KD Campus

KD Campus Pvt. Ltd

PLOT NO. 2 SSI, OPP METRO PILLAR 150, GT KARNAL ROAD, JAHANGIRPURI, DELHI: 110033

NDA MATHS MOCK TEST - 154 (SOLUTION)

1. (C) Let $\frac{x}{\cos\theta} = \frac{y}{\cos\left(\theta+\frac{\pi}{3}\right)} = \frac{z}{\cos\left(\theta-\frac{\pi}{3}\right)} = k$

$x = k.\cos\theta, y = k.\cos\left(\theta+\frac{\pi}{3}\right), z = k.\cos\left(\theta-\frac{\pi}{3}\right)$

Now, $y + z - x = k.\cos\left(\theta+\frac{\pi}{3}\right) + k.\cos\left(\theta-\frac{\pi}{3}\right)$

$- k.\cos\theta$

$\Rightarrow y + z - x = k\left[\cos\left(\theta+\frac{\pi}{3}\right) + \cos\left(\theta-\frac{\pi}{3}\right) - \cos\theta\right]$

$\Rightarrow y + z - x = k\left[2\cos\theta.\cos\frac{\pi}{3} - \cos\theta\right]$

$\Rightarrow y + z - x = k\left[2(\cos\theta)\times\frac{1}{2} - \cos\theta\right]$

$\Rightarrow y + z - x = k \times 0 = 0$

2. (B) Let $y = \tan^{-1}\left(\frac{2\sqrt{x}}{1-x}\right)$

Let $x = \tan^2\theta \Rightarrow \theta = \tan^{-1}\sqrt{x}$

$\Rightarrow y = \tan^{-1}\left(\frac{2\tan\theta}{1-\tan^2\theta}\right)$

$\Rightarrow y = \tan^{-1}(\tan 2\theta)$

$\Rightarrow y = 2\theta$

$\Rightarrow y = 2\tan^{-1}\sqrt{x}$

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

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

$\Rightarrow \frac{dy}{dx} = \frac{1}{\sqrt{x}(1+x)}$

3. (A) In ABC, $a = 2\sqrt{2}$, $b = 3$ and C = 45°

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

$\Rightarrow \cos 45 = \frac{(2\sqrt{2})^2+(3)^2-c^2}{2\times 2\sqrt{2}\times 3}$

$\Rightarrow \frac{1}{\sqrt{2}} = \frac{8+9-c^2}{12\sqrt{2}}$

$\Rightarrow 12 = 17 - c^2 \Rightarrow c = \sqrt{5}$

4. (D) Given that $a = \frac{dy}{dx}$, $b = \frac{d^2y}{dx^2}$

$y = f(x)$

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

$\Rightarrow \frac{dy}{dx} = f'(x)$

$\Rightarrow \frac{dx}{dy} = \frac{1}{f'(x)}$

Again, differentiating

$\Rightarrow \frac{d^2x}{dy^2} \times \frac{dy}{dx} = -1[f(x)]^{-2} f''(x)$

$\Rightarrow \frac{d^2x}{dy^2} \times a = -(a)^{-2} \times b$

$\Rightarrow \frac{d^2x}{dy^2} = \frac{-b}{a^3}$

5. (D)

6. (C) $I = \int_0^{\pi/2} \frac{\sin x - \cos x}{1+\sin x.\cos x}$ ...(i)

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

$I = \int_0^{\pi/2} \frac{\sin\left(\frac{\pi}{2}-x\right) - \cos\left(\frac{\pi}{2}-x\right)}{1+\sin\left(\frac{\pi}{2}-x\right).\cos\left(\frac{\pi}{2}-x\right)} dx$

$I = \int_0^{\pi/2} \frac{\cos x - \sin x}{1+\cos x.\sin x} dx$ ...(ii)

from eq(i) and eq(ii)

2I = 0 ⇒ I = 0

7. (D) $\begin{vmatrix} ab-a^2 & a-b & b^2-ab \\ bc-ac & c-a & ab-a^2 \\ b^2-ab & b-c & bc-ac \end{vmatrix}$

$\Rightarrow \begin{vmatrix} a(b-a) & a-b & b(b-a) \\ c(b-a) & c-a & a(b-a) \\ b(b-a) & b-c & c(b-a) \end{vmatrix}$

$\Rightarrow (b-a)^2 \begin{vmatrix} a & a-b & b \\ c & c-a & a \\ b & b-c & c \end{vmatrix}$

$C_2 \to C_2 + C_3 - C_1$

$\Rightarrow (b-a)^2 \begin{vmatrix} a & 0 & b \\ c & 0 & a \\ b & 0 & c \end{vmatrix} = 0$

8. (B) $\left[\dfrac{\sin\frac{\pi}{4} - i\cos\frac{\pi}{4}}{\sin\frac{\pi}{4} + i\cos\frac{\pi}{4}}\right]^2$

$\Rightarrow \left[\dfrac{\frac{1}{\sqrt{2}} - i\times\frac{1}{\sqrt{2}}}{\frac{1}{\sqrt{2}} + i\times\frac{1}{\sqrt{2}}}\right]^2$

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

$\Rightarrow \left[\dfrac{(1-i)^2}{2}\right]^2$

$\Rightarrow \left(\dfrac{-2i}{2}\right)^2$

$\Rightarrow i^2 = -1$

9. (D) $I = \int \sin x.\log(\sin x)\,dx$

$I = \log(\sin x).\int \sin x\,dx - \int\left\{\frac{d}{dx}(\log(\sin x)).\int \sin x\,dx\right\}dx$

$I = -\cos x.\log(\sin x) - \int \frac{1}{\sin x}\times \cos x(-\cos x)\,dx$

$I = -\cos x.\log(\sin x) + \int \frac{\cos^2 x}{\sin x}dx$

$I = -\cos x.\log(\sin x) + \int \frac{(1-\sin^2 x)}{\sin x}dx$

$I = -\cos x.\log(\sin x) + \int (\operatorname{cosec} x - \sin x)\,dx$

$I = -\cos x.\log(\sin x) + \log\left(\tan\frac{x}{2}\right) + \cos x + c$

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

Prop.IV

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

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

from eq(i) and eq(ii)

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

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

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

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

11. (C) $y = \tan^{-1}\left[\dfrac{\cos x - \sin x}{\cos x + \sin x}\right]$

$y = \tan^{-1}\left[\dfrac{1-\tan x}{1+\tan x}\right]$

$y = \tan^{-1}\left[\dfrac{\tan\frac{\pi}{4} - \tan x}{1+\tan\frac{\pi}{4}.\tan x}\right]$

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

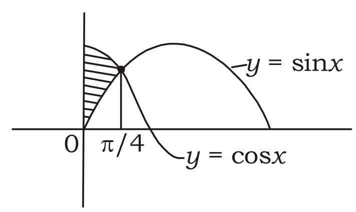
$y = \frac{\pi}{4} - x$

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

$\frac{dy}{dx} = -1$

12. (C)

13. (B)



Area $= \int_0^{\pi/4}(\cos x - \sin x)dx$

Area $= [\sin x + \cos x]_0^{\pi/4}$

Area $= \sin\frac{\pi}{4} + \cos\frac{\pi}{4} - \sin 0 - \cos 0$

Area $= \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}} - 0 - 1$

Area $= (\sqrt{2} - 1)$ sq. unit

14. (C) A = {1, 3, 4, 5}, B = {2, 3, 4, 6} and C = {x, y}

$(A\cap B)$ = { 3, 4}

Now, $(A\cap B)\times C$ = {3, 4}×(x, y)

No. of elements in $(A\cap B)\times C$ = 2×2 = 4

15. (B) The required Probability $= \dfrac{^5C_1 \times {}^8C_2}{^{13}C_3}$

$= \dfrac{5\times 28}{13\times 22}$

$= \dfrac{70}{143}$

16. (C) $z = \dfrac{3+2i}{2-3i} - \dfrac{2-3i}{3+2i}$

$z = \dfrac{(3+2i)(2+3i)}{(2-3i)(2+3i)} - \dfrac{(2-3i)(3-2i)}{(3+2i)(3-2i)}$

$z = \dfrac{13i}{4-9i^2} - \dfrac{-13i}{9-4i^2}$

$z = \dfrac{13i}{13} + \dfrac{13i}{13}$

$z = i + i = 2i$ and $\bar{z} = -2i$

Now, $z^2 + z\bar{z} = z(z + \bar{z})$

$\Rightarrow z^2 + z\bar{z} = 2i(2i - 2i) = 0$

17. (D) Digits 0, 1, 3, 5, 7, 8

| 3 | 6 | 6 | 6 | = 3×6×6×6 = 648

(5,7,8)

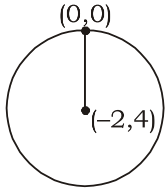
18. (C) Given that $b_{xy} = \dfrac{-13}{8}$ and $b_{yx} = \dfrac{-2}{13}$

Now, $r = \sqrt{b_{xy} \times b_{yx}}$

$\Rightarrow r = \sqrt{\left(\dfrac{-13}{8}\right) \times \left(\dfrac{-2}{13}\right)}$

$\Rightarrow r = \sqrt{\dfrac{1}{4}} = \dfrac{-1}{2}$

19. (C)



Equation of circle

$x^2 + y^2 + 4x - 8y = 0$

$\Rightarrow (x + 2)^2 - 4 + (y - 4)^2 - 16 = 0$

$\Rightarrow (x + 2)^2 + (y - 4)^2 = 20$

Equation of diameter

$y - 0 = \dfrac{4-0}{-2-0}(x - 0)$

$y = -2x \Rightarrow 2x + y = 0$

20. (D) Given that $\vec{a} = 3\hat{i} - \hat{j} - 2\hat{k}$ and $\vec{b} = \hat{i} + \hat{j} - 2\hat{k}$

Now, $(\vec{a} + 2\vec{b}) \times (2\vec{a} - \vec{b})$

$\Rightarrow 2(\vec{a} \times \vec{a}) + 4(\vec{b} \times \vec{a}) - (\vec{a} \times \vec{b}) - 2(\vec{b} \times \vec{b})$

$\Rightarrow 0 - 4(\vec{a} \times \vec{b}) - (\vec{a} \times \vec{b}) - 0 = -5(\vec{a} \times \vec{b})$

21. (B) $f(x) = e^{\sin(\log \sin x)}$

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

$f'(x) = e^{\sin(\log\sin x)} \times \cos(\log\sin x) \times \dfrac{\cos x}{\sin x}$

$f'(x) = \cot x.\cos(\log\sin x).e^{\sin(\log\sin x)}$

$f'\left(\dfrac{\pi}{2}\right) = \cot\dfrac{\pi}{2}.\cos\left(\log\sin\dfrac{\pi}{2}\right).e^{\sin\left(\log\sin\frac{\pi}{2}\right)}$

$f'\left(\dfrac{\pi}{2}\right) = 0.\cos(\log 1).e^{\sin(\log 1)}$

$f'\left(\dfrac{\pi}{2}\right) = 0.\cos 0.e^{\sin 0}$

$f'\left(\dfrac{\pi}{2}\right) = 0 \times 1 \times 1 = 0$

22. (C) $\log_5(5.3^x - 13)$, $\log_5(3^x - 1)$ and $\log_5 2$ are in A.P.,

then $2\log_5(3^x - 1) = \log_5(5.3^x - 13) + \log_5 2$

$\Rightarrow \log_5(3^x - 1)^2 = \log_5\{(5.3^x - 13) \times 2\}$

$\Rightarrow (3^x - 1)^2 = 2(5.3^x - 13)$

$\Rightarrow (3^x)^2 + 1 - 2.3^x = 10.3^x - 26$

$\Rightarrow (3^x)^2 - 12.3^x + 27 = 0$

$\Rightarrow (3^x - 9)(3^x - 3) = 0$

$\Rightarrow 3^x - 9 = 0 \Rightarrow 3^x = 3^2 \Rightarrow x = 2$

and $3^x - 3 = 0 \Rightarrow 3^x - 3^1 \Rightarrow x = 1$

Hence $x = 1, 2$

23. (B) The required Probability

$= \dfrac{{}^6C_3 + {}^6C_4 + {}^6C_5 + {}^6C_6}{2^6}$

$= \dfrac{20 + 15 + 6 + 1}{64}$

$= \dfrac{42}{64} = \dfrac{21}{32}$

24. (A) $\begin{vmatrix} 1+c & 1 & 1 \\ 1 & 1+a & 1 \\ 1 & 1 & 1+b \end{vmatrix} = k$

$\Rightarrow (1 + c)[(1 + a)(1 + b) - 1] - 1(1 + b - 1) + 1(1 - 1 - a) = k$

$\Rightarrow (1 + c)(a + b + ab) - b - a = k$

$\Rightarrow a + ac + b + bc + ab + abc - a - b = k$

$\Rightarrow ac + bc + ab + abc = k$

$\Rightarrow \dfrac{ac + bc + ab + abc}{abc} = \dfrac{k}{abc}$

$\Rightarrow b^{-1} + a^{-1} + c^{-1} + 1 = \dfrac{k}{abc}$

$\Rightarrow 0 + 1 = \dfrac{k}{abc}$

$\Rightarrow k = abc$ $[\because a^{-1} + b^{-1} + c^{-1} = 0]$

25. (C) Circle $x^2 + y^2 - 2x - 6y + 15 = 0$

Equation of circle concentric with given circle

$x^2 + y^2 - 2x - 6y + c = 0$ ...(i)

its passing through (–1, 4)

$(-1)^2 + (4)^2 - 2 \times (-1) - 6 \times 4 + c = 0$

$\Rightarrow 1 + 16 + 2 - 24 + c = 0 \Rightarrow c = 5$

from eq(i)

Eqation of circle

$\Rightarrow x^2 + y^2 - 2x - 6y + 5 = 0$

26. (D) Angle describe in 12 hr by hour-hand = 360°
Angle describe in 1 hr(60 min) by hour-hand = $\frac{360}{12}$
Angle describe in 1 min by hour-hand
$= \frac{360}{12\times 60}$
Angle describe in 24 min by hour-hand
$= \frac{360}{12\times 60} \times 24 = 12°$

27. (C) We know that
curve $\sqrt{x} + \sqrt{y} = \sqrt{a}$
Area = $\frac{a^2}{b}$
Given that $\sqrt{x} + \sqrt{y} = \sqrt{3}$
The required area = $\frac{3^2}{6} = \frac{3}{2}$ sq. unit

28. (C) Let A = $\begin{bmatrix} 1 & -3 & -2 \\ 4 & 0 & 5 \\ 1 & 2 & -1 \end{bmatrix}$
Co-factors of A

$C_{11}=(-1)^{1+1}\begin{vmatrix} 0 & 5 \\ 2 & -1 \end{vmatrix}, C_{12}=(-1)^{1+2}\begin{vmatrix} 4 & 5 \\ 1 & -1 \end{vmatrix}, C_{13}=(-1)^{1+3}\begin{vmatrix} 4 & 0 \\ 1 & 2 \end{vmatrix}$
$= -10 \qquad = -(-4-5) = 9 \qquad = 8 - 0 = 8$

$C_{21}=(-1)^{2+1}\begin{vmatrix} -3 & -2 \\ 2 & -1 \end{vmatrix}, C_{22}=(-1)^{2+2}\begin{vmatrix} 1 & -2 \\ 1 & -1 \end{vmatrix}, C_{23}=(-1)^{2+3}\begin{vmatrix} 1 & -3 \\ 1 & 2 \end{vmatrix}$
$= -(3 + 4) = -7 \qquad = -1 + 2 = 1 \qquad = -(2+3) = -5$

$C_{31}=(-1)^{3+1}\begin{vmatrix} 3 & -2 \\ 0 & 5 \end{vmatrix}, C_{32}=(-1)^{3+2}\begin{vmatrix} 1 & -2 \\ 4 & 5 \end{vmatrix}, C_{33}=(-1)^{3+3}\begin{vmatrix} 1 & -3 \\ 4 & 0 \end{vmatrix}$
$= -15 = -15 \qquad = -(5 + 8) = -13 \qquad = 0 + 12 = 12$

$C = \begin{bmatrix} -10 & 9 & 8 \\ -7 & 1 & -5 \\ -15 & -13 & 12 \end{bmatrix}, C^T = \begin{bmatrix} -10 & -7 & -15 \\ 9 & 1 & -13 \\ 8 & -5 & 12 \end{bmatrix}$

Adj A = C^T

Adj A = $\begin{bmatrix} -10 & -7 & -15 \\ 9 & 1 & -13 \\ 8 & -5 & 12 \end{bmatrix}$

29. (B) A = $\begin{bmatrix} 2 & 2 \\ 2 & 2 \end{bmatrix}$

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

$A^2 = \begin{bmatrix} 4 & 4 \\ 4 & 4 \end{bmatrix} = \begin{bmatrix} 4 & 4 \\ 4 & 4 \end{bmatrix}$

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

and $A^4 = \begin{bmatrix} 2^4 & 2^4 \\ 2^4 & 2^4 \end{bmatrix} = \begin{bmatrix} 16 & 16 \\ 16 & 16 \end{bmatrix}$

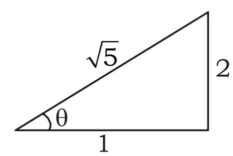
30. (C) $a^{1/3} - \frac{1}{a^{1/3}} = 4$

$\Rightarrow \left(a^{1/3} - \frac{1}{a^{1/3}}\right)^3 = 4^3$

$\Rightarrow a - \frac{1}{a} - 3 \times a = 64$

$\Rightarrow a - \frac{1}{a} = 64 + 12 = 76$

31. (D)



$\sin^{-1}\left(\frac{2}{\sqrt{5}}\right) = \theta$

$\Rightarrow \sin\theta = \frac{2}{\sqrt{5}}$

Now, $\sec\theta = \sqrt{5}$

$\Rightarrow \sec^{-1}(\sqrt{5}) = \theta$

32. (A) $I = \int_{-1}^{1} x^2 |x| dx$

$I = \int_{-1}^{0} x^2 |x| dx + \int_{0}^{1} x^2 |x| dx$

$I = -\int_{-1}^{0} x^3 dx + \int_{0}^{1} x^3 dx$

$I = -\left[\frac{x^4}{4}\right]_{-1}^{0} + \left[\frac{x^4}{4}\right]_{0}^{1}$

$I = \frac{-1}{4}[0 - (-1)^4] + \frac{1}{4}[1^4 - 0]$

$I = \frac{1}{4} + \frac{1}{4} = \frac{1}{2}$

33. (B) The no. of ways = ${}^{15-1}C_{11-1}$
$= {}^{14}C_{10} = 1001$

34. (C) $n = 25$

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

$= \frac{25 \times 23}{2} = 275$

35. (B) zero

36. (C) Let $a - ib = \sqrt{5-12i}$

On squaring

$\Rightarrow (a^2 - b^2) - (2ab)i = 5 - 12i$

On comparing

$a^2 - b^2 = 5$ and $2ab = 12$ ...(i)

Now, $(a^2 + b^2)^2 = (a^2 - b^2)^2 + (2ab)^2$

$\Rightarrow (a^2 + b^2)^2 = 5^2 + (12)^2$

$\Rightarrow (a^2 + b^2)^2 = 13 \Rightarrow a^2 + b^2 = 13$ ...(iii)

On solving eq(i) and eq(ii)

$2a^2 = 18$ and $2b^2 = 8$

$\Rightarrow a = \pm 3 \quad b = \pm 2$

Hence $\sqrt{5-12i} = \pm(3 - 2i)$

37. (D) Given that $P(A) = \frac{2}{5}$, $P(B) = \frac{1}{2}$ and

$P\left(\frac{A}{B}\right) = \frac{3}{4}$

Now, $P\left(\frac{A}{B}\right) = \frac{P(A \cap B)}{P(B)}$

$\Rightarrow \frac{3}{4} = \frac{P(A \cap B)}{1/2}$

$\Rightarrow P(A \cap B) = \frac{3}{4} \times \frac{1}{2} = \frac{3}{8}$

and $P\left(\frac{B}{A}\right) = \frac{P(A \cap B)}{P(A)}$

$\Rightarrow P\left(\frac{B}{A}\right) = \frac{3/8}{2/5} = \frac{15}{16}$

38. (C) $\begin{bmatrix} 3 & -2 \\ x & -1 \end{bmatrix} \times \begin{bmatrix} -2 & 6 \\ 2 & 5 \end{bmatrix} = \begin{bmatrix} -10 & y \\ -4 & 1 \end{bmatrix}$

$\Rightarrow \begin{bmatrix} -6-4 & 18-10 \\ -2x-2 & 6x-5 \end{bmatrix} = \begin{bmatrix} -10 & y \\ -4 & 1 \end{bmatrix}$

$\Rightarrow \begin{bmatrix} -10 & 8 \\ -2x-2 & 6x-5 \end{bmatrix} = \begin{bmatrix} -10 & y \\ -4 & 1 \end{bmatrix}$

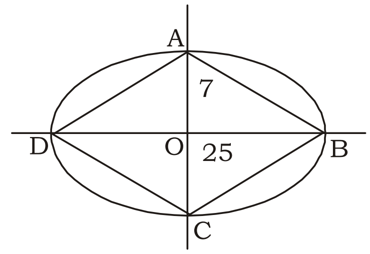
On complaring

$-2x - 2 = -4$ and $y = 8$

$\Rightarrow x = 1$

Hence $x = 1$ and $y = 8$

39. (A)



Given that $e = \frac{24}{25}$

and $2ae = 48$

$\Rightarrow 2a \times \frac{24}{25} = 48 \Rightarrow a = 25$

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

$\Rightarrow b^2 = 25 \times 25 \left(1 - \frac{24}{25} \times \frac{24}{25}\right)$

$\Rightarrow b^2 = 25 \times 25 \times \frac{49}{25 \times 25} \Rightarrow b = 7$

Area of AOB = $\frac{1}{2} \times OA \times OB$

$= \frac{1}{2} \times 7 \times 25$

Area of ABCD = 4 × Area of ΔAOB

$= 4 \times \frac{1}{2} \times 7 \times 25 = 350$ sq.unit

40. (D) $(\sqrt{3} - 2i)(2 + \sqrt{3}i)$

$\Rightarrow 2\sqrt{3} - 4i + 3i - 2\sqrt{3}i^2$

$\Rightarrow 4\sqrt{3} - i$

41. (C) Planes $-2x + y + 4z = 7$ and $-4x + 2y - z = 8$

Now, $\cos\theta = \frac{(-2)\times(-4) + 1 \times 2 + 4 \times (-1)}{\sqrt{(-2)^2 + 1^2 + 4^2}\sqrt{(-4)^2 + 2^2 + (-1)^2}}$

$\Rightarrow \cos\theta = \frac{8 + 2 - 4}{\sqrt{21}\sqrt{21}}$

$\Rightarrow \cos\theta = \frac{6}{21}$

$\Rightarrow \cos\theta = \frac{2}{7} \Rightarrow \theta = \cos^{-1}\left(\frac{2}{7}\right)$

42. (A) $\frac{\sin A}{\sin C} = \frac{\sin(A-B)}{\sin(B-C)}$

$\Rightarrow \frac{\sin A}{\sin C} = \frac{\sin A.\cos B - \cos A.\sin B}{\sin B.\cos C - \cos B.\sin C}$

$\Rightarrow \frac{a}{c} = \frac{a\cos B - b\cos A}{b\cos C - c\cos B}$ [by Sine Rule]

$\Rightarrow ab\cos C - ac\cos B = ac\cos B - bc\cos A$

$\Rightarrow ab\cos C + bc\cos A = 2ac\cos B$

$\Rightarrow ab \times \frac{a^2+b^2-c^2}{2ab} + bc \times \frac{b^2+c^2-a^2}{2bc}$

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

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

$\Rightarrow b^2 = a^2 + c^2 - b^2$

$\Rightarrow 2b^2 = a^2 + c^2$

Hence a^2, b^2, c^2 are in A.P.

43. (B) In the expansion of $\left(2\sqrt{x} + \frac{1}{4x^{3/2}}\right)^6$

$T_{r+1} = {}^6C_r\,(2\sqrt{x})^{6-r}\left(\frac{1}{4x^{3/2}}\right)^r$

$T_{r+1} = {}^6C_r\,(2)^{6-3r}\,x^{\frac{6-4r}{2}}$

Here, $\frac{6-4r}{2} = 1$

$\Rightarrow 6 - 4r = 2 \Rightarrow r = 1$

Coefficient of $x = {}^6C_1\,(2)^3$

$= 6\times 8 = 48$

44. (B) $\begin{vmatrix} b+c & b^2+c^2 & k \\ c+a & c^2+a^2 & k \\ a+b & a^2+b^2 & k \end{vmatrix} = (a-b)(b-c)(c-a)$

$\Rightarrow k\begin{vmatrix} b+c & b^2+c^2 & 1 \\ c+a & c^2+a^2 & 1 \\ a+b & a^2+b^2 & 1 \end{vmatrix} = (a-b)(b-c)(c-a)$

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

$\Rightarrow k\begin{vmatrix} b+c & b^2+c^2 & 1 \\ a-b & a^2-b^2 & 0 \\ a-c & a^2-c^2 & 0 \end{vmatrix} = (a-b)(b-c)(c-a)$

$\Rightarrow k(a-b)(a-c)\begin{vmatrix} b+c & b^2+c^2 & 1 \\ 1 & a+b & 0 \\ 1 & a+c & 0 \end{vmatrix}$

$= -(a-b)(b-c)(a-c)$

$\Rightarrow k\begin{vmatrix} b+c & b^2+c^2 & 1 \\ 1 & a+b & 0 \\ 1 & a+c & 0 \end{vmatrix} = -(b-c)$

$R_3 \to R_3 - R_2$

$\Rightarrow k\begin{vmatrix} b+c & b^2+c^2 & 1 \\ 1 & a+b & 0 \\ 0 & c-b & 0 \end{vmatrix} = c - b$

$\Rightarrow k(c-b)\begin{vmatrix} b+c & b^2+c^2 & 1 \\ 1 & a+b & 0 \\ 0 & 1 & 0 \end{vmatrix} = (c-b)$

$\Rightarrow k[(b+c)\times 0 - (b^2+c^2)\times 0 + 1\times 1] = 1$

$\Rightarrow k \times 1 = 1 \Rightarrow k = 1$

45. (C) $f(x) = \sqrt{1+\sin^2 x^2}$

$f'(x) = \frac{1}{2}\times\frac{1}{\sqrt{1+\sin^2 x^2}} \times 2\sin x^2.\cos x^2 \times 2x$

$f'(x) = \frac{2x\sin x^2.\cos x^2}{\sqrt{1+\sin^2 x^2}}$

$f'\left(\frac{\sqrt{\pi}}{2}\right) = \frac{2\times\frac{\sqrt{\pi}}{2}\sin\frac{\pi}{4}.\cos\frac{\pi}{4}}{\sqrt{1+\sin^2\frac{\pi}{4}}}$

$f'\left(\frac{\sqrt{\pi}}{2}\right) = \frac{\sqrt{\pi}\times\frac{1}{\sqrt{2}}\times\frac{1}{\sqrt{2}}}{\sqrt{1+\frac{1}{2}}}$

$f'\left(\frac{\sqrt{\pi}}{2}\right) = \frac{\frac{\sqrt{\pi}}{2}}{\sqrt{\frac{3}{2}}} = \sqrt{\frac{\pi}{6}}$

46. (D) 1 0 1 0 1 . 1 1

$1\times 2^0 = 1$
$0\times 2^1 = 0$
$1\times 2^2 = 4$
$0\times 2^3 = 0$
$1\times 2^4 = 16$
21

$\frac{1}{2} = 1\times 2^{-1}$
$\frac{1}{4} = 1\times 2^{-2}$
$\frac{1}{2} + \frac{1}{4} = \frac{3}{4} = 0.75$

Hence $(10101.11)_2 = (21.75)_{10}$

47. (A) $I = \int \frac{1}{x(x^3-1)}\,dx$

$I = \int \frac{x^2}{x^3(x^3-1)}\,dx$

Let $x^3 = t$

$\Rightarrow 3x^2\,dx = dt \Rightarrow x^2\,dx = \frac{1}{3}dt$

$I = \int \frac{1}{3}\times\frac{dt}{t(t-1)}$

$I = \frac{1}{3}\int\left(\frac{1}{t-1}-\frac{1}{t}\right)dt$

$I = [\log(t-1) - \log t] + c$

$I = \frac{1}{3}\log\left(\frac{t-1}{t}\right) + c$

$I = \frac{1}{3}\log\left(\frac{x^3-1}{x^3}\right) + c$

48. (C) Let $y = \log_{10}(5x^2-7)$

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

$\frac{dy}{dx} = \frac{1}{5x^2-7} \times 5 \times 2x$

$\frac{dy}{dx} = \frac{10x}{5x^2-7}$

49. (B) $\frac{\cos 5x - 2\cos 4x + \cos 3x}{\sin 5x - \sin 3x}$

$\Rightarrow \frac{\cos 5x + \cos 3x - 2\cos 4x}{\sin 5x - \sin 3x}$

$\Rightarrow \frac{2\cos 4x.\cos x - 2\cos 4x}{2\cos 4x.\sin x}$

$\Rightarrow \frac{2\cos 4x(\cos x - 1)}{2\cos 4x.\sin x}$

$\Rightarrow \frac{-(1-\cos x)}{\sin x}$

$\Rightarrow \frac{-2\sin^2\frac{x}{2}}{2\sin\frac{x}{2}.\cos\frac{x}{2}} = -\tan\frac{x}{2}$

50. (A) **Statement I**

$n = 12$

The required sum $= \frac{n}{6}(n+1)(2n+1)$

$= \frac{12}{6}(12+1)(2\times12+1)$

$= 2\times13\times25 = 650$

Statement I is correct.

Statement II

$n = 7$

The required sum $= \left[\frac{n(n+1)}{2}\right]^2$

$= \left[\frac{7(7+1)}{2}\right]^2$

$= \left(\frac{7\times8}{2}\right)^2 = 784$

Statement II is incorrect.

51. (C) The required Probability $= \frac{4}{52} = \frac{1}{13}$

52. (D) $\lim_{x\to5}\frac{\sqrt{5x}-5}{\sqrt{2x-1}-3}$ $\left[\frac{0}{0}\right]$form

by L-Hospital's Rule

$\Rightarrow \lim_{x\to5}\frac{\frac{1}{2}(5x)^{-1/2}\times5-0}{\frac{1}{2}(2x-1)^{-1/2}\times2-0}$

$\Rightarrow \lim_{x\to5}\frac{\frac{5}{2}\times\frac{1}{\sqrt{5x}}}{\frac{1}{\sqrt{(2x-1)}}} \Rightarrow \lim_{x\to5}\frac{5\sqrt{2x-1}}{2\sqrt{5x}}$

$\Rightarrow \frac{5\sqrt{2\times5-1}}{2\sqrt{5\times5}} \Rightarrow \frac{5\times3}{2\times5} = \frac{3}{2}$

53. (C) Probability of Kapil's selection $P(k) = \frac{3}{4}$

and $P(\bar{k}) = 1-\frac{3}{4} = \frac{1}{4}$

Probability of Sumit's selection $P(s) = \frac{1}{3}$

$P(\bar{s}) = 1-\frac{1}{3} = \frac{2}{3}$

Probability of one of them is selected

$= \frac{3}{4}\times\frac{2}{3}+\frac{1}{4}\times\frac{1}{3}$

$= \frac{6}{12}+\frac{1}{12} = \frac{7}{12}$

54. (C)

55. (B) Let $\vec{x} = a\hat{i} + b\hat{j} + c\hat{k}$

Now, $(\vec{x}.\hat{i})\hat{i} = [(a\hat{i}+b\hat{j}+c\hat{k}.\hat{i}]\hat{i}$

$= [a]i = a\hat{i}$

Similarly $(\vec{y}.\hat{j})\hat{j} = b\hat{j}$

and $(\vec{z}.\hat{k})\hat{k} = z\hat{k}$

Now, $(x.\hat{i})\hat{i} + (\vec{x}.\hat{j})\hat{j} + (\hat{x}.\hat{k})\hat{k}$

$\Rightarrow a\hat{i} + b\hat{j} + c\hat{z} = \vec{x}$

56. (C) **Statement I**

For any three coplanar vectors $\vec{x}, \vec{y}$ and $\vec{z}$,

$(\vec{x} \times \vec{y}).\vec{z} = 0$

Statement I is correct.

Statement II

L.H.S = $\vec{x}.\{(\vec{y}+\vec{z})\times(\vec{x}+\vec{y}+\vec{z})\}$

$= \vec{x}.\{\vec{y}\times\vec{x}+\vec{y}\times\vec{y}+\vec{y}\times\vec{z}+\vec{z}\times\vec{x}+\vec{z}\times\vec{y}$
$+\vec{z}\times\vec{z}\}$

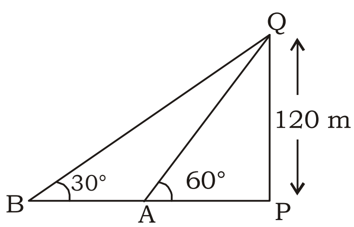
$= \vec{x}.\{\vec{y}\times\vec{x}+\vec{y}\times\vec{z}+\vec{z}\times\vec{x}-\vec{y}\times\vec{z}\}$

$= \vec{x}.(\vec{y}\times\vec{x})+\vec{x}(\vec{z}\times\vec{x})$

= 0 + 0 = 0 = R.H.S.

Statement II is correct.

57. (A)



In ΔAPQ:-

$\tan 60° = \frac{PQ}{AP}$

$\Rightarrow \sqrt{3} = \frac{120}{AP} \Rightarrow AP = \frac{120}{\sqrt{3}}$

In ΔBPQ:-

$\tan 30° = \frac{PQ}{BP}$

$\Rightarrow \frac{1}{\sqrt{3}} = \frac{120}{AB + AP}$

$\Rightarrow AB + AP = 120\sqrt{3}$

$\Rightarrow AB + \frac{120}{\sqrt{3}} = 120\sqrt{3}$

$\Rightarrow AB = 120\left(\sqrt{3} - \frac{1}{\sqrt{3}}\right) \Rightarrow AB = 80\sqrt{3}$

Distance between both trees = $80\sqrt{3}$ m

58. (B) Let $y = f(x) = \sqrt{x + \sqrt{x + \sqrt{x+, \ldots\infty}}}$

$\Rightarrow y = \sqrt{x+y}$

On squaring

$\Rightarrow y^2 = x + y$

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

$\Rightarrow 2y\frac{dy}{dx} = 1 + \frac{dy}{dx}$

$\Rightarrow (2y-1)\frac{dy}{dx} = 1$

$\Rightarrow \frac{dy}{dx} = \frac{1}{2y-1}$

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

59. (C) $\sin^2\frac{\pi}{5} + \sin^2\frac{2\pi}{5} + \sin^2\frac{3\pi}{5} + \sin^2\frac{4\pi}{5}$

$\Rightarrow \sin^2\frac{\pi}{5} + \sin^2\frac{2\pi}{5} + \sin^2\left(\pi - \frac{2\pi}{5}\right) +$
$\sin^2\left(\pi - \frac{\pi}{5}\right)$

$\Rightarrow \sin^2\frac{\pi}{5} + \sin^2\frac{2\pi}{5} + \sin^2\frac{2\pi}{5} + \sin^2\frac{\pi}{5}$

$\Rightarrow 2\left(\sin^2\frac{\pi}{5} + \sin^2\frac{2\pi}{5}\right)$

$\Rightarrow 2\left[\left(\frac{\sqrt{10-2\sqrt{5}}}{4}\right)^2 + \left(\frac{\sqrt{10+2\sqrt{5}}}{4}\right)^2\right]$

$\Rightarrow 2\left[\frac{10-2\sqrt{5}}{16} + \frac{10+2\sqrt{5}}{16}\right]$

$\Rightarrow 2 \times \frac{20}{16} = \frac{5}{2}$

60. (C) $\frac{(n+2)!+(n+1)(n-1)!}{(n+1)(n-1)!}$

$\Rightarrow \frac{(n+2)(n+1)n(n-1)!+(n+1)(n-1)!}{(n+1)(n-1)!}$

$\Rightarrow \frac{(n+1)(n-1)![(n+2)n+1]}{(n+1)(n-1)!}$

$\Rightarrow n^2 + 2n + 1 = (n+1)^2$

61. (B) $\int e^x\left[\frac{x^2+x+1}{(x+1)^2}\right]dx$

$\Rightarrow \int e^x\left[\frac{x(x+1)+1}{(x+1)^2}\right]dx$

$\Rightarrow \int e^x\left[\frac{x}{x+1} + \frac{1}{(x+1)^2}\right]dx$

$\Rightarrow e^x \times \frac{x}{x+1} + c \Rightarrow \frac{x.e^x}{x+1} + c$

62. (D) In ΔABC, $\frac{1}{b+c}+\frac{1}{a+b}=\frac{3}{a+b+c}$

$\Rightarrow \frac{a+b+b+c}{(b+c)(a+b)}=\frac{3}{a+b+c}$

$\Rightarrow \frac{a+2b+c}{(b+c)(a+b)}=\frac{3}{a+b+c}$

$\Rightarrow (a+2b+c)(a+b+c) = 3(b+c)(a+b)$

$\Rightarrow a^2+ab+ac+2ab+2b^2+2bc+ac+bc+c^2 = 3(ab+b^2+ca+bc)$

$\Rightarrow a^2+2b^2+c^2+3ab+2ac+3bc = 3ab+3b^2+3ca+3bc$

$\Rightarrow a^2+c^2-b^2 = ac$

$\Rightarrow \frac{a^2+c^2-b^2}{2ac}=\frac{1}{2}$

$\Rightarrow \cos B = \cos\frac{\pi}{3} \Rightarrow B = \frac{\pi}{3}$

63. (C) A leap year = 366 days
= 52 weeks and 2 days

The required Probability = $\frac{2}{7}$

64. (C) $\cos(\tan^{-1}x) = \cos\left[\cos^{-1}\left(\frac{1}{\sqrt{1+x^2}}\right)\right]$

$\cos(\tan^{-1}x) = \frac{1}{\sqrt{1+x^2}}$

65. (C) $\frac{1}{ab}, \frac{1}{bc}$ and $\frac{1}{ca}$ are in A.P., then

$\frac{2}{bc}=\frac{1}{ab}+\frac{1}{ca}$

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

Hence b, a and c are in A.P.

66. (B) $\sin^{-1}\left(\cos\left(\cos^{-1}\left(\sin\frac{7\pi}{4}\right)\right)\right)$

$\Rightarrow \sin^{-1}\left(\cos\left(\cos^{-1}\left(\sin\left(2\pi-\frac{\pi}{4}\right)\right)\right)\right)$

$\Rightarrow \sin^{-1}\left(\cos\left(\cos^{-1}\left(-\sin\frac{\pi}{4}\right)\right)\right)$

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

$\Rightarrow \sin^{-1}\left(\sin\left(-\frac{\pi}{4}\right)\right) \Rightarrow -\frac{\pi}{4}$

67. (D) Differential equation

$\frac{dy}{dx}+2xy = (\tan x)\, e^{-x^2}$

On comparing with general equation

P = $2x$ and Q = $(\tan x)\, e^{-x^2}$

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

I.F. = $e^{\int 2x\, dx}$

I.F. = e^{x^2}

Solution of the differential equation

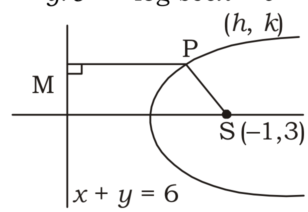
$y \times \text{I.F.} = \int Q \times \text{I.F.}\, dx$

$\Rightarrow y \times e^{x^2} = \int (\tan x) e^{-x^2} \times e^{x^2}\, dx$

$\Rightarrow y \times e^{x^2} = \int \tan x\, dx$

$\Rightarrow y.\, e^{x^2} = \log \sec x + c$

68. (C)



Now, PS = PM

$\Rightarrow \sqrt{(h+1)^2+(k-3)^2} = \frac{h+k-6}{\sqrt{1^2+1^2}}$

On squaring

$\Rightarrow h^2+1+2h+k^2+9-6h = \frac{h^2+k^2+36+2hk-12k-12h}{2}$

On solving

$\Rightarrow h^2+k^2-2hk+16h = 16$

Equation of parabola

$x^2+y^2-2xy+16x = 16$

69. (D) We know that

$(1+x)^n = C_0 + C_1x + C_2x^2 + \ldots\ldots + C_nx^n$

On putting $x = 1$

$\Rightarrow (1+1)^n = C_0 + C_1 + C_2 + \ldots\ldots + C_n$

Hence $C_0 + C_1 + C_2 + \ldots\ldots + C_n = 2^n$

70. (C) $y^{1/4} = x - \sqrt{1+x^2}$

$\Rightarrow y = \left(x-\sqrt{1+x^2}\right)^4$ ...(i)

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

$\Rightarrow \frac{dy}{dx} = 4\left(x-\sqrt{1+x^2}\right)^3\left[1-\frac{1\times 2x}{2\sqrt{1+x^2}}\right]$

$\Rightarrow y_1 = 4\left(x-\sqrt{1+x^2}\right)^3\left(\frac{\sqrt{1+x^2}-x}{\sqrt{1+x^2}}\right)$

$\Rightarrow y_1 = \frac{-4\left(x-\sqrt{1+x^2}\right)^4}{\sqrt{1+x^2}}$

$\Rightarrow \sqrt{1+x^2}\, y_1 = -4y$ ...(ii) [from eq(i)]

Again differentiating

$\Rightarrow \sqrt{1+x^2}\, y_2 + y_1 \times \frac{1}{2} \times \frac{1\times 2x}{\sqrt{1+x^2}} = -4y_1$

$\Rightarrow (1+x^2)y_2 + xy_1 = -4y_1\sqrt{1+x^2}$

$\Rightarrow (1+x^2)y_2 + xy_1 = -4 \times (-4y)$ [from eq(ii)]

$\Rightarrow (1+x^2)y_2 + xy_1 = 16y$

71. (B) Given that $a = 12,\ b = 20,\ c = 16$

Now, $\cos B = \dfrac{a^2 + c^2 - b^2}{2ac}$

$\Rightarrow \cos B = \dfrac{(12)^2 + (16)^2 - (20)^2}{2 \times 12 \times 16}$

$\Rightarrow \cos B = \dfrac{144 + 256 - 400}{2 \times 12 \times 16}$

$\Rightarrow \cos B = 0 \Rightarrow B = 90°$

Now, sinA = sin90 = 1

72. (C) $\dfrac{1 - 3\tan^2 A}{3\tan A - \tan^3 A}$

$\Rightarrow \dfrac{1 - 3\tan^2 \frac{17\pi}{4}}{3\tan\frac{17\pi}{4} - \tan^3 \frac{17\pi}{4}}$ $\left[\because A = \dfrac{17\pi}{4}\right]$

$\Rightarrow \dfrac{1 - 3\tan^2\left(4\pi + \frac{\pi}{4}\right)}{3\tan\left(4\pi + \frac{\pi}{4}\right) - \tan^3\left(4\pi + \frac{\pi}{4}\right)}$

$\Rightarrow \dfrac{1 - 3\tan^2 \frac{\pi}{4}}{3\tan\frac{\pi}{4} - \tan^3 \frac{\pi}{4}}$

$\Rightarrow \dfrac{1 - 3 \times 1}{3 \times 1 - 1^3} = \dfrac{-2}{2} = -1$

73. (B) Given that $X = \begin{bmatrix} -1 & 2 \\ 0 & -4 \end{bmatrix}$, $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ and

$B = \begin{bmatrix} 1 & -10 \\ -3 & 6 \end{bmatrix}$

Now, AX = B

$\Rightarrow \begin{bmatrix} a & b \\ c & d \end{bmatrix}\begin{bmatrix} -1 & 2 \\ 0 & -4 \end{bmatrix} = \begin{bmatrix} 1 & -10 \\ -3 & 6 \end{bmatrix}$

$\Rightarrow \begin{bmatrix} -a & 2a - 4b \\ -c & 2c - 4d \end{bmatrix} = \begin{bmatrix} 1 & -10 \\ -3 & 6 \end{bmatrix}$

On comparing

$-a = 1,\quad 2a - 4b = -10$

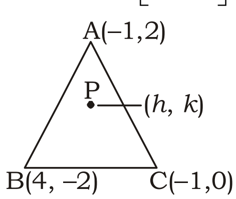
$\Rightarrow a = -1,\quad 2\times(-1) - 4b = -10 \Rightarrow b = 2$

$-c = -3,\quad 2c - 4d = 6$

$\Rightarrow c = 3,\quad 2\times 3 - 4d = 6 \Rightarrow d = 0$

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

74. (B)



Let P is circumcentre,

then AP = BP = CP

Now, AP = BP

$\Rightarrow \sqrt{(h+1)^2 + (k-2)^2} = \sqrt{(h-4)^2 + (k+2)^2}$

On squaring

$\Rightarrow h^2 + 1 + 2h + k^2 + 4 - 4k = h^2 + 16 - 8h + k^2 + 4 + 4k$

$\Rightarrow 10h - 8k = 15$ ...(i)

and AP = CP

$\Rightarrow \sqrt{(h+1)^2 + (k-2)^2} = \sqrt{(h+1)^2 + k^2}$

On squaring

$\Rightarrow h^2 + 1 + 2h + k^2 + 4 - 4k = h^2 + 1 + 2h + k^2$

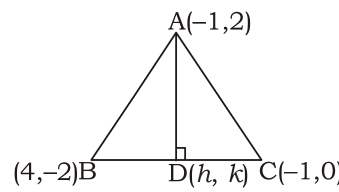
$\Rightarrow 4 - 4k = 0 \Rightarrow k = 1$ ...(ii)

from eq(i)

$10h - 8 = 15 \Rightarrow h = \dfrac{23}{10}$

Hence circumcentre $P = \left(\dfrac{23}{10}, 1\right)$

75. (B)



Let D(h, k)

Slope of BC $= \dfrac{0+2}{-1-4} = \dfrac{-2}{5}$

Slope of DC $= \dfrac{-k}{-1-h} = \dfrac{k}{1+h}$

Slope of AD $= \dfrac{k-2}{h+1}$

A.T.Q.

Slope of BC = Slope of DC

$\Rightarrow \dfrac{-2}{5} = \dfrac{k}{1+h}$

$\Rightarrow 2h + 5k = -2$ ...(i)

and (Slope of BC)×(Slope of AD) = –1

$\Rightarrow \dfrac{-2}{5} \times \dfrac{k-2}{h+1} = -1$

$\Rightarrow 5h - 2k = -9$ ...(ii)

On solving eq(i) and eq(ii)

$h = \dfrac{-49}{29},\ k = \dfrac{8}{29}$

Hence $H = \left(\dfrac{-49}{29}, \dfrac{8}{29}\right)$

76. (D) Centroid of $\Delta ABC = \left(\dfrac{-1+4-1}{3}, \dfrac{2-2+0}{3}\right)$

$= \left(\dfrac{2}{3}, 0\right)$

77. (B) $(A \cap B) \cup (B \cap C)$

78. (C) $S_n = n^2 + n - 7$

$S_{n-1} = (n-1)^2 + (n-1) - 7$

$S_{n-1} = n^2 - n - 7$

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

$\Rightarrow T_n = (n^2 + n - 7) - (n^2 - n - 7)$

$\Rightarrow T_n = 2n$

$\Rightarrow T_{21} = 2 \times 21 = 42$

79. (C) $\log_{10}\left(\frac{3}{4}\right) - \log_{10}\left(\frac{81}{32}\right) + \log_{10}\left(\frac{27}{8}\right)$

$\Rightarrow \log_{10}\left(\frac{\frac{3}{4} \times \frac{27}{8}}{\frac{81}{32}}\right)$

$\Rightarrow \log_{10}\left(\frac{81}{32} \times \frac{32}{81}\right) = \log_{10} 1 = 0$

80. (C)

81. (D) **Statement I**

We know that

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

Statement I is incorrect.

Statement II

We know that

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

$\Rightarrow \frac{\cos 2\alpha + 1}{2} + \frac{\cos 2\beta + 1}{2} + \frac{\cos 2\gamma + 1}{2} = 1$

$\Rightarrow \cos 2\alpha + 1 + \cos 2\beta + 1 + \cos 2\gamma + 1 = 2$

$\Rightarrow \cos 2\alpha + \cos 2\beta + \cos 2\gamma = -1$

Statement II is incorrect.

82. (D) $9! \times C(17, 9) = k.P(17, 8)$

$\Rightarrow 9! \times \frac{17!}{9!8!} = k \times \frac{17!}{9!}$

$\Rightarrow \frac{1}{8!} = k \times \frac{1}{9!}$

$\Rightarrow \frac{1}{8!} = \frac{k}{9 \times 8!} \Rightarrow k = 9$

83. (D) $A = \tan^{-1}3$ and $B = \tan^{-1}2$

We know that

$A + B + C = \pi$

$\Rightarrow \tan^{-1}3 + \tan^{-1}2 + c = \pi$

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

$\Rightarrow \tan^{-1}\left(\frac{5}{-5}\right) + c = \pi$

$= \frac{3\pi}{4} + c = \pi \Rightarrow c = \frac{\pi}{4}$

84. (B) A.T.Q

$a + 45d = 147$ ...(i)

$a + 146d = 46$ ...(ii)

On solving eq(i) and eq(ii)

$a = 192,\ d = -1$

Now, Let nth term is zero

$\Rightarrow a + (n-1)d = 0$

$\Rightarrow 192 + (n-1)\times(-1) = 0$

$\Rightarrow 192 = n - 1 \Rightarrow n = 193$

85. (B) $\log\left(a + \sqrt{1+a^2}\right) + \log\left(\frac{1}{a + \sqrt{1+a^2}}\right)$

$\Rightarrow \log\left(a + \sqrt{1+a^2}\right) - \log\left(a + \sqrt{1+a^2}\right)$

$\Rightarrow 0$

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

For option (C)

Let $\vec{c} = \frac{\hat{i} + \hat{j} - 4\hat{k}}{3\sqrt{2}}$

A.T.Q.

$\vec{a}.\vec{c} = \frac{3+1-4}{3\sqrt{2}} = 0$

and $\vec{b}.\vec{c} = \frac{4-4}{3\sqrt{2}} = 0$

The required unit vector $= \frac{\hat{i} + \hat{j} - 4\hat{k}}{3\sqrt{2}}$

87. (B) $A + B + C = \pi$

$\Rightarrow B = \pi - (A + C)$

Now, $\cos B = \cos A.\cos C$

$\Rightarrow \cos[\pi - (A + C)] = \cos A.\ \cos C$

$\Rightarrow -\cos(A + C) = \cos A.\cos C$

$\Rightarrow -\cos A.\cos C + \sin A.\sin C = \cos A.\cos C$

$\Rightarrow \sin A.\sin C = 2\cos A.\cos C$

$\Rightarrow \tan A.\tan C = 2$

88. (B) Differential equation

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

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

On integrating

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

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

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

$\Rightarrow \tan^{-1}\left(\frac{y-x}{1+xy}\right) = \tan^{-1}c$

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

$\Rightarrow y - x = c(1 + xy)$

89. (B) Given that $f(x) = |3x^2 - 2x - 47)$ and $g(x) = x^2$
Now, $fog(x) = f[g(x)]$
$\Rightarrow fog(x) = f(x^2)$
$\Rightarrow fog(x) = |3x^4 - 2x^2 - 47|$
$\Rightarrow fog(2) = |3\times2^4 - 2\times2^2 - 47|$
$\Rightarrow fog(2) = |48 - 8 - 47| = 7$

90. (B) $n(E) = {}^4C_2\times{}^3C_1\times{}^6C_0 + {}^4C_2\times{}^3C_0\times{}^6C_1 + {}^4C_3\times{}^3C_0\times{}^6C_0$
$n(E) = 6\times3\times1 + 6\times1\times6 + 4\times1\times1$
$n(E) = 18 + 36 + 4 = 58$
$n(S) = {}^{13}C_3 = 286$
The required Probability = $\frac{58}{286} = \frac{29}{143}$

91. (C) Equation
$lx^2 - mx + m = 0$
$\alpha + \beta = \frac{m}{l}$ and $\alpha.\beta = \frac{m}{l}$
Now, $\sqrt{\frac{\alpha}{\beta}} + \sqrt{\frac{\beta}{\alpha}} \Rightarrow \frac{\alpha+\beta}{\sqrt{\alpha\beta}}$
$\Rightarrow \frac{m/l}{\sqrt{m/l}} = \sqrt{\frac{m}{l}}$
Hence $\sqrt{\frac{\alpha}{\beta}} + \sqrt{\frac{\beta}{\alpha}} = \sqrt{\frac{m}{l}}$

92. (B) $I = \int_0^{\pi/2} \frac{\phi(x)}{\phi(x) + \phi\left(\frac{\pi}{2} - x\right)}\, dx$ ...(i)
Prop.IV $\int_0^a f(x)dx = \int_0^a f(a-x)dx$
$I = \int_0^{\pi/2} \frac{\phi\left(\frac{\pi}{2} - x\right)}{\phi\left(\frac{\pi}{2} - x\right) + \phi(x)}\, dx$ ...(ii)
from eq(i) and eq(ii)
$2I = \int_0^{\pi/2} \frac{\phi(x) + \phi\left(\frac{\pi}{2} - x\right)}{\phi(x) + \phi\left(\frac{\pi}{2} - x\right)}\, dx$
$2I = \int_0^{\pi/2} 1\, dx$
$2I = [x]_0^{\pi/2}$
$2I = \frac{\pi}{2} - 0 \Rightarrow I = \frac{\pi}{4}$

93. (C) In ΔABC, if $\angle C = 120°$, $c = \sqrt{6}$, $a = 2$
Sine Rule
$\frac{a}{\sin A} = \frac{b}{\sin b} = \frac{c}{\sin C}$
Now, $\frac{a}{\sin A} = \frac{c}{\sin c}$
$\Rightarrow \frac{2}{\sin A} = \frac{\sqrt{6}}{\sin 120}$
$\Rightarrow \frac{2}{\sin A} = \frac{\sqrt{6}}{\sqrt{3}/2}$
$\Rightarrow \sin A = \frac{1}{\sqrt{2}} \Rightarrow A = 45°$

94. (C) $\cot^{-1}(4\cot x) + \cot^{-1}\left(\frac{5 + 3\cos 2x}{3\sin x}\right)$
$\Rightarrow \cot^{-1}\left(\frac{4}{\tan x}\right) + \tan^{-1}\left(\frac{3\sin 2x}{5 + 3\cos 2x}\right)$
$\Rightarrow \tan^{-1}\left(\frac{\tan x}{4}\right) + \tan^{-1}\left(\frac{\frac{3\times 2\tan x}{1+\tan^2 x}}{5 + \frac{3(1-\tan^2 x)}{1+\tan^2 x}}\right)$
$\Rightarrow \tan^{-1}\left(\frac{\tan x}{4}\right) + \tan^{-1}\left(\frac{\frac{6\tan x}{1+\tan^2 x}}{\frac{8+2\tan^2 x}{1+\tan^2 x}}\right)$
$\Rightarrow \tan^{-1}\left[\frac{\frac{\tan x}{4} + \frac{3\tan x}{4+\tan^2 x}}{1 - \frac{\tan x}{4}\times\frac{3\tan x}{4+\tan^2 x}}\right]$
$\Rightarrow \tan^{-1}\left[\frac{4\tan x + \tan^3 x + 12\tan x}{16 + 4\tan^2 x - 3\tan^2 x}\right]$
$\Rightarrow \tan^{-1}\left[\frac{16\tan x + \tan^3 x}{16 + \tan^2 x}\right]$
$\Rightarrow \tan^{-1}\left[\frac{\tan x(16 + \tan^2 x)}{16 + \tan^2 x}\right]$
$\Rightarrow \tan^{-1}(\tan x) = x$

95. (B) Let $y = x^7 + 7^x$
On differentiating both side w.r.t.'x'
$\frac{dy}{dx} = 7x^6 + 7^x \log 7$

96. (C)

97. (B)

98. (C) $\begin{vmatrix} a+b & 1-c & c-a-b \\ b+c & 1-a & a-b-c \\ c+a & 1-b & b-a-c \end{vmatrix}$

$C_3 \to C_3 + C_1$

$\Rightarrow \begin{vmatrix} a+b & 1-c & c \\ b+c & 1-a & a \\ c+a & 1-b & b \end{vmatrix}$

$C_2 \to C_2 + C_3$

$\Rightarrow \begin{vmatrix} a+b & 1 & c \\ b+c & 1 & a \\ c+a & 1 & b \end{vmatrix}$

$C_1 \to C_1 + C_3$

$\Rightarrow \begin{vmatrix} a+b+c & 1 & c \\ a+b+c & 1 & a \\ a+b+c & 1 & b \end{vmatrix}$

$\Rightarrow (a+b+c) \begin{vmatrix} 1 & 1 & c \\ 1 & 1 & a \\ 1 & 1 & b \end{vmatrix}$

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

99. (C) $2a\sin^2\frac{B}{2} + 2b\sin^2\frac{A}{2} = 2a + 2b - 3c$

$\Rightarrow 2a + 2b - 2a\sin^2\frac{B}{2} - 2b\sin^2\frac{A}{2} = 3c$

$\Rightarrow a + a - 2a\sin^2\frac{B}{2} + b + b - 2b\sin^2\frac{A}{2} = 3c$

$\Rightarrow a + a\left(1 - 2\sin^2\frac{B}{2}\right) + b + b\left(1 - 2\sin^2\frac{A}{2}\right) = 3c$

$\Rightarrow a + a\cos B + b + b\cos A = 3c$

$\Rightarrow a + a \times \frac{a^2+c^2-b^2}{2ac} + b + b \times \frac{b^2+c^2-a^2}{2bc} = 3c$

$\Rightarrow a + \frac{a^2+c^2-b^2}{2c} + b + \frac{b^2+c^2-a^2}{2c} = 3c$

$\Rightarrow a + b + \frac{2c^2}{2c} = 3c$

$\Rightarrow a + b + c = 3c$

$\Rightarrow a + b = 2c$

Hence a, c and b are in A.P.

100. (B) Line $\frac{3x-1}{-4} = \frac{y-1}{4} = \frac{z-2}{2}$

$\Rightarrow \frac{x - \frac{1}{3}}{-\frac{4}{3}} = \frac{y-1}{4} = \frac{z-1}{2}$

Direction cosines

$\left\langle \frac{-4/3}{\sqrt{\left(\frac{-4}{3}\right)^2 + 4^2 + 2^2}}, \frac{4}{\sqrt{\left(\frac{-4}{3}\right)^2 + 4^2 + 2^2}}, \frac{2}{\sqrt{\left(\frac{-4}{3}\right)^2 + 4^2 + 2^2}} \right\rangle$

$\Rightarrow \left\langle \frac{-4/3}{14/3}, \frac{4}{14/3}, \frac{2}{14/3} \right\rangle$

$\Rightarrow \left\langle \frac{-2}{7}, \frac{6}{7}, \frac{3}{7} \right\rangle$

101. (D) In ΔABC, $a = 13$ cm, $b = 12$ cm and $\angle C = 150°$

Area of $\Delta ABC = \frac{1}{2}ab\sin C$

$= \frac{1}{2} \times 13 \times 12 \sin 150$

$= 13 \times 6 \times \frac{1}{2} = 39\text{cm}^2$

102. (B) $\frac{\log_3 4 \times \log_{16} 2 \times \log_4 9}{\log_2 8 \times \log_8 9 \times \log_9 16}$

$\Rightarrow \frac{\log_3 2^2 \times \log_{2^4} 2 \times \log_{2^2} 3^2}{\log_2 2^3 \times \log_{2^3} 3^2 \times \log_{3^2} 2^4}$

$\Rightarrow \frac{2\log_3 2 \times \frac{1}{4}\log_2 2 \times \frac{2}{2}\log_2 3}{3\log_2 2 \times \frac{2}{3}\log_2 3 \times \frac{4}{2}\log_3 2}$

$\Rightarrow \frac{\frac{1}{2}}{4} = \frac{1}{8}$

103. (A) $\lim_{x\to\infty} \frac{x^3 - 2x^2 + 3x + 1}{1 - 2x + 6x^2 - 4x^3}$

$\Rightarrow \lim_{x\to\infty} \frac{x^3\left(1 - \frac{2}{x} + \frac{3}{x^2} + \frac{1}{x^3}\right)}{x^3\left(\frac{1}{x^3} - \frac{2}{x^2} + \frac{6}{x} - 4\right)}$

$\Rightarrow \frac{1-0+0+0}{0-0+0-4} = \frac{-1}{4}$

104. (C) foci$(\pm ae, 0) = (\pm 2, 0)$ and $e = \frac{1}{\sqrt{2}}$

here, $ae = 2$

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

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

$\Rightarrow b^2 = 8\left(1 - \frac{1}{2}\right)$

$\Rightarrow b^2 = 8 \times \frac{1}{2} \Rightarrow b^2 = 4$

Equation of ellipse

$\frac{x^2}{8} + \frac{y^2}{4} = 1$

$\Rightarrow x^2 + 2y^2 = 8$

105. (D) Sphere $4x^2 + 4y^2 + 4z^2 - 8x - 10z = 20$

$$\Rightarrow x^2 + y^2 + z^2 - 2x - \frac{5}{2}z - 5 = 0$$

here, $u = -1$, $v = 0$, $w = \frac{-5}{4}$, $d = -5$

$$\text{radius}(r) = \sqrt{u^2 + v^2 + w^2 - d}$$

$$r = \sqrt{1 + 0 + \frac{25}{16} + 5}$$

$$r = \sqrt{\frac{121}{16}} = \frac{11}{4}$$

106. (C) Given that $f(x) = \sqrt{64 - x^2} \Rightarrow f'(x) = \frac{-x}{\sqrt{64 - x^2}}$

Now, $\lim\limits_{x \to 4} \frac{f(x) - f(4)}{x - 4}$ $\left[\frac{0}{0}\right]$ Form

by L-Hospital's Rule

$$\Rightarrow \lim_{x \to 4} \frac{f'(x) - 0}{1}$$

$$\Rightarrow \lim_{x \to 4} \frac{-x}{\sqrt{64 - x^2}}$$

$$\Rightarrow \frac{-4}{\sqrt{64 - 16}}$$

$$\Rightarrow \frac{-4}{\sqrt{48}} = \frac{-1}{\sqrt{3}}$$

107. (B) $f(x) = x^{1/3}(3 - 4x)$

$$f'(x) = x^{1/3}(-4) + (3 - 4x) \times \frac{1}{3} x^{-2/3}$$

$$f'(x) = -4x^{1/3} + \frac{3 - 4x}{3x^{2/3}}$$

$$f'(x) = \frac{-12x + 3 - 4x}{3x^{2/3}}$$

$$f'(x) = \frac{3 - 16x}{3x^{2/3}}$$

For critical points

$f'(x) = 0$

$$\Rightarrow \frac{3 - 16x}{3x^{2/3}} = 0 \Rightarrow x = \frac{3}{16}$$

108. (C) $x\sqrt{1 + y^2} + y\sqrt{1 + x^2} = 0$

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

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

$$y \times \frac{1 \times 2x}{2\sqrt{1 + x^2}} + \sqrt{1 + x^2}\ \frac{dy}{dx} = 0$$

$$\Rightarrow \frac{xy}{\sqrt{1 + y^2}}\frac{dy}{dx} + \sqrt{1 + y^2} + \frac{xy}{\sqrt{1 + x^2}} + \sqrt{1 + x^2}\ \frac{dy}{dx} = 0$$

$$\Rightarrow \frac{-x^2}{\sqrt{1 + x^2}}\frac{dy}{dx} + \sqrt{1 + y^2} + \frac{-y^2}{\sqrt{1 + y^2}} + \sqrt{1 + x^2}\ \frac{dy}{dx} = 0$$

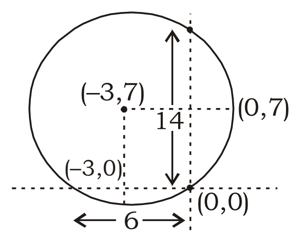
$$\Rightarrow \frac{dy}{dx}\left[\sqrt{1 + x^2} - \frac{x^2}{\sqrt{1 + x^2}}\right] = \frac{y^2}{\sqrt{1 + y^2}} - \sqrt{1 + y^2}$$

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

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

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

109. (C)



Intercepts on x-axis and y-axis = 6 units and 14 units

110. (A) $8 \tan\theta + 15 = 0$, where $\frac{\pi}{2} < \theta < \pi$

$$\Rightarrow \tan\theta = \frac{-15}{8}$$

here, $\sin\theta = \frac{15}{17}$, $\cos\theta = \frac{-8}{17}$, $\cot\theta = \frac{-8}{15}$

Now, $3\cot\theta - 4\cos\theta + \sin\theta$

$$\Rightarrow 3\left(\frac{-8}{15}\right) - 4\left(\frac{-8}{17}\right) + \frac{15}{17}$$

$$\Rightarrow \frac{-8}{5} + \frac{32}{17} + \frac{15}{17}$$

$$\Rightarrow \frac{-8}{5} + \frac{47}{17}$$

$$\Rightarrow \frac{-136 + 235}{85} = \frac{99}{85}$$

111. (B) $\sec 2040 = \sec(360 \times 6 - 120)$

$\Rightarrow \sec 2040 = \sec 120$

$\Rightarrow \sec 2040 = \sec(90 + 30)$

$$\Rightarrow \sec 2040 = -\sec 30 = \frac{-2}{\sqrt{3}}$$

112. (C) $y = (1+x^2)\tan^{-1}x - x$

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

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

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

$$\frac{dy}{dx} = 2x.\tan^{-1}x$$

113. (C) $I = \int e^{x-\frac{1}{x}}\left(1+\frac{1}{x^2}\right)dx$

Let $x - \frac{1}{x} = t$

$$\Rightarrow \left(1+\frac{1}{x^2}\right)dx = dt$$

$$I = \int e^t\,dt$$

$$I = e^t + c$$

$$I = e^{x-\frac{1}{x}} + c$$

114. (D) $\frac{1}{\cos 615} + \frac{\sqrt{3}}{\sin 525}$

$$\Rightarrow \frac{1}{\cos(720-105)} + \frac{\sqrt{3}}{\sin(360+165)}$$

$$\Rightarrow \frac{1}{\cos 105} + \frac{\sqrt{3}}{\sin 165}$$

$$\Rightarrow \frac{1}{\cos(90+15)} + \frac{\sqrt{3}}{\sin(180+15)}$$

$$\Rightarrow \frac{1}{-\sin 15} + \frac{\sqrt{3}}{\sin 15}$$

$$\Rightarrow \frac{\sqrt{3}-1}{\sin 15}$$

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

115. (D) Given that $\vec{a} = -3\hat{i} + 2\hat{j} + \hat{k}$ and $\vec{b} = \hat{i} + \hat{j} - 2\hat{k}$

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

$$\Rightarrow \vec{b} + 2\vec{a} = -5\hat{i} + 5\hat{j}$$

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

$$\Rightarrow 2\vec{a} - 3\vec{b} = -9\hat{i} + \hat{j} + 8\hat{k}$$

Now, $(\vec{b} + 2\vec{a}).(2\vec{a} - 3\vec{b}) = -5\times(-9) + 5\times 1 + 0$

$= 46 + 5 = 50$

116. (A) $\sec^{-1}(-2) = \sec^{-1}\left(-\sec\frac{\pi}{3}\right)$

$$\Rightarrow \sec^{-1}(-2) = \sec^{-1}\left[\sec\left(\pi - \frac{\pi}{3}\right)\right]$$

$$\Rightarrow \sec^{-1}(-2) = \sec^{-1}\left(\sec\frac{2\pi}{3}\right) = \frac{2\pi}{3}$$

117. (B) $f(x) = \begin{cases} ax^2 - 6, & x < 1 \\ x + 7, & x \ge 1 \end{cases}$ is continuous at $x = 1$,

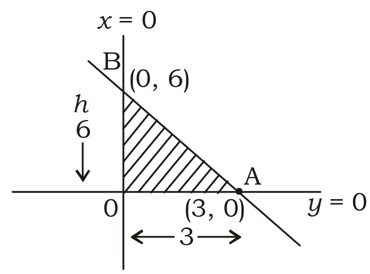
then $\lim_{x\to 1^-} f(x) = f(1)$

$$\Rightarrow \lim_{x\to 1} ax^2 - 6 = 1 + 7$$

$$\Rightarrow a - 6 = 8 \Rightarrow a = 14$$

118. (C)

119. (A)



The required area $= \frac{1}{2}\times OA\times OB$

$= \frac{1}{2}\times 3\times 6 = 9$ sq.unit

120. (B) $I = \int_{-1}^{1} x^2.e^x\,dx$

$$I = 2\int_0^1 x^2.e^x\,dx$$

$$I = 2\left[x^2\int e^x dx - \int\left\{\frac{d}{dx}(x^2).\int e^x dx\right\}dx\right]_0^1$$

$$I = 2\left[x^2.e^x - \int 2x.e^x dx\right]_0^1$$

$$I = 2\left[x^2.e^x - 2\left\{x.e^x - \int 1.e^x dx\right\}\right]_0^1$$

$$I = \left[x^2.e^x - 2x.e^x + 2e^x\right]_0^1$$

$I = [(1.e^1 - 2.1.e^1 + 2e^1) - (0 - 0 + 2e^0)]$

$I = 2[e - 2e + 2e - 2)$

$I = 2e - 4$

NDA (MATHS) MOCK TEST - 154 (Answer Key)

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

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