\,dx$

On integrating

$\Rightarrow \log y - \log x = \dfrac{x^2}{2} + c$

$\Rightarrow \log\dfrac{y}{x} = \dfrac{x^2}{2} + c$

9. (B) Let $y = 3\sqrt{\tan x^2}$

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

$\Rightarrow \frac{dy}{dx} = 3 \times \frac{1}{2}(\tan x^2)^{-1/2} (\sec^2 x^2)(2x)$

$\Rightarrow \frac{dy}{dx} = \frac{3x\sec^2 x^2}{\sqrt{\tan x^2}}$

10. (C) $n(S) = 2^5 = 32$

$n(E) = {}^5C_3 + {}^5C_4 + {}^5C_5$

$n(E) = 10 + 5 + 1 = 16$

The required probability $P(E) = \frac{n(E)}{n(S)}$

$\Rightarrow P(E) = \frac{16}{32} = \frac{1}{2}$

11. (D) S = 0.4 + 0.44 + 0.444 +.......n terms

$S = \frac{4}{10} + \frac{44}{100} + \frac{444}{1000} + \ldots\ldots n \text{ terms}$

$S = \frac{4}{9}\left[\frac{9}{10} + \frac{99}{100} + \frac{999}{1000} + \ldots n \text{ terms}\right]$

$S = \frac{4}{9}\left[\left(1-\frac{1}{10}\right)+\left(1-\frac{1}{100}\right)+\left(1-\frac{1}{1000}\right)+\ldots n \text{ terms}\right]$

$S = \frac{4}{9}(1 + 1 + 1 + \ldots\ n \text{ terms})$

$-\frac{4}{9}\left[\frac{1}{10} + \frac{1}{100} + \frac{1}{1000} + \ldots n \text{ terms}\right]$

$S = \frac{4}{9}n - \frac{4}{9} \times \frac{\frac{1}{10}\left(1-\left(\frac{1}{10}\right)^n\right)}{1-\frac{1}{10}}$

$S = \frac{4}{9}n - \frac{4}{9} \times \frac{1}{9}\left[1-\frac{1}{10^n}\right]$

$S = \frac{4}{9}\left[n - \frac{1}{9}\left(1-\frac{1}{10^n}\right)\right]$

12. (B) Curve $y = 3x^2 + 8x + 9$

$\Rightarrow \frac{dy}{dx} = 6x + 8$

Slope at (–1, 4) $(m_1) = 6(-1)+8 = 2$

Slope at (–2, 5) = 6(–2) + 8 = –4

Now, $\tan\theta = \left|\frac{m_1 - m_2}{1 + m_1 m_2}\right|$

$\Rightarrow \tan\theta = \left|\frac{2+4}{1+2(-4)}\right|$

$\Rightarrow \tan\theta = \frac{6}{7} \Rightarrow \theta = \tan^{-1}\left(\frac{6}{7}\right)$

The required angle $= \theta = \tan^{-1}\left(\frac{6}{7}\right)$

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

$[1^\infty \text{ from}]$

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

$\Rightarrow e^{\lim_{x\to\infty}\left[\frac{2}{1+\frac{1}{x}-\frac{5}{x^2}}\right]} \Rightarrow e^{\frac{1}{1+0-0}} = e^2$

14. (B) Vectors $3\hat{i} + (\lambda+1)\hat{j} + \lambda\hat{k}$ and $(\lambda-2)\hat{i} + 2\hat{j} - 4\hat{k}$ are perpendicular,

then $3 \times (\lambda-2) + (\lambda+1) \times 2 + \lambda \times (-4) = 0$

$\Rightarrow 3\lambda - 6 + 2\lambda + 2 - 4\lambda = 0 \Rightarrow \lambda = 4$

15. (D)

16. (A) $(1 + x)^3(1 + x^2)^2$

$\Rightarrow (1+ x^3 + 3x^2 + 3x)(1 + x^4 + 2x^2)$

Coefficient of $x^5 = 2 + 3 = 5$

17. (C) A line makes the angles α, β and γ with the axes,

then $\cos^2\alpha + \cos^2\beta + \cos^2\gamma = 1$

$\Rightarrow 1 - \sin^2\alpha + 1 - \sin^2\beta + 1 - \sin^2\gamma = 1$

$\Rightarrow 3 - (\sin^2\alpha + \sin^2\beta + \sin^2\gamma) = 1$

$\Rightarrow \sin^2\alpha + \sin^2\beta + \sin^2\gamma = 2$

18. (B) Given that $\tan\theta = \frac{b}{a}$

Now, $\frac{a\cos\theta + b\sin\theta}{a\cos\theta - b\sin\theta}$

$\Rightarrow \frac{a + b\tan\theta}{a - b\tan\theta}$

$\Rightarrow \frac{a + b \times \frac{b}{a}}{a - b \times \frac{b}{a}} = \frac{a^2+b^2}{a^2-b^2}$

19. (A) $\sqrt{2+\sqrt{2+\sqrt{2+\sqrt{2+\sqrt{2+2\cos\frac{16\pi}{3}}}}}}$

$\Rightarrow \sqrt{2+\sqrt{2+\sqrt{2+\sqrt{2+\sqrt{2\times 2\cos^2\frac{8\pi}{3}}}}}}$

$\Rightarrow \sqrt{2+\sqrt{2+\sqrt{2+\sqrt{2+2\cos\frac{8\pi}{3}}}}}$

$\Rightarrow \sqrt{2+\sqrt{2+\sqrt{2+\sqrt{2\times 2\cos^2\frac{4\pi}{3}}}}}$

$\Rightarrow \sqrt{2+\sqrt{2+\sqrt{2+2\cos\frac{4\pi}{3}}}}$

$\Rightarrow \sqrt{2+\sqrt{2+\sqrt{2\times 2\cos^2\frac{2\pi}{3}}}}$

$\Rightarrow \sqrt{2+\sqrt{2+2\cos\frac{2\pi}{3}}}$

$\Rightarrow \sqrt{2+\sqrt{2\times 2\cos^2\frac{\pi}{3}}}$

$\Rightarrow \sqrt{2+2\cos\frac{\pi}{3}}$

$\Rightarrow \sqrt{2\times 2\cos^2\frac{\pi}{6}}$

$\Rightarrow 2 \times \cos\frac{\pi}{6} = 2 \times \frac{\sqrt{3}}{2} = \sqrt{3}$

20. (B) A.T.Q,

$\frac{17}{2}[2a + (17-1)d] = 867$

$\Rightarrow \frac{1}{2}[2a + 16d] = 51$

$\Rightarrow a + 8d = 51 \Rightarrow T_9 = 51$

21. (A) The required no. of triangles = ${}^{11}C_3 - {}^{6}C_3$
= 165 – 20
= 145

22. (B) $\sin^{-1}(\log_3 2x)$

Here $-1 \le \log_3 2x \le 1$

$\Rightarrow 3^{-1} \le 2x \le 3^1$

$\Rightarrow \frac{1}{3} \le 2x \le 3$

$\Rightarrow \frac{1}{6} \le x \le \frac{3}{2}$

Domain = $\left[\frac{1}{6}, \frac{3}{2}\right]$

23. (C) Series $\frac{1^2}{2} + \frac{1^2+2^2}{2+4} + \frac{1^2+2^2+3^2}{2+4+6} + ...$

$T_n = \frac{1^2+2^2+3^2+.....+n^2}{2+4+6+.....+n}$

$T_n = \frac{1^2+2^2+3^2+.....+n^2}{2(1+2+3+.....+n)}$

$T_n = \frac{\frac{n}{6}(n+1)(2n+1)}{2\times\frac{n(n+1)}{2}} = \frac{2n+1}{6}$

24. (A) $f(x) = x^2 + 5x - 6$

$f'(x) = 2x + 5 \Rightarrow f'(c) = 2c + 5$

$a = -1,\ b = \frac{1}{2}$

$f(a) \Rightarrow f(-1) = (-1)^2 + 5(-1) - 6 = -10$

$f(b) \Rightarrow f\left(\frac{1}{2}\right) = \left(\frac{1}{2}\right)^2 + 5 \times \frac{1}{2} - 6 = \frac{-13}{4}$

Now, $f'(c) = \frac{f(b)-f(a)}{b-a}$

$\Rightarrow 2c + 5 = \frac{\frac{-13}{4}+10}{\frac{1}{2}+1}$

$\Rightarrow 2c + 5 = \frac{9}{2}$

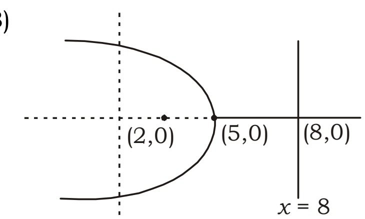
$\Rightarrow 4c + 10 = 9 \Rightarrow c = \frac{-1}{4}$

25. (A) $I = \int_{-\pi/2}^{\pi/2} \frac{\sin x}{1+\cos x}\, dx = 0$

We know that

$\int_{-a}^{a} f(x)\, dx = \begin{cases} 0, & \text{function is odd} \\ 2\int_0^a f(x)\, dx, & \text{function is even} \end{cases}$

26. (B)



equation of directix

$x = 8$

27. (C) Direction ratios of lines are (–1, 2,–4) and (–2, x, –3).

A.T.Q.,

$\cos\frac{\pi}{2} = \frac{-1\times(-2)+2\times x+(-4)\times(-3)}{\sqrt{(-1)^2+2^2+(-4)^2}\sqrt{(-2)^2+x^2+(-3)^2}}$

$\Rightarrow 0 = \frac{2+2x+12}{\sqrt{21}\sqrt{x^2+13}}$

$\Rightarrow 0 = 2x + 14 \Rightarrow x = -7$

28. (B) $y = \tan^{-1}\left[\frac{x^{1/2}(x^{1/2}-1)}{1+x^{3/2}}\right]$

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

Let $x = \tan A$ and $x^{1/2} = \tan B$

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

$y = \tan^{-1}[\tan(A - B)]$
$y = A - B$
$y = \tan^{-1}x - \tan^{-1}(x^{1/2})$
On differetiating both side w.r.t. 'x'

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

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

29. (A) We know that
A.M. ≥ G.M. ≥ H.M.

$$\Rightarrow \frac{a+b}{2} \geq \sqrt{ab} \geq \frac{2ab}{a+b}$$

$$\Rightarrow \frac{2ab}{a+b} \leq \sqrt{ab} \leq \frac{a+b}{2}$$

30. (C) A.T.Q.,

$$\text{Mean} = \frac{a^{n-9} + b^{n-9}}{a^{n-10} + b^{n-10}}$$

$$\Rightarrow \frac{a+b}{2} = \frac{a^{n-9} + b^{n-9}}{a^{n-10} + b^{n-10}}$$

On comparing
$n - 9 = 1 \Rightarrow n = 10$

31. (B) The required remainder = 4

32. (D) S = 3 + 6 + 9 + ...+ 99
S = 3(1 + 2 + 3 + ...+ 33)

$$S = 3 \times \frac{33 \times 34}{2}$$

S = 33 × 51 = 1683

33. (C) Let $a + ib = \sqrt{1 + 2\sqrt{2}i}$
On squaring both side
$\Rightarrow (a^2 - b^2)^2 + 2abi = 1 + 2\sqrt{2}\,i$
On comparing
$\Rightarrow a^2 - b^2 = 1$ and $2ab = 2\sqrt{2}$ ...(i)
Now, $(a^2 + b^2)^2 = (a^2 - b^2)^2 + (2ab)^2$
$\Rightarrow (a^2 + b^2)^2 = 1 + 8$
$\Rightarrow a^2 + b^2 = 3$ ...(ii)
from eq(i) and eq(ii)
$\Rightarrow 2a^2 = 4$ and $2b^2 = 2$
$\Rightarrow a = \pm\sqrt{2}$, $b = \pm 1$

Hence $\sqrt{1+2\sqrt{2}i} = \pm\left(\sqrt{2} + i\right)$

34. (B) Let $y = 7^{22}$
taking log both sides
$\Rightarrow \log_{10}y = 22\log_{10}7$
$\Rightarrow \log_{10}y = 22 \times 0.8451$
$\Rightarrow \log_{10}y = 18.5922$
The required number of digits =18 +1= 19

35. (C) $\vec{a} = 3\hat{i} - \hat{j} + \hat{k}$ and $\vec{b} = -2\hat{i} + 3\hat{j} + 4\hat{k}$

Now, $\vec{b} - \vec{a} = (-2\hat{i} + 3\hat{j} + 4\hat{k}) - (3\hat{i} - \hat{j} + \hat{k})$

$\Rightarrow \vec{b} - \vec{a} = -5\hat{i} + 4\hat{j} + 3\hat{k}$

and $\vec{a} + 3\vec{b} = (3\hat{i} - \hat{j} + \hat{k}) + 3(-2\hat{i} + 3\hat{j} + 4\hat{k})$

$\Rightarrow \vec{a} + 3\vec{b} = -3\hat{i} + 8\hat{j} + 13\hat{k}$

Now, $(\vec{b} - \vec{a}).(\vec{a} + 3\vec{b})$

$\Rightarrow (-5\hat{i} + 4\hat{j} + 3\hat{k}).(-3\hat{i} + 8\hat{j} + 13\hat{k})$

$\Rightarrow -5 \times (-3) + 4 \times 8 + 3 \times 13 = 86$

36. (C) Total students = 13
The required no. of ways = (13 – 1)! =12!

37. (B) Differential equation
$x\,dy = (x^2 + y^2 + y)\,dx$
$\Rightarrow xdy - ydx = (x^2 + y^2)\,dx$

$$\Rightarrow \frac{xdy - ydx}{x^2 + y^2} = dx$$

On integrating

$$\int d\left[\tan^{-1}\frac{y}{x}\right] = \int dx$$

$$\Rightarrow \tan^{-1}\frac{y}{x} = x + c$$

$$\Rightarrow \frac{y}{x} = \tan(x + c)$$

$\Rightarrow y = x\tan(x + c)$

38. (B) Total students = 500
Passed students $n(E \cup H) = 500 - 29 = 471$
$n(E) = 247$ and $n(H) = 307$
Now, $n(E \cap H) = n(E) + n(H) - n(E \cup H)$
$\Rightarrow n(E \cap H) = 247 + 307 - 471$
$\Rightarrow n(E \cap H) = 83$
The required no. of students = 83

39. (C) $\lim_{x \to 0} \frac{4x^4 + 2x^2 + 1}{3x^3 - 2x^4 + 6}$

$$\Rightarrow \frac{4 \times 0 + 2 \times 0 + 1}{3 \times 0 - 2 \times 0 + 6} = \frac{1}{6}$$

40. (D) $[A]_{(x+2)\times(y-3)}$ and $[B]_{(x+1)\times(8-y)}$
Both AB and BA exist
$y - 3 = x + 1 \Rightarrow x - y = -4$ ...(i)
and $x + 2 = 8 - y \Rightarrow x + y = 6$ ...(ii)
On solving
$2x = 2 \Rightarrow x = 1$ and $2y = 10 \Rightarrow y = 5$

41. (C) The required possible ways = 9×8 = 72

42. (D) $f(x) = \cot x - \cot^2 x + \cot^3 x ....\infty$

$\Rightarrow f(x) = \frac{\cot x}{1+\cot x}$

Now, $I = \int_0^{\pi/2} \tan x . f(x)\ dx$

$\Rightarrow I = \int_0^{\pi/2} \tan x \times \frac{\cot x}{1+\cot x}\ dx$

$\Rightarrow I = \int_0^{\pi/2} \frac{1}{1+\cot x}\ dx$

$\Rightarrow I = \int_0^{\pi/2} \frac{\sin x}{\sin x+\cos x}\ dx$ ...(i)

Prop.IV $\int_0^a f(x)\ dx = \int_0^a f(a-x)\ dx$

$\Rightarrow I = \int_0^{\pi/2} \frac{\sin\left(\frac{\pi}{2}-x\right)}{\sin\left(\frac{\pi}{2}-x\right)+\cos\left(\frac{\pi}{2}-x\right)}\ dx$

$\Rightarrow I = \int_0^{\pi/2} \frac{\cos x}{\cos x+\sin x}\ dx$ ...(ii)

from eq(i) and eq(ii)

$\Rightarrow 2I = \int_0^{\pi/2} \frac{\sin x+\cos x}{\sin x+\cos x}\ dx$

$\Rightarrow 2I = \int_0^{\pi/2} 1\ dx$

$\Rightarrow 2I = [x]_0^{\pi/2}$

$\Rightarrow 2I = \frac{\pi}{2} - 0 \Rightarrow I = \frac{\pi}{4}$

43. (A) Hyperbola $\frac{x^2}{25} - \frac{y^2}{\lambda} = 1$

$a^2 = 25,\ b^2 = \lambda$

Now, $e = \sqrt{1+\frac{a^2}{b^2}}$

$\Rightarrow e = \sqrt{1+\frac{25}{\lambda}} \Rightarrow e = \sqrt{\frac{\lambda+25}{\lambda}}$

foci = $(0,\ \pm be) = \left(0, \pm\sqrt{\lambda} \times \sqrt{\frac{\lambda+25}{\lambda}}\right)$

$= (0,\ \pm\sqrt{\lambda+25})$

and ellipse $\frac{x^2}{9} + \frac{y^2}{36} = 1$

$a^2 = 9,\ b^2 = 36$

Now, $e = \sqrt{1-\frac{a^2}{b^2}}$

$\Rightarrow e = \sqrt{1-\frac{9}{36}} \Rightarrow e = \frac{\sqrt{3}}{2}$

foci = $(0,\ \pm be) = (0, \left(0, \pm 6 \times \frac{\sqrt{3}}{2}\right)$

$= (0,\ \pm 3\sqrt{3})$

A.T.Q.,

$\sqrt{\lambda+25} = 3\sqrt{3}$

$\Rightarrow \lambda + 25 = 27 \Rightarrow \lambda = 2$

44. (C) Lines $10x - 24y + 6 = 0 \Rightarrow 5x - 12y + 3 = 0$ and $5x - 12y + 16 = 0$

The required distance = $\frac{16-3}{\sqrt{5^2+(-12)^2}}$

$= \frac{13}{13} = 1$

45. (B) Given $x + z = y$

Now, $\sin x + \sin y + \sin z$

$\Rightarrow \sin x + \sin z + \sin y$

$\Rightarrow 2\sin\frac{x+z}{2}.\cos\frac{x-z}{2} + 2\sin\frac{y}{2}.\cos\frac{y}{2}$

$\Rightarrow 2\sin\frac{y}{2}.\cos\frac{x-z}{2} + 2\sin\frac{y}{2}.\cos\frac{y}{2}$

$\Rightarrow 2\sin\frac{y}{2}\left[\cos\frac{x-z}{2} + \cos\frac{y}{2}\right]$

$\Rightarrow 2\sin\frac{y}{2} \times 2\cos\frac{\frac{x-z}{2}+\frac{y}{2}}{2} . \cos\frac{\frac{x-z}{2}-\frac{y}{2}}{2}$

$\Rightarrow 4\sin\frac{y}{2} \times \cos\frac{x+y-z}{4} \times \cos\frac{x-z-y}{4}$

$\Rightarrow 4\sin\frac{y}{2} \times \cos\frac{x}{2} \times \cos\frac{z}{2}$ $[\because x + z = y]$

$\Rightarrow 4\cos\frac{x}{2} \times \sin\frac{y}{2} \times \cos\frac{z}{2}$

46. (C) $\cot\left(7\frac{1}{2}\right)^\circ = \frac{\cos 7\frac{1}{2}}{\sin 7\frac{1}{2}} \times \frac{2\cos 7\frac{1}{2}}{2\cos 7\frac{1}{2}}$

$\cot\left(7\frac{1}{2}\right)^\circ = \frac{2\cos^2 7\frac{1}{2}}{2\sin 7\frac{1}{2}.\cos 7\frac{1}{2}}$

$\cot\left(7\frac{1}{2}\right)^{\circ} = \frac{1+\cos 15}{\sin 15}$

$\cot\left(7\frac{1}{2}\right)^{\circ} = \dfrac{1+\frac{\sqrt{3}+1}{2\sqrt{2}}}{\frac{\sqrt{3}-1}{2\sqrt{2}}}$

$\cot\left(7\frac{1}{2}\right)^{\circ} = \frac{2\sqrt{2}+\sqrt{3}+1}{\sqrt{3}-1} \times \frac{\sqrt{3}+1}{\sqrt{3}+1}$

$\cot\left(7\frac{1}{2}\right)^{\circ} = \frac{2\sqrt{6}+3+\sqrt{3}+2\sqrt{2}+\sqrt{3}+1}{3-1}$

$\cot\left(7\frac{1}{2}\right)^{\circ} = \frac{2\sqrt{6}+2\sqrt{3}+2\sqrt{2}+4}{2}$

$\cot\left(7\frac{1}{2}\right)^{\circ} = \sqrt{6}+\sqrt{3}+\sqrt{2}+2$

47. (C) Word "DISEASE"

Total no. of words = $\frac{7!}{2!2!}$ = 1260

When vowels come together

no. of words = $\frac{4!}{2!} \times \frac{4!}{2!}$ = 144

The required no. of words = 1260 – 144 = 1116

48. (A) A.T.Q.,

$\frac{\sqrt{3}}{4}a^2 = 16\sqrt{3}$

$\Rightarrow a^2 = 64 \Rightarrow a = 8$

Now, $R = \frac{a^3}{4\Delta}$

$\Rightarrow R = \frac{8\times8\times8}{4\times16\sqrt{3}} \Rightarrow R = \frac{8}{\sqrt{3}}$

Area of circumcircle = πR^2

$= \pi \times \left(\frac{8}{\sqrt{3}}\right)^2 = \frac{64\pi}{3}\text{cm}^2$

49. (B) $(-\sqrt{-1})^{4n+1} + (-\sqrt{-1})^{4n-3}$

$\Rightarrow (-i)^{4n+1} + (-i)^{4n-3}$

$\Rightarrow (-i)^{4n}(-i)^1 + (-i)^{4n}(-i)^{-3}$

$\Rightarrow -i + \frac{-1}{i^3}$

$\Rightarrow -i + \frac{-1}{-i}$

$\Rightarrow -i - i = -2i$

50. (C) Equation $x^2 + 5|x| + 6 = 0$ has no root because sum of three positive number can not zero.

51. (B) We know that

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

Now, $\frac{b+c}{a} = \frac{k\sin B + k\sin C}{\sin A}$

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

$\Rightarrow \frac{b+c}{a} = \dfrac{2\sin\frac{B+C}{2}.\cos\frac{B-C}{2}}{2\sin\frac{A}{2}.\cos\frac{A}{2}}$

[$\because$ A+B+C = 180]

$\Rightarrow \frac{b+c}{a} = \dfrac{2\cos\frac{A}{2}.\cos\frac{B-C}{2}}{2\sin\frac{A}{2}.\cos\frac{A}{2}}$

$\Rightarrow \frac{b+c}{a} = \dfrac{\cos\frac{B-C}{2}}{\sin\frac{A}{2}}$

52. (C)

2	37	1
2	18	0
2	9	1
2	4	0
2	2	0
2	1	1
	0	

0 .25
× 2
0.50
× 2
1.00

$(0.25)_{10} = (0.01)_2$

$(37)_{10} = (100101)_2$

Hence $(37.25)_{10} = (100101.01)_2$

53. (B) $\begin{vmatrix} x^2+y^2 & x+y & k \\ y^2+z^2 & y+z & k \\ z^2+x^2 & z+x & k \end{vmatrix} = (x-y)(y-z)(z-x)$

$R_2 \to R_2 - R_1$ and $R_3 \to R_3 - R_1$

$\Rightarrow \begin{vmatrix} x^2+y^2 & x+y & k \\ z^2-x^2 & z-x & 0 \\ z^2-y^2 & z-y & 0 \end{vmatrix} = (x-y)(y-z)(z-x)$

$\Rightarrow (z-x)(z-y)\begin{vmatrix} x^2+y^2 & x+y & k \\ z+x & 1 & 0 \\ z+y & 1 & 0 \end{vmatrix}$

$= -(x-y)(z-y)(z-x)$

$R_3 \to R_3 - R_2$

$$\Rightarrow \begin{vmatrix} x^2+y^2 & x+y & k \\ z+x & 1 & 0 \\ y-x & 0 & 0 \end{vmatrix} = -(x-y)$$

$$\Rightarrow (y-x)\begin{vmatrix} x^2+y^2 & x+y & k \\ z+x & 1 & 0 \\ 1 & 0 & 0 \end{vmatrix} = y-x$$

$\Rightarrow (x^2+y^2)\times 0 - (x+y)\times 0 + k(0-1) = 1$

$\Rightarrow -k = 1 \Rightarrow k = -1$

54. (C) Let $y = x^5 + 5^x$

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

$$\Rightarrow \frac{dy}{dx} = 5x^4 + 5^x.\log 5$$

55. (A) Let $f(x) = y = \dfrac{7^x + 7^{-x}}{7^x - 7^{-x}}$

by Componendo & Dividendo Rule

$$\Rightarrow \frac{y+1}{y-1} = \frac{7^x + 7^{-x} + 7^x - 7^{-x}}{7^x + 7^{-x} - 7^x + 7^{-x}}$$

$$\Rightarrow \frac{y+1}{y-1} = \frac{2\times 7^x}{2\times 7^{-x}}$$

$$\Rightarrow \frac{y+1}{y-1} = 7^{2x}$$

taking log both side

$$\Rightarrow \log_7\left(\frac{y+1}{y-1}\right) = 2x \Rightarrow x = \frac{1}{2}\left[\log_7\left(\frac{y+1}{y-1}\right)\right]$$

$$\Rightarrow f^{-1}(y) = \frac{1}{2}\left[\log_7\left(\frac{y+1}{y-1}\right)\right]$$

$$\Rightarrow f^{-1}(x) = \frac{1}{2}\left[\log_7\left(\frac{x+1}{x-1}\right)\right]$$

56. (D) $4f(x+1) + f\left(\dfrac{1}{x+1}\right) = 3x$ ...(i)

On putting $x = 1$

$4f(2) + f\left(\dfrac{1}{2}\right) = 3$ ...(ii)

On putting $x = \dfrac{-1}{2}$ in eq(i)

$4f\left(\dfrac{1}{2}\right) + f(2) = \dfrac{-3}{2}$ ...(iii)

On solving eq(ii) and eq(iii)

$15f(2) = 12 + \dfrac{3}{2}$

$\Rightarrow 15f(2) = \dfrac{27}{2} \Rightarrow f(2) = \dfrac{9}{10}$

57. (C) $I = \int_0^{\pi} |\cos x|\ dx$

$I = 2\int_0^{\pi/2} \cos x$

$I = 2[\sin x]_0^{\pi/2}$

$I = 2\left[\sin\dfrac{\pi}{2} - \sin 0\right]$

$I = 2[1-0] = 2$

58. (B) $S = \dfrac{1}{9.12} + \dfrac{1}{12.15} + \dfrac{1}{15.18} + ... +$ upto 10 terms

$$S = \frac{1}{9.12} + \frac{1}{12.15} + \frac{1}{15.18} + ... + \frac{1}{36.39}$$

$$S = \frac{1}{3}\left[\left(\frac{1}{9} - \frac{1}{12}\right) + \left(\frac{1}{12} - \frac{1}{15}\right) + ... + \left(\frac{1}{36} - \frac{1}{39}\right)\right]$$

$$S = \frac{1}{3}\left[\frac{1}{9} - \frac{1}{39}\right]$$

$$S = \frac{1}{3} \times \frac{39-9}{9\times 39}$$

$$S = \frac{1}{3} \times \frac{30}{9\times 39} = \frac{10}{351}$$

59. (D) $\lim\limits_{x\to 0} \dfrac{\sin x + \cos x - 1}{\tan x}$ $\left[\dfrac{0}{0}\right]$ from

by L-Hospital's Rule

$$\Rightarrow \lim_{x\to 0} \frac{\cos x - \sin x}{\sec^2 x}$$

$$\Rightarrow \frac{\cos 0 - \sin 0}{\sec^2 0}$$

$$\Rightarrow \frac{1-0}{1} = 1$$

60. (C) Ratio of angles = 8 : 5 : 2

Let Angles = $8x$, $5x$, $2x$

Now, $8x + 5x + 2x = 180$

$\Rightarrow 15x = 180 \Rightarrow x = 12$

Angles = 96, 60, 24

Now, cos96 + cos60 + cos24

$\Rightarrow$ cos96 + cos24 + cos60

$$\Rightarrow 2\cos\frac{96+24}{2}.\cos\frac{96-24}{2} + \frac{1}{2}$$

$$\Rightarrow 2\cos 60.\cos 36 + \frac{1}{2}$$

$$\Rightarrow 2\times\frac{1}{2}\cos 36 + \frac{1}{2}$$

$$\Rightarrow \frac{\sqrt{5}+1}{4} + \frac{1}{2} = \frac{\sqrt{5}+3}{4}$$

61. (C) $\frac{\cot\theta}{1+\sin\theta}-\frac{\tan\theta}{1+\cos\theta}$

$\Rightarrow \frac{\cot\theta(1-\sin\theta)}{(1+\sin\theta)(1-\sin\theta)}-\frac{\tan\theta(1-\cos\theta)}{(1+\cos\theta)(1-\cos\theta)}$

$\Rightarrow \frac{\cos\theta(1-\sin\theta)}{\sin\theta\times\cos^2\theta} - \frac{\sin\theta(1-\cos\theta)}{\cos\theta\times\sin^2\theta}$

$\Rightarrow \frac{1-\sin\theta}{\sin\theta.\cos\theta} - \frac{1-\cos\theta}{\sin\theta.\cos^2\theta}$

$\Rightarrow \frac{1-\sin\theta-1+\cos\theta}{\sin\theta.\cos\theta}$

$\Rightarrow \frac{\cos\theta-\sin\theta}{\sin\theta.\cos\theta}$ = cosecθ – secθ

62. (C) Equations $2x + y + 2z = 4$, $4x + y + 2z = 6$ and $5x - 3y - z = 11$

Using elementary method

$[A/B] = \left[\begin{array}{ccc|c} 2 & 1 & 2 & 4 \\ 4 & 1 & 2 & 6 \\ 5 & -3 & -1 & 11 \end{array}\right]$

$R_2 \to R_2 - 2R_1$ and $R_3 \to R_3 - \frac{5}{2}R_1$

$[A/B] = \left[\begin{array}{ccc|c} 2 & 1 & 2 & 4 \\ 0 & -1 & -2 & -2 \\ 0 & \frac{-11}{2} & -6 & 1 \end{array}\right]$

$R_3 \to 2R_3$

$[A/B] = \left[\begin{array}{ccc|c} 2 & 1 & 2 & 4 \\ 0 & -1 & -2 & -2 \\ 0 & -11 & -12 & 2 \end{array}\right]$

$R_3 \to R_3 - 11R_2$

$[A/B] = \left[\begin{array}{ccc|c} 2 & 1 & 2 & 4 \\ 0 & -1 & -2 & -2 \\ 0 & 0 & 10 & 24 \end{array}\right]$

Rank A = 3 and Rank [A/B] = 3

Hence solution is consistent with an unique solution.

63. (B) Number of elelments in set B = 4

Number of subsets of a set B = 2^4 = 16

Number of subsets of set A = 16 + 48

= 64 = 2^6

Hence no. of elements in set A = 6

64. (A) **Statement I**

In a leap year = 366 days

= 52 weeks and 2 days

The probability = $\frac{2}{7}$

In a normal year = 365 days = 52 weeks and 1 days

The probability = $\frac{1}{7}$

Statement I is correct.

Statement II

In month of July = 31 days = 28 + 3

The probabily = $\frac{3}{7}$

In month of June = 30 days = 28 + 2

The probabily = $\frac{2}{7}$

Statement II is incorrect.

65. (C) $4\sin x.\sin\left(\frac{\pi}{3}+x\right).\sin\left(\frac{\pi}{3}-x\right)$

$\Rightarrow 2\sin x.\left[2\sin\left(\frac{\pi}{3}+x\right).\sin\left(\frac{\pi}{3}-x\right)\right]$

$\Rightarrow 2\sin x\left[\cos\left(\frac{\pi}{3}+x-\frac{\pi}{3}+x\right).\cos\left(\frac{\pi}{3}+x+\frac{\pi}{3}-x\right)\right]$

$\Rightarrow 2\sin x\left[\cos 2x-\cos\frac{2\pi}{3}\right]$

$\Rightarrow 2\sin x.\cos 2x - 2\sin x.\cos\frac{2\pi}{3}$

$\Rightarrow \sin(x+2x) + \sin(x-2x) - 2\sin x\left(\frac{-1}{2}\right)$

$\Rightarrow \sin 3x - \sin x + \sin x = \sin 3x$

66. (D) $I = \int\frac{\sin x}{\cos(x+a)}\,dx$

Let $x + a = t \Rightarrow x = t - a \Rightarrow dx = dt$

$I = \int\frac{\sin(t-a)}{\cos t}\,dt$

$I = \int\frac{\sin t.\cos a-\cos t.\sin a}{\cos t}\,dt$

$I = \cos a\int\tan t\,dt - \sin a\int 1\,dt$

$I = \cos a.\log\sec(x+a) - \sin a.(x+a) + c$

$I = \cos a.\log\sec(x+a) - x\sin a - a.\sin a + c$

$I = \cos a.\log\sec(x+a) - x\sin a + c$

67. (C) $\dfrac{1+2i\cos\theta}{1-2i\cos\theta}$

$\Rightarrow \dfrac{1+2i\cos\theta}{1-2i\cos\theta}\times\dfrac{1+2i\cos\theta}{1+2i\cos\theta}$

$\Rightarrow \dfrac{1+4i^2\cos^2\theta+4i\cos\theta}{1-4i^2\cos^2\theta}$

$\Rightarrow \dfrac{1-4\cos^2\theta+4i\cos\theta}{1+4\cos^2\theta}$

it is purely imaginary,
then $1-4\cos^2\theta = 0$

$\Rightarrow \cos^2\theta = \dfrac{1}{4}$

$\Rightarrow \cos^2\theta = \cos^2\dfrac{\pi}{3} \Rightarrow \theta = n\pi \pm \dfrac{\pi}{3}$

68. (A) $y = \cos(\ln x)$ ...(i)
On differentiating both side w.r.t. 'x'

$\Rightarrow \dfrac{dy}{dx} = -\sin(\ln x)\times\dfrac{1}{x}$

$\Rightarrow x\dfrac{dy}{dx} = -\sin(\ln x)$

Again, differentiating

$\Rightarrow x\dfrac{d^2y}{dx^2}+\dfrac{dy}{dx}.1 = -\cos(\ln x)\times\dfrac{1}{x}$

$\Rightarrow x^2\dfrac{d^2y}{dx^2}+x\dfrac{dy}{dx} = -y$ [from eq(i)]

$\Rightarrow x^2\dfrac{d^2y}{dx^2}+x\dfrac{dy}{dx}+y = 0$

69. (C) $\dfrac{\log_{81}27+\log_{64}16}{\log_3 9+\log_{16}2}$

$\Rightarrow \dfrac{\log_{3^4}3^3+\log_{4^3}4^2}{\log_3 3^2+\log_{2^4}2}$

$\Rightarrow \dfrac{\frac{3}{4}+\frac{2}{3}}{2+\frac{1}{4}}$ $\left[\because \log_{a^b}a^c = \dfrac{c}{b}\right]$

$\Rightarrow \dfrac{\frac{17}{12}}{\frac{9}{4}} = \dfrac{17}{27}$

70. (C) Given roots are –14 and – 4
equation $(x+14)(x+4) = 0$
$x^2+18x+56 = 0$
New equation
$x^2-15x+56 = 0$
$(x-7)(x-8) = 0$
$x = 7, 8$
Hence roots of new equation are 7, 8.

71. (C) $\dfrac{\sin 3x+\sin 5x}{\sin 3x-\sin 5x}$

$\Rightarrow \dfrac{2\sin\frac{3x+5x}{2}.\cos\frac{3x-5x}{2}}{2\cos\frac{3x+5x}{2}.\sin\frac{3x-5x}{2}}$

$\Rightarrow \dfrac{\sin 4x.\cos x}{\cos 4x.(-\sin x)} \Rightarrow \dfrac{-\tan 4x}{\tan x}$

72. (A) Role's Theorem-
(i) $f(x)$ is continuous on a closed interval $[a, b]$.
(ii) $f(x)$ is differentiable on an open interval (a, b).
(iii) $f(a) = f(b)$
(iv) $f'(c) = 0$
Given that $f(x) = 3x^3+ax^2+2bx$
$f'(x) = 9x^2+2ax+2b$
(i) Function is continuous on a interval $[-1,1]$.
(ii) Function is differentiable on a interval $(-1, 1)$.
(iii) $f(-1) = f(1)$
$\Rightarrow 3(-1)^3+a(-1)^2+2b(-1) = 3(1)^3+a(1)^2+2b\times1$
$\Rightarrow -3+a-2b = 3+a+2b$

$\Rightarrow -6 = 4b \Rightarrow b = \dfrac{-3}{2}$

(iv) $f'(c) = 0$
$\Rightarrow 9c^2+2ac+2b = 0$

$c = \dfrac{-1}{2}$ and $b = \dfrac{-3}{2}$

$\Rightarrow 9\left(\dfrac{-1}{2}\right)^2+2a\left(\dfrac{-1}{2}\right)+2\left(\dfrac{-3}{2}\right) = 0$

$\Rightarrow \dfrac{9}{4}-a-3 = 0 \Rightarrow a = \dfrac{-3}{4}$

Now, $2a-3b = 2\left(\dfrac{-3}{4}\right)-3\times\left(\dfrac{-3}{2}\right)$

$\Rightarrow 2a-3b = \dfrac{-3}{2}+\dfrac{9}{2} = 3$

73. (C) $\dfrac{1+x+iy}{1-x-iy}$

$\Rightarrow \dfrac{1+x+iy}{1-x-iy}\times\dfrac{1-x+iy}{1-x+iy}$

$\Rightarrow \dfrac{(1+iy)^2-x^2}{(1-x)^2-(iy)^2}$

$\Rightarrow \dfrac{1+i^2y^2+2iy-x^2}{1+x^2-2x-i^2y^2}$

$\Rightarrow \dfrac{1-y^2+2iy-x^2}{1+x^2-2x+y^2}$

$\Rightarrow \dfrac{x^2+2iy-x^2}{1+1-2x}$ $[\because x^2+y^2=1]$

$\Rightarrow \dfrac{2iy}{2(1-x)} = \dfrac{iy}{1-x}$

74. (B) $f(x) = \begin{cases} 2ax+7b, & x<-3 \\ 4, & x=-3 \\ a+bx, & x3-3 \end{cases}$ is continuous

at $x = -3$,

then $\lim_{x\to -3^-} f(x) = \lim_{x\to -3^+} f(x) = f(-3)$

Now, $\lim_{x\to -3^-} f(x) = f(-3)$

$\Rightarrow \lim_{x\to -3} 2ax + 4b = 4$

$\Rightarrow 2a(-3) + 4b = 4$

$\Rightarrow -6a + 4b = 4$ ...(i)

and $\lim_{x\to -3^+} f(x) = f(-3)$

$\Rightarrow \lim_{x\to -3} a + bx = 4$

$\Rightarrow a + b(-3) = 4$

$\Rightarrow a - 3b = 4$ ...(ii)

On solving eq(i) and eq(ii)

$a = -2,\ b = -2$

75. (B) $\cot^{-1}\dfrac{24}{7} + \sin^{-1}\dfrac{3}{5}$

$\Rightarrow \tan^{-1}\dfrac{7}{24} + \tan^{-1}\dfrac{3}{4}$ $\left[\because \sin^{-1}x = \tan^{-1}\dfrac{x}{\sqrt{1-x^2}}\right]$

$\Rightarrow \tan^{-1}\left[\dfrac{\frac{7}{24}+\frac{3}{4}}{1-\frac{7}{24}\times\frac{3}{4}}\right]$

$\Rightarrow \tan^{-1}\left[\dfrac{100}{75}\right] = \tan^{-1}\left(\dfrac{4}{3}\right)$

76. (C) $\sqrt{5+2\sqrt{6}} = (\sqrt{3}+\sqrt{2})$

77. (D) Total terms in the expansion = 4

78. (C) sphere $x^2 + y^2 + z^2 + 6x + 5y + 32 - 5 = 0$

On comparing with general equation

$u = 3,\ u = \dfrac{5}{2}\ \omega = \dfrac{3}{2},\ d = -5$

radius = $\sqrt{u^2+u^2+\omega^2-d}$

$= \sqrt{(3)^2+\left(\dfrac{5}{2}\right)^2+\left(\dfrac{3}{2}\right)^2+5}$

$= \sqrt{9+\dfrac{25}{4}+\dfrac{9}{4}+5}$

$= \sqrt{\dfrac{90}{4}} = \sqrt{\dfrac{45}{2}} = \dfrac{3\sqrt{5}}{\sqrt{2}}$

79. (B) $I = \int x\cos x\,dx$

$I = x\int \cos x\,dx - \int\left\{\dfrac{d}{dx}(x).\int\cos x\,dx\right\}dx$

$I = x\sin x - \int 1.\sin x\,dx$

$I = x\sin x + \cos x + c$

80. (C) 'PROBABILITY'

No. of permutation = $\dfrac{11!}{2!2!} = 9979200$

81. (A) Equation $3x^2 - 5x + 1 = 0$

roots are α and β, then

$\alpha+\beta = \dfrac{5}{3}$ and $\alpha.\beta = \dfrac{1}{3}$

Now, $(\alpha-\beta)^2 = (\alpha+\beta)^2 - 4\alpha\beta$

$\Rightarrow (\alpha-\beta)^2 = \dfrac{25}{9} - \dfrac{4}{3}$

$\Rightarrow (\alpha-\beta)^2 = \dfrac{13}{9} \Rightarrow \alpha-\beta = \dfrac{\sqrt{13}}{3}$

then $\dfrac{\alpha}{\beta}-\dfrac{\beta}{\alpha} = \dfrac{\alpha^2-\beta^2}{\alpha\beta}$

$\Rightarrow \dfrac{\alpha}{\beta}-\dfrac{\beta}{\alpha} = \dfrac{(\alpha+\beta)(\alpha-\beta)}{\alpha\beta}$

$\Rightarrow \dfrac{\alpha}{\beta}-\dfrac{\beta}{\alpha} = \dfrac{\frac{5}{3}\times\frac{\sqrt{13}}{3}}{\frac{1}{3}} = \dfrac{5\sqrt{13}}{3}$

82. (D) Let $y = x^2 \ln\sin x$

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

$\dfrac{dy}{dx} = x^2\dfrac{d}{dx}(\ln\sin x) + (\ln\sin x)\times 2x$

$\dfrac{dy}{dx} = x^2.\dfrac{\cos x}{\sin x} + (\ln\sin x)\times 2x$

$\dfrac{dy}{dx} = x^2.\cot x + 2x\ln\sin x$

83. (A) $\tan^{-1}\frac{1}{7} + \sin^{-1}\frac{7}{25}$

$\Rightarrow \tan^{-1}\frac{1}{7} + \tan^{-1}\frac{7}{24}$ $\left[\because \sin^{-1}x = \tan^{-1}\frac{x}{\sqrt{1-x^2}}\right]$

$\Rightarrow \tan^{-1}\left(\frac{\frac{1}{7}+\frac{7}{24}}{1-\frac{1}{7}\times\frac{7}{24}}\right) = \tan^{-1}\left(\frac{73}{161}\right)$

84. (A) A = $\{x \in R : x^2 + 4x + 3 < 0\}$

A = $\{x \in R : -3 < x < -1\}$

B = $\{x \in R : x^2 - 7x + 12 > 0\}$

B = $\{x \in R : -\infty < x < 3 \text{ and } 4 < x < \infty\}$

Statement 1

$A \cap B = \{x \in R : -3 < x < -1\}$

Statement 1 is correct.

Statement 2

A – B = $\{\phi\}$

Statement 2 is incorrect.

85. (B) $\sqrt{\frac{\omega}{1+\omega^2}}$

$\Rightarrow \sqrt{\frac{\omega}{-\omega}}$ $[\because 1 + \omega + \omega^2 = 0]$

$\Rightarrow \sqrt{\frac{1}{-1}} = \sqrt{-1} = i$

86. (D) We know that

$\tan 2A = \frac{2\tan A}{1-\tan^2 A}$

$A = 22\frac{1}{2}$

$\Rightarrow \tan 45 = \frac{2\tan 22\frac{1}{2}}{1-\tan^2 22\frac{1}{2}}$

$\Rightarrow 1 = \frac{2\tan 22\frac{1}{2}}{1-\tan^2 22\frac{1}{2}}$

$\Rightarrow \tan^2 22\frac{1}{2} + 2\tan 22\frac{1}{2} - 1 = 0$

$\Rightarrow \tan 22\frac{1}{2} = \frac{-2 \pm \sqrt{(-2)^2 - 4\times 1\times(-1)}}{2\times 1}$

$\Rightarrow \tan 22\frac{1}{2} = \frac{-2 \pm 2\sqrt{2}}{2}$

$\Rightarrow \tan 22\frac{1}{2} = -1 \pm \sqrt{2}$

Hence $\tan 22\frac{1}{2} = \sqrt{2} - 1$

87. (B) $\frac{dy}{dx} + y.\tan x = \sec x$

On comparing with general equation

P = $\tan x$ and Q = $\sec x$

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

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

I.F. = $e^{\log \sec x} = \sec x$

Solution of the differential equation

$y \times$ I.F. = Q $\times$ I.F. dx

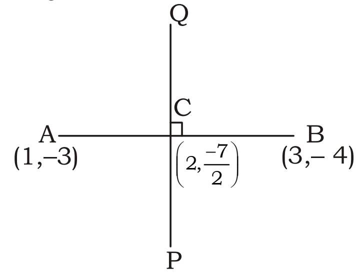
$\Rightarrow y \times \sec x = \int \sec x.\sec x\,dx$

$\Rightarrow y \sec x = \tan x + c$

$\Rightarrow \frac{y}{\cos x} = \frac{\sin x}{\cos x} + c$

$\Rightarrow y = \sin x + c.\cos x$

88. (C)



Mid-point of line joining the points

$= \left(\frac{1+3}{2}, \frac{-3-4}{2}\right) = \left(2, \frac{-7}{2}\right)$

Slope of line AB (m_1) = $\frac{-4+3}{3-1} = \frac{-1}{2}$

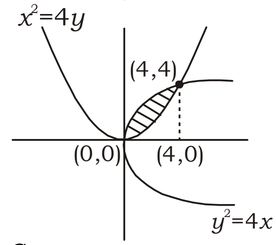
Slope of line PQ (m_2) = $\frac{-1}{\frac{-1}{2}} = 2$

equation of line PQ

$y + \frac{7}{2} = 2(x - 2)$

$\Rightarrow 4x - 2y = 11$

89. (C)



Curve

$y_1 \Rightarrow y = 2\sqrt{x}$

$y_2 \Rightarrow y = \frac{x^2}{4}$

The required Area (A) = $\int_0^4 (y_1 - y_2)dx$

$$A = \int_0^4 \left(2\sqrt{x} - \frac{x^2}{4}\right)dx$$

$$A = \left[2 \times \frac{x^{3/2}}{\frac{3}{2}} - \frac{x^3}{4\times 3}\right]_0^4$$

$$A = \left[\frac{4}{3}\times(4)^{3/2} - \frac{1}{12}(4)^3 - 0 - 0\right]$$

$$A = \frac{32}{3} - \frac{16}{3} = \frac{16}{3} \text{ sq. unit}$$

90. (A) $I = \int \frac{1}{\sqrt{1-\sin x}}\,dx$

$$I = \frac{1}{\sqrt{1-\cos\left(\frac{\pi}{2}-x\right)}}\,dx$$

$$I = \frac{1}{\sqrt{2\sin^2\left(\frac{\pi}{4}-\frac{x}{2}\right)}}\,dx$$

$$I = \frac{1}{\sqrt{2}}\int \text{cosec}\left(\frac{\pi}{4}-\frac{x}{2}\right)dx$$

$$I = \frac{1}{\sqrt{2}}\,\frac{\log\left|\text{cosec}\left(\frac{\pi}{4}-\frac{x}{2}\right)-\cot\left(\frac{\pi}{4}-\frac{x}{2}\right)\right|}{\frac{-1}{2}} + c$$

$$I = \sqrt{2}\log\left|\text{cosec}\left(\frac{\pi}{4}-\frac{x}{2}\right)+\cot\left(\frac{\pi}{4}-\frac{x}{2}\right)\right| + c$$

91. (D) Equation of rectangular hyperbola
$x^2 - y^2 = 1$
$a = 1,\ b = 1$

Now, $e^2 = 1 + \frac{b^2}{a^2}$

$\Rightarrow e^2 = 1 + 1 \Rightarrow e = \sqrt{2}$

92. (A) eccentricity $e = \frac{1}{\sqrt{2}}$ and distance between foci $2ae = \sqrt{3}$

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

then $e^2 = 1 - \frac{b^2}{a^2}$

$\Rightarrow \frac{1}{2} = 1 - \frac{2b^2}{3}$

$\Rightarrow \frac{2b^2}{3} = \frac{1}{2} \Rightarrow b^2 = \frac{3}{4}$

equation of ellipse

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

$\Rightarrow \frac{2x^2}{3} + \frac{4y^2}{3} = 1$

$\Rightarrow 2x^2 + 4y^2 = 3$

93. (C) In the expansion of $\left(x^3 - \frac{1}{2x^2}\right)^{13}$

$T_{r+1} = {}^{13}C_r\,(x^3)^{13-r}\left(\frac{-1}{2x^2}\right)^r$

$T_{r+1} = {}^{13}C_r(-1)^r\,x^{39-5r}\left(\frac{1}{2}\right)^r$

Now, $39 - 5r = 9$

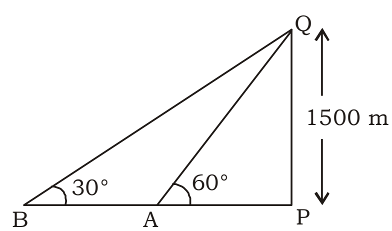
$\Rightarrow 5r = 30 \Rightarrow r = 6$

Coefficient of $x^9 = {}^{13}C_6\,(-1)^6\left(\frac{1}{2}\right)^6$

$= \frac{13!}{6!7!} \times \frac{1}{64}$

$= \frac{13\times 11\times 3\times 4}{64} = \frac{429}{16}$

94. (B)



Let AP = x m

In ΔAPQ :-

$\tan 60° = \frac{PQ}{AP}$

$\Rightarrow \sqrt{3} = \frac{1500}{x} \Rightarrow x = \frac{1500}{\sqrt{3}}$ ...(i)

In ΔBPQ :-

$\tan 30° = \frac{PQ}{BP}$

$\Rightarrow \frac{1}{\sqrt{3}} = \frac{1500}{x + AB}$

$\Rightarrow x + AB = 1500\sqrt{3}$

$\Rightarrow AB = 1500\sqrt{3} - x$

$\Rightarrow AB = 1500\sqrt{3} - \frac{1500}{\sqrt{3}}$

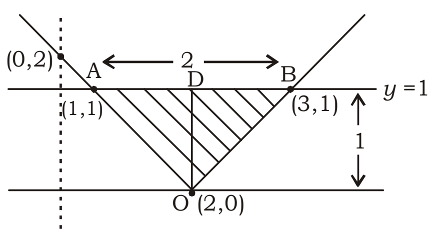
$\Rightarrow AB = 1500 \times \frac{2}{\sqrt{3}}$

time taken by aeroplane A to B = 20 sec

Now, speed of aeroplane $= \frac{1500 \times \frac{2}{\sqrt{3}}}{20}$ m/sec

$= 50\sqrt{3}$ m/sec

95 . (C)

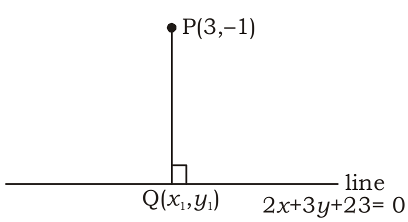


$y = |x - 2|$

Area $= \frac{1}{2} \times OD \times AB$

$= \frac{1}{2} \times 1 \times 2 = 1$ sq. unit

96. (C)



Let Q = (x_1, y_1)

Line $2x + 3y + 23 = 0$

slope of line $(m_1) = \frac{-2}{3}$

slope of line PQ$(m_2) = \frac{y_1 + 1}{x_1 - 3}$

Now, $m_1 \times m_2 = -1$

$\Rightarrow \frac{-2}{3} \times \frac{y_1 + 1}{x_1 - 3} = -1$

$\Rightarrow -2y_1 - 2 = -3x_1 + 9$

$\Rightarrow 3x_1 - 2y_1 = 11$ ...(i)

Point Q(x_1, y_1) passes through the line $2x + 3y + 23 = 0$

then $2x_1 + 3y_1 + 23 = 0$ ...(ii)

from eq(i) and eq(ii)

$x = -1$ and $y = -7$

Hence co-ordinate of Q = (–1, –7)

97. (C) Equations $2x + y + z = 4$, $6x + 7y + 11z = 2$ and $2x - 3y + z = 5$

Let $A = \begin{bmatrix} 2 & 1 & 1 \\ 6 & 7 & 11 \\ 2 & -3 & 1 \end{bmatrix}$, $X = \begin{bmatrix} x \\ y \\ z \end{bmatrix}$, $B = \begin{bmatrix} 4 \\ 2 \\ 5 \end{bmatrix}$

Using elementary method

$[A/B] = \begin{bmatrix} 2 & 1 & 1 & / & 4 \\ 6 & 7 & 11 & / & 2 \\ 2 & -3 & 1 & / & 5 \end{bmatrix}$

$R_2 \to R_2 - 3R_1$ and $R_3 \to R_3 - R_1$

$[A/B] = \begin{bmatrix} 2 & 1 & 1 & / & 4 \\ 0 & 4 & 8 & / & -10 \\ 0 & -4 & 0 & / & 1 \end{bmatrix}$

$R_3 \to R_3 + R_2$

$[A/B] = \begin{bmatrix} 2 & 1 & 1 & / & 4 \\ 0 & 4 & 8 & / & -10 \\ 0 & 0 & 8 & / & -9 \end{bmatrix}$

Rank(A) = Rank (A/B)

Hence equation have unique solution.

98. (D) $4 \times n!$, $3 \times (n+1)!$ and $2 \times (n+2)!$ are in G.P,

then $[3 \times (n+1)!]^2 = (4 \times n!) \times (2 \times (n+2)!)$

$\Rightarrow 9 \times (n+1)! \times (n+1)! = 4 \times n! \times 2 \times (n+2)!$

$\Rightarrow 9 \times (n+1) n! \times (n+1)! = 4 \times n! \times 2 \times (n+2)(n+1)!$

$\Rightarrow 9(n+1) = 8(n+2)$

$\Rightarrow 9n + 9 = 8n + 16 \Rightarrow n = 7$

99. (D) $m = \tan\theta = \tan 30 = \frac{1}{\sqrt{3}}$ and $c = 52$

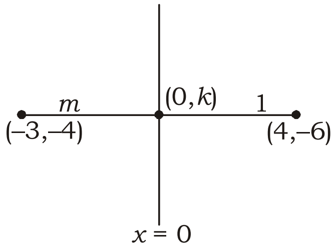
The equation of line

$y = mx + c$

$\Rightarrow y = \frac{1}{\sqrt{3}}x + 52$

$\Rightarrow \sqrt{3}y - x = 52\sqrt{3}$

100. (B)



Let the $x = 0$ divides the line joining the points (3, –4) and (4, –6) in the ratio $m : 1$,

then $\frac{4m-3}{m+1} = 0$

$\Rightarrow m = \frac{3}{4}$

The required ratio = 3 : 4

101. (C) $(3x + 4y - 5) + \lambda(5x - y + 11) = 0$

$(3 + 5\lambda)x + (4 - \lambda)y - 5 + 11\lambda = 0$

$y = \frac{-(3+5\lambda)}{(4-\lambda)}x + \frac{5-11\lambda}{4-\lambda}$

Slope $m = \frac{-(3+5\lambda)}{4-\lambda}$

Given straight line parallel to x-axis i.e $\theta = 0 \Rightarrow m = 0$

then $\frac{-(3+5\lambda)}{4-\lambda} = 0$

$\Rightarrow \lambda = \frac{-3}{5}$

102. (A) $A = \begin{bmatrix} 2 & 4 \\ 4 & 4 \end{bmatrix}$ and $A^2 = \begin{bmatrix} 20 & 24 \\ 24 & 32 \end{bmatrix}$

From option A

$A^2 - 6A - 8I = \begin{bmatrix} 20 & 24 \\ 24 & 32 \end{bmatrix} - 6\begin{bmatrix} 2 & 4 \\ 4 & 4 \end{bmatrix} - 8\begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$

$A^2 - 6A - 8I = \begin{bmatrix} 8 & 0 \\ 0 & 8 \end{bmatrix} - \begin{bmatrix} 8 & 0 \\ 0 & 8 \end{bmatrix}$

$A^2 - 6A - 8I = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

$A^2 - 6A - 8I = 0$

103. (D) $\begin{vmatrix} 1 & \omega & 3\omega^2 \\ 3 & 3\omega^2 & 9\omega^3 \\ 2 & 2\omega^3 & 6\omega^4 \end{vmatrix}$

$\Rightarrow \begin{vmatrix} 1 & \omega & 3\omega^2 \\ 3 & 3\omega^2 & 9 \\ 2 & 2 & 6\omega \end{vmatrix}$

$\Rightarrow 1(18\omega^3 - 18) - \omega(18\omega - 18) + 3\omega^2(6 - 6\omega^2)$

$\Rightarrow 1(18 - 18) - 18\omega^2 + 18\omega + 18\omega^2 - 18\omega^4$

$\Rightarrow 0 + 18\omega - 18\omega = 0$

104. (B) $z = 1 + \cos\frac{\pi}{12} + i\sin\frac{\pi}{12}$

$z = 2\cos^2\frac{\pi}{24} + i \times 2\sin\frac{\pi}{24} \times \cos\frac{\pi}{24}$

$z = 2\cos\frac{\pi}{24}\left[\cos\frac{\pi}{24} + i\sin\frac{\pi}{24}\right]$

Hence $|z| = 2\cos\frac{\pi}{24}$

105. (C) $z = \left[\frac{1+\sqrt{3}i}{1-\sqrt{3}i}\right]^3$

$z = \left[\frac{(1+\sqrt{3}i)(1+\sqrt{3}i)}{(1-\sqrt{3}i)(1+\sqrt{3}i)}\right]^3$

$z = \left[\frac{1+3i^2+2\sqrt{3}i}{1-3i^2}\right]^3$

$z = \left[\frac{-2+2\sqrt{3}i}{4}\right]^3$

$z = \left[\frac{-1+\sqrt{3}i}{2}\right]^3$

$z = \omega^3 = 1$

106. (B) Sum of n'terms

$S_n = n^2 + 3n$ ...(i)

$S_{n-1} = (n-1)^2 + 3(n-1)$

$S_{n-1} = n^2 + n - 2$ ...(ii)

n^{th} term of the series

$T_n = S_n - S_{n-1}$

$T_n = (n^2 + 3n) - (n^2 + n - 2)$

$T_n = 2n + 2$

107. (B) $\sqrt{(4-\sqrt{5})} = \sqrt{\frac{8-2\sqrt{15}}{2}}$

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

$= \frac{\sqrt{5}-\sqrt{3}}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}}$

$= \frac{\sqrt{10}-\sqrt{6}}{2}$

108. (C) Equation whose roots 3 and –15
$(x-3)(x+15) = 0$
$x^2 + 12x - 45 = 0$
Now, original equation
$x^2 + 4x - 45 = 0$
Roots of original equation are –9 and 5.

109. (D) Series 0.8 + 0.08 + 0.008 +...... ∞

Sum of the series $= \dfrac{0.8}{1-0.1}$

$= \dfrac{0.8}{0.9} = \dfrac{8}{9}$

110. (B) Vectors $-\hat{i} + m\hat{j} + \hat{k}$ and $\hat{i} + \hat{j} + \hat{k}$
Angle between the vectors

$$\cos\theta = \frac{-1\times1 + m\times1 + 1\times1}{\sqrt{(-1)^2 + m^2 + 1^2}\sqrt{1^2 + (-1)^2 + 1^2}}$$

$$\Rightarrow \cos\frac{\pi}{3} = \frac{m}{\sqrt{m^2+2}\times\sqrt{3}}$$

$$\Rightarrow \frac{1}{2} = \frac{m}{\sqrt{3}\sqrt{m^2+2}}$$

$$\Rightarrow \frac{1}{4} = \frac{m^2}{3(m^2+2)}$$

$\Rightarrow m^2 = 6 \Rightarrow m = \sqrt{6}$

111. (C) $n(S) = 6 \times 6 = 36$
E = {(6, 3), (3, 6), (5, 4), (4, 5)}
$n(E) = 4$

The required Probability $= \dfrac{4}{36} = \dfrac{1}{9}$

112. (A) Days (in February 2017) = 28
The required Probability = 0

113. (D) No. of diagonals $= \dfrac{n(n-3)}{2}$

$n = 11$

No. of diagonals $= \dfrac{11\times8}{2} = 44$

114. (D) $\dfrac{\sin^2\frac{3A}{2}}{\sin^2\frac{A}{2}} - \dfrac{\cos^2\frac{3A}{2}}{\cos^2\frac{A}{2}}$

$$\Rightarrow \left(\frac{\sin\frac{3A}{2}}{\sin\frac{A}{2}}\right)^2 - \left(\frac{\cos\frac{3A}{2}}{\cos\frac{A}{2}}\right)^2$$

$$\Rightarrow \left(\frac{3\sin\frac{A}{2} - 4\sin^3\frac{A}{2}}{\sin\frac{A}{2}}\right)^2 - \left(\frac{4\cos^3\frac{A}{2} - 3\cos\frac{A}{2}}{\cos\frac{A}{2}}\right)^2$$

$$\Rightarrow \left(3 - 4\sin^2\frac{A}{2}\right)^2 - \left(4\cos^2\frac{A}{2} - 3\right)^2$$

$$\Rightarrow 9 + 16\sin^4\frac{A}{2} - 24\sin^2\frac{A}{2} - 16\cos^4\frac{A}{2} - 9 + 24\cos^2\frac{A}{2}$$

$$\Rightarrow 16\sin^4\frac{A}{2} - 16\cos^4\frac{A}{2} - 24\left(\sin^2\frac{A}{2} - \cos^2\frac{A}{2}\right)$$

$$\Rightarrow 16\left(\sin^2\frac{A}{2} - \cos^2\frac{A}{2}\right)\left(\sin^2\frac{A}{2} + \cos^2\frac{A}{2}\right) - 24\left(\sin^2\frac{A}{2} - \cos^2\frac{A}{2}\right)$$

$$\Rightarrow \left(\sin^2\frac{A}{2} - \cos^2\frac{A}{2}\right)(16 - 24)$$

$\Rightarrow 8\cos A$

115. (C) We know that
$\cos^2 A = 1 - 2\sin^2 A$
$\Rightarrow 2\sin^2 A = 1 - \cos^2 A$

$A = 22\frac{1}{2}$

$\Rightarrow 2\sin^2 22\frac{1}{2} = 1 - \cos 45$

$\Rightarrow 2\sin^2 22\frac{1}{2} = 1 - \dfrac{1}{\sqrt{2}}$

$\Rightarrow \sin^2 22\frac{1}{2} = \dfrac{\sqrt{2}-1}{2\sqrt{2}}$

$\Rightarrow \sin 22\frac{1}{2} = \sqrt{\dfrac{\sqrt{2}-1}{2\sqrt{2}}}$

then $\cos\left(247\frac{1}{2}\right) = \cos\left(270 - 22\frac{1}{2}\right)$

$= -\sin 22\frac{1}{2}$

$= -\sqrt{\dfrac{\sqrt{2}-1}{2\sqrt{2}}}$

116. (A) $I = \int_0^{\pi/2} \frac{\sin x}{\sin x + \cos x}\, dx$ ...(i)

Prop.IV $\int_0^a f(x)\, dx = \int_0^a f(a-x) dx$

$$I = \int_0^{\pi/2} \frac{\sin\left(\frac{\pi}{2} - x\right)}{\sin\left(\frac{\pi}{2} - x\right) + \cos\left(\frac{\pi}{2} - x\right)}\, dx$$

$I = \int_0^{\pi/2} \frac{\cos x}{\cos x + \sin x}$ ...(ii)

from eq(i) and eq(ii)

$$I + I = \int_0^{\pi/2} \frac{\sin x + \cos x}{\sin x + \cos x}$$

$$2I = \int_0^{\pi/2} 1.dx$$

$$2I = [x]_0^{\pi/2}$$

$$2I = \frac{\pi}{2} - 0 \Rightarrow I = \frac{\pi}{4}$$

117. (C) $y = x^2 - e^x$

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

$$\frac{dy}{dx} = 2x - e^x$$

$\frac{dx}{dy} = \frac{1}{2x - e^x}$ ...(i)

On differenting both side w.r.t. 'y'

$$\frac{d^2x}{dy^2} = (-1)(2x - e^x)^{-1-1}\ (2 - e^x) \frac{dx}{dy}$$

$$\frac{d^2x}{dy^2} = \frac{-1}{(2x - e^x)^2} (2 - e^x) \times \frac{1}{(2x - e^x)}$$

$$\frac{d^2x}{dy^2} = \frac{e^x - 2}{(2x - e^x)^3}$$

118. (B) $x = g(t)$ and $y = f(t)$

$$\Rightarrow \frac{dx}{dt} = g'(t),\ \frac{dy}{dt} = f'(t)$$

$$\Rightarrow \frac{d^2x}{dt^2} = g''(t),\ \frac{d^2y}{dt^2} = f''(t)$$

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

$$\Rightarrow \frac{dy}{dx} = \frac{f'(t)}{g'(t)}$$

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

$$\Rightarrow \frac{d^2y}{dx^2} = \frac{[g'(t)f''(t) - f'(t).g''(t)]\frac{dt}{dx}}{\{g'(t)\}^2}$$

Given that $\frac{d^2y}{dx^2} = 0$

$$\Rightarrow g'(t)\ f''(t) - f'(t).g''(t) = 0$$

$$\Rightarrow \frac{dx}{dt} . \frac{d^2y}{dx^2} - \frac{dy}{dt} . \frac{d^2x}{dt^2} = 0$$

$$\Rightarrow \frac{dx}{dt} . \frac{d^2y}{dx^2} = \frac{dy}{dt} . \frac{d^2x}{dt^2}$$

119. (A) Given that $y = a^{x \log_a \tan x}$

$$\Rightarrow y = a^{\log_a (\tan x)^x}$$

$$\Rightarrow y = (\tan x)^x$$

On taking log both side

$$\Rightarrow \log y = x \log\tan x$$

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

$$\Rightarrow \frac{1}{y}\frac{dy}{dx} = x.\frac{\sec^2 x}{\tan x} + \log\tan x \times 1$$

$$\Rightarrow \frac{1}{y}\frac{dy}{dx} = \frac{2x}{\sin 2x} + \log\tan x$$

$$\Rightarrow \frac{dy}{dx} = y(2x.\text{cosec}2x + \log\tan x)$$

120. (D) Let $y = \log_3 x$ and $z = \log_x 3$

$$\Rightarrow y = \frac{\log x}{\log 3},\ z = \frac{\log 3}{\log x}$$

$$\Rightarrow \frac{dy}{dx} = \frac{1}{x \log 3}, \frac{dz}{dx} = -(\log 3)(\log x)^{-2} \times \frac{1}{x}$$

$$\frac{dz}{dx} = \frac{-\log 3}{x(\log x)^2}$$

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

$$\Rightarrow \frac{dy}{dz} = \frac{1}{x \log 3} \times \frac{-x(\log x)^2}{\log 3}$$

$$\Rightarrow \frac{dy}{dz} = -\left(\frac{\log x}{\log 3}\right)^2 = -(\log_3 x)^2$$

NDA (MATHS) MOCK TEST - 136 (Answer Key)

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

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