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# NDA MATHS MOCK TEST - 74 (SOLUTION)

1. (C) Equation of the line AB

$$\frac{2x-1}{\sqrt{3}} = \frac{y+2}{2} = \frac{z-3}{3}$$

$$\frac{x-\frac{1}{2}}{\frac{\sqrt{3}}{2}} = \frac{y+2}{2} = \frac{z-3}{3}$$

direction cosines of a line parallel to AB

$$= \left[\frac{\sqrt{3}}{2\sqrt{\left(\frac{\sqrt{3}}{2}\right)^2+(2)^2+(3)^2}}, \frac{2}{\sqrt{\left(\frac{\sqrt{3}}{2}\right)^2+(2)^2+(3)^2}}, \frac{3}{\sqrt{\left(\frac{\sqrt{3}}{2}\right)^2+(2)^2+(3)^2}}\right]$$

$$= \left(\frac{\sqrt{3}}{\sqrt{55}}, \frac{4}{\sqrt{55}}, \frac{6}{\sqrt{55}}\right)$$

2. (A) Given that

$U = \{1, 2, 3, 4, 5, 6, 7\}$, $A = \{2, 4, 6\}$

$B = \{3, 5\}$ and $C = \{1, 2, 4, 7\}$

$(B \cap C) = \phi$

$A - (B \cap C) = \{2, 4, 6\} - \phi$

$= \{2, 4, 6\}$

3. (C) Given that

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

$x^2 - 1 \neq 0$

$x^2 \neq 1$

$x \neq -1, 1$

then domain of the function = $R - \{-1, 1\}$

4. (B) Given that

| Class | $x_i$ | $f_i$ | $f_i \times x_i$ | $d_i = \lvert x_i - A \rvert$ | $f_i \times d_i$ |
|---|---|---|---|---|---|
| 10-20 | 15 | 2 | 30 | 30 | 60 |
| 20-30 | 25 | 3 | 75 | 20 | 60 |
| 30-40 | 35 | 8 | 280 | 10 | 80 |
| 40-50 | 45 | 14 | 630 | 0 | 0 |
| 50-60 | 55 | 8 | 440 | 10 | 80 |
| 60-70 | 65 | 3 | 195 | 20 | 60 |
| 70-80 | 75 | 2 | 150 | 30 | 60 |
| | | $\Sigma f_i = 40$ | $\Sigma f_i \times x_i = 1800$ | | $\Sigma f_i \times d_i = 400$ |

$$A = \frac{\Sigma f_i \times x_i}{\Sigma f_i} = \frac{1800}{40} = 45$$

$$\text{Mean deviation} = \frac{\Sigma f_i \times d_i}{\Sigma f_i}$$

$$= \frac{400}{40} = 10$$

5. (A) One card is drawn from a well shuffled deck of 52 cards.

total sample space $n(S) = 52$

four ace in the deck of 52 cards

$n(E) = 4$

Probability that the card drawn is an ace

$$P(E) = \frac{n(E)}{n(S)} = \frac{4}{52} = \frac{1}{13}$$

then probability that the card drawn is not ace

$$P(\overline{E}) = 1 - \frac{1}{13} = \frac{12}{13}$$

6. (A) $S = \{(H, 1), (H, 2), (H, 3), (H, 4), (H, 5), (H, 6), (T, H), (T, T)\}$, $n(S) = 8$

$E = (T, H)$, $n(E) = 1$

Probability of getting one tail

$$P(E) = \frac{1}{8}$$

7. (D) Let $f(x) = \frac{x}{[x]}$

$$\text{L.H.L.} = \lim_{x \to 2^-} f(x) = \lim_{h \to 0} f(2-h)$$

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

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

$= 2$

$$\text{R.H.L.} = \lim_{x \to 2^+} f(x) = \lim_{h \to 0} f(2+h)$$

$$= \lim_{h \to 0} \frac{2+h}{[2+h]}$$

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

$= 1$

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

Hence limit doest not exist.

8. (D) $\lim_{x \to 0} \frac{x.5^x - x}{1 - \cos x}$ $\left(\frac{0}{0}\right)$ Form

by L-hospital's Rule

$$= \lim_{x \to 0} \frac{x.5^x \log 5 + 5^x.1 - 1}{0 + \sin x}$$

$= \lim_{x\to 0} \frac{(\log 5)\, x.5^x + 5^x - 1}{\sin x}$ $\left(\frac{0}{0}\right)$ Form

again by L-Hospital's Rule

$= \lim_{x\to 0} \frac{(\log 5)\{x.5^x \log 5 + 5^x.1\} + 5^x.\log 5 - 0}{\cos x}$

$= \frac{(\log 5)\{0 + 5^0\} + 5^o.\log 5}{\cos 0}$

$= \frac{\log 5 + \log 5}{1}$

= 2 log5

9. (C) Points $A(1, 3, 4)$, $B(-1, 6, 10)$, $C(-7, 4, 7)$ and D $(-5, 1, 1)$

AB = $\sqrt{(-2)^2 + (3)^2 + (6)^2} = \sqrt{4+9+36} = 7$

BC = $\sqrt{(-6)^2 + (-2)^2 + (-3)^2} = \sqrt{36+4+9} = 7$

CD = $\sqrt{(2)^2 + (-3)^2 + (-6)^2} = \sqrt{4+9+36} = 7$

DA = $\sqrt{(6)^2 + (2)^2 + (3)^2} = \sqrt{36+4+9} = 7$

AB = BC = CD = DA

then

these points are vertices of a Rhombus.

10. (D) Differential equation

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

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

On comparing with general equation

$\frac{dy}{dx} + Py = Q$

$P = \frac{-2x}{1-x^2}$, $Q = \frac{1}{1-x^2}$

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

$= e^{\int \frac{-2x}{1-x^2}dx}$

$= e^{\log(1-x^2)} = (1 - x^2)$

Solution of the differential equation

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

$y \times (1 - x^2) = \int \frac{1}{1-x^2} \times (1 - x^2)dx + c$

$y \times (1 - x^2) = \int 1.dx + c$

$y(1 - x^2) = x + c$

11. (B) degree = 2

12. (D) Let $a + ib = \sqrt{1+\sqrt{3}i}$

On squaring both side

$(a^2 - b^2) + i(2ab) = 1 + \sqrt{3}\, i$

On comparing

$a^2 - b^2 = 1$ and $2ab = \sqrt{3}$ ...(i)

$(a^2 + b^2)^2 - 4a^2b^2 = 1$

$(a^2 + b^2)^2 - 3 = 1$ $[\because 2ab = \sqrt{3}]$

$(a^2 + b^2)^2 = 4$

$a^2 + b^2 = 2$ ...(ii)

from equation (i) and equation (ii)

$a = \pm\sqrt{\frac{3}{2}}$ and $b = \pm\sqrt{\frac{1}{2}}$

then square root of $(1 + \sqrt{3}\, i) = \pm\left(\frac{\sqrt{3}+i}{\sqrt{2}}\right)$

13. (B) $\begin{vmatrix} a^2 & a^2 & b^2+c^2 \\ b^2 & c^2+a^2 & b^2 \\ a^2+b^2 & c^2 & c^2 \end{vmatrix}$

$\Rightarrow a^2(c^4 + a^2c^2 - b^2c^2) - a^2(b^2c^2 - a^2c^2 - b^4) + (b^2 + c^2)(b^2c^2 - a^2c^2 - a^4 - b^2c^2 - a^2b^2)$

On solving

$\Rightarrow -4a^2b^2c^2$

14. (B) $\begin{vmatrix} \sin^2\theta & \cos^2\theta & 1 \\ -\sec^2\theta & \tan^2\theta & -1 \\ -30 & 32 & 2 \end{vmatrix}$

$C_3 \to C_3 - C_2$

$= \begin{vmatrix} \sin^2\theta & \cos^2\theta & 1-\cos^2\theta \\ -\sec^2\theta & \tan^2\theta & -1-\tan^2\theta \\ -30 & 32 & -30 \end{vmatrix}$

$= \begin{vmatrix} \sin^2\theta & \cos^2\theta & \sin^2\theta \\ -\sec^2\theta & \tan^2\theta & -\sec^2\theta \\ -30 & 32 & -30 \end{vmatrix}$

$= 0$ $[\because C_1$ and $C_3$ are same$]$

15. (B) $f(x) = \begin{vmatrix} \cos x & 0 & \sin x \\ 0 & 1 & 0 \\ -\sin x & 0 & \cos x \end{vmatrix}$

$f(x) = \cos x(\cos x - 0) - 0 + \sin x(0 + \sin x)$

$= \cos^2 x + \sin^2 x$

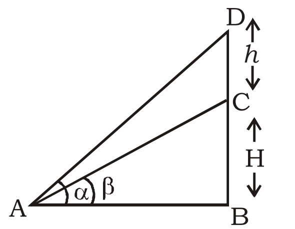
$f(x) = 1$

$f(y) = 1$

$f(x + y) = 1$

then $f(x + y) = f(x).\ f(y)$

16. (D)




Given that

Height of flag staff (CD) = $h$

Let height of tower (BC) = H

In $\Delta$ABC

$\tan \beta = \frac{BC}{AB} = \frac{H}{AB}$ ...(i)

In $\Delta$ABD

$\tan \alpha = \frac{BD}{AB} = \frac{H+h}{AB}$ ...(ii)

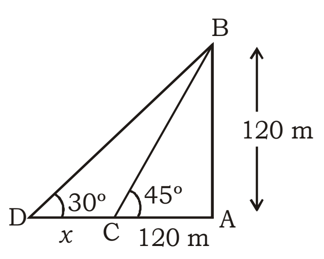
From equation (i) and (ii)

$\frac{\tan\beta}{\tan\alpha} = \frac{H}{H+h}$

$H \tan \beta + h \tan \beta = H \tan \alpha$

$H = \frac{h\tan\beta}{\tan\alpha - \tan\beta}$

17. (C) Let the distance between two house = $x$ $m$




In $\Delta$ABC

$\tan 45^\circ = \frac{AB}{AC}$

$1 = \frac{120}{AC}$

AC = 120

In $\Delta$ABD

$\tan 30^\circ = \frac{AB}{AD}$

$\frac{1}{\sqrt{3}} = \frac{120}{x+120}$

$x = 120\ (\sqrt{3}-1)m$

distance between two houses = $120\ (\sqrt{3}-1)m$

18. (A) Given that $x + y = 15$

Let $P = xy^2$ ...(i)

$P = x(15 - x)^2$

$P = 225x + x^3 - 30x^2$

differentiate both side w.r.t. '$x$'

$\frac{dP}{dx} = 225 + 3x^2 - 60x$

again differentiate both side w.r.t. '$x$'

$\frac{d^2P}{dx^2} = 6x - 60$ ...(ii)

For maxima and minima

$\frac{dP}{dx} = 0$

$3x^2 - 60x + 225 = 0$

$(x - 15)(x - 5) = 0$

$x = 5, 15$ and $y = 10, 0$

on putting $x = 5$ in equation (ii)

$\left(\frac{d^2P}{dx^2}\right)_{at\, x=5} = 6 \times 5 - 60 = -30$ (maxima)

on putting $x = 15$ in equation (ii)

$\left(\frac{d^2P}{dx^2}\right)_{at\, x=15} = 15 \times 6 - 60 = 30$ (minima)

minimum value of P(at $x = 15$, $y = 0$) = 0

19. (B) Given that diameter of sphere = D

radius of sphere $r = \frac{D}{2}$

then surface area $S = 4\pi r^2$

$S = 4\pi \times \left(\frac{D}{2}\right)^2$

$S = \pi D^2$

$\frac{dS}{at} = \pi \times 2D \times \frac{dD}{dt}$ ...(i) and volume $V = \frac{4}{3}\pi r^3$

$$V = \frac{4}{3}\pi\left(\frac{D}{2}\right)^3$$

$$V = \frac{\pi D^3}{6}$$

$$\frac{dV}{dt} = \frac{\pi}{6} \times 3D^2 \frac{dD}{dt} \quad \text{...(ii)}$$

from equation (i) and equation (ii)

$$\frac{dV}{dt} = \frac{1}{4}D\frac{dS}{dt}$$

20. (B) $I = \int \frac{1}{(x^2 - a^2)}dx$

$$I = \int \frac{1}{(x-a)(x+a)}dx$$

$$= \frac{1}{2a}\int\left[\frac{1}{x-a} - \frac{1}{x+a}\right]dx$$

$$I = \frac{1}{2a}[\log(x-a) - \log(x+a)] + C$$

$$I = \frac{1}{2a}\log\left[\frac{x-a}{x+a}\right] + C$$

21. (D) Given that,

A = {1, 2} and B = {1, 3, 4}

then $(A \cap B) = \{1\}$ and $(A \cup B) = \{1, 2, 3, 4\}$

$[(A \cap B) \times (A \cup B)] = [\{1\} \times \{1, 2, 3, 4\}]$

$[(A \cap B) \times (A \cup B)] = [(1, 1), (1, 2), (1, 3), (1, 4)]$

22. (A) E is universal set and $A = B \cap C$

then $E - (E - (E - A))$

$\Rightarrow E - (E - A')$ $[\because E - A = A']$

$\Rightarrow E - A$

$\Rightarrow A'$

$\Rightarrow (B \cap C)' = (B' \cup C')$

23. (A) Given that

$g(x) = 4x + 7$

Let $g(x) = y$

$y = 4x + 7$

$$x = \frac{y-7}{4}$$

$$g^{-1}(y) = \frac{y-7}{4}$$

$$g^{-1}(x) = \frac{x-7}{4}$$

24. (A) We know that

$$\frac{-1+\sqrt{3}i}{2} = \omega \text{ and } \frac{-1-\sqrt{3}i}{2} = \omega^2$$

then $\left(\frac{1-\sqrt{3}i}{2}\right)^{36} - \left(\frac{-1-\sqrt{3}i}{2}\right)^{36}$

$= (-\omega)^{36} - (\omega^2)^{36}$

$= (\omega^3)^{12} - (\omega^3)^{24}$

$= 1 - 1$

$= 0$

25. (A) Let $z = \sqrt{2}\, i + \sqrt{-2}\, i$

$z = \sqrt{2}\, i + i\sqrt{2} \times i$

$z = \sqrt{2}\,(i - 1)$

modulus of $z = |z| = \left|\sqrt{2}\,(i-1)\right|$

$= \sqrt{2}\,\sqrt{1+1}$

$|z| = 2$

26. (C) Statement (S):-

We know that

$$\frac{-1+\sqrt{3}i}{2} = \omega \text{ and } \frac{-1-\sqrt{3}i}{2} = \omega^2$$

then $\left(\frac{-1-\sqrt{3}i}{2}\right)^{30} - \left(\frac{-1-\sqrt{3}i}{2}\right)^{30}$

$\Rightarrow (\omega)^{30} - (\omega^2)^{30}$

$\Rightarrow 1 - 1$

$\Rightarrow 0$

Statement is true.

Reason (R) is false because $\omega^3 = 1$

27. (C) $n!$, $2 \times n!$, $(n + 1)!$ are in A.P.

then $2 \times 2 \times n! = n! + (n + 1)!$ $[\because 2b = a + c]$

$4 \times n! = n! + (n + 1)!$

$4 \times n! = n! + (n + 1)n!$

$n = 2$

28. (B) Let three terms of G.P.

$a, ar, ar^2$

according to question

$$a = \frac{1}{3}(ar + ar^2)$$

$3 = r + r^2$

$r^2 + r - 3 = 0$

$$\text{then } r = \frac{-1 \pm \sqrt{(-1)^2 - 4 \times 1 \times (-3)}}{2 \times 1}$$

$$r = \frac{-1 \pm \sqrt{13}}{2}$$

positive term $r = \frac{\sqrt{13} - 1}{2}$

29. (D) Two dice are thrown together

$n(S) = 6 \times 6 = 36$

the difference of the numbers appearing on them is 2.

$E = \{(1, 3), (3, 1), (2, 4), (4, 2), (3, 5), (5, 3), (4, 6), 6, 4\}$

$n(E) = 8$

$P(E) = \frac{n(E)}{n(S)} = \frac{8}{36} = \frac{2}{9}$

30. (C) Given that

$x = (1011)_2$ and $y = (100)_2$

1011

$1 \times 2^0 = 1$
$1 \times 2^1 = 2$
$0 \times 2^2 = 0$
$1 \times 2^3 = 8$
11

$x = (1011)_2 = (11)_{10}$

100

$0 \times 2^0 = 0$
$0 \times 2^1 = 0$
$0 \times 2^2 = 4$
4

$y = (100)_2 = (4)_{10}$

$x^2 - y^2 = (11)^2 - (4)^2$

$= 121 - 16$

$= (105)_{10}$

| | | |
|---|---|---|
| 2 | 105 | |
| 2 | 52 | 1 |
| 2 | 26 | 0 |
| 2 | 13 | 0 |
| 2 | 6 | 1 |
| 2 | 3 | 0 |
| 2 | 1 | 1 |
| | 0 | 1 |

$x^2 - y^2 = (105)_{10} = 1101001$

31. (C) Vectors $6\hat{i} + 2\hat{j}$, $3\hat{i} - 4\hat{j}$ and $2\hat{i} - \lambda\hat{j}$ are collinear.

then $\begin{vmatrix} 6 & 2 & 1 \\ 3 & -4 & 1 \\ 2 & -\lambda & 1 \end{vmatrix} = 0$

$6(-4 + \lambda) - 2(3 - 2) + 1(-3\lambda + 8) = 0$

$3\lambda - 18 = 0$

$\lambda = 6$

32. (B) $3^{2-\log_3 4+\log_3 2}$

$\Rightarrow 3^2 \times 3^{-\log_3 4} \times 3^{\log_3 2}$

$= 9 \times 3^{\log_3 \frac{1}{4}} \times 3^{\log_3 2}$

$= 9 \times \frac{1}{4} \times 2$

$= \frac{9}{2}$

33. (A) Given = {1, 2, 3, 4, 5, 6}

4 digit number less than 2000.

| 1 | 6 | 6 | 6 | = 1 × 6 × 6 ×6 = 216

Only (1) can put here.

number of 4 digit numbers each less than 2000 = 216

34. (A) $^nC_{32} = {}^nC_5$

$n = 32 + 5$

$= 37$ [$\because$ $^nC_r = {}^nC_s$ then $n = r + s$]

35. (B) {0, 1, 2, 3, 4, 5, 6}

3 digit numbers formed by using the digits when repetition is not allowed.

| 6 | 6 | 5 | = 6 × 6 × 5 = 180

'0' can not put here.

number of 3 digit numbers = 180

36. (D)

| Age | Person (*f*) | C |
|---|---|---|
| 0-10 | 6 | 6 |
| 10-20 | 7 | 13 |
| 20-30 | 10 | 23 |
| **30-40** | **12** | **35** |
| 40-50 | 18 | 53 |
| 50-60 | 7 | 60 |

$\frac{n}{2} = \frac{60}{2} = 30$

$l_1 = 30$, $l_2 = 40$

$f = 12$, $C = 23$

$\text{Median} = l_1 + \frac{\frac{n}{2} - C}{f} \times (l_2 - l_1)$

$= 30 + \frac{30 - 23}{12} \times (40 - 30)$

$= 30 + \frac{7}{12} \times 10$

$= 30 + \frac{35}{6}$

$\text{Median} = \frac{215}{6}$

37. (A)

| class | $x$ | $f$ | $f \times x$ |
|---|---|---|---|
| 0-4 | 2 | 9 | 18 |
| 4-8 | 6 | 6 | 36 |
| 8-12 | 10 | 8 | 80 |
| 12-16 | 14 | 2 | 28 |
| 16-20 | 18 | 5 | 90 |
| | | $\Sigma f = 30$ | $\Sigma f \times x = 252$ |

Mean = $\dfrac{\Sigma f \times x}{\Sigma f}$

$= \dfrac{252}{30}$

$= 8.4$

38. (C) Conic

$4x^2 - 16y^2 + 24x + 64y = 4$

$4x^2 + 24x - 16y^2 + 64y = 4$

$4(x+3)^2 - 16(y-2)^2 = -24$

$$\frac{(x+3)^2}{6} - \frac{(y-2)^2}{\frac{3}{2}} = -1$$

$a^2 = 6,\ b^2 = \dfrac{3}{2}$

then

$e^2 = 1 + \dfrac{a^2}{b^2}$

$e^2 = 1 + \dfrac{6 \times 2}{3}$

$e^2 = 5$

eccentricity $e = \sqrt{5}$

39. (A) Let locus of a point = $(h, k, l)$ which is equidistance from the points (3, –4, – 2) and (4, 3, –2).

$\Rightarrow \sqrt{(h-3)^2 + (k+4)^2 + (l+2)^2}$

$= \sqrt{(h-4)^2 + (k-3)^2 + (l+2)^2}$

$\Rightarrow h^2 + 9 - 6h + k^2 + 16 + 8k + (l+2)^2$

$= h^2 + 16 - 8h + k^2 + 9 - 6k + (l+2)^2$

$\Rightarrow -6h + 8k = -8h - 6k$

$\Rightarrow 14k = -2h$

$\Rightarrow h + 7k = 0$

Locus of a point is $x + 7y = 0$

40. (B) Equation of the circle

$x^2 + y^2 + x - 3y + 5 = 0$

On comparing with general equation

$x^2 + y^2 + 2gx + 2fy + c = 0$

$g = \dfrac{1}{2},\ f = -\dfrac{3}{2},\ c = 5$

centre = $(-g, -f) = \left(-\dfrac{1}{2}, \dfrac{3}{2}\right)$

41. (B) Given that

$$f(x) = \tan^{-1}\left(\frac{x^x - x^{-x}}{2}\right)$$

differentiate both side w.r.t. '$x$'.

$$f'(x) = \frac{1}{1+\left(\frac{x^x - x^{-x}}{2}\right)^2} \frac{d}{dx}\left(\frac{x^x - x^{-x}}{2}\right)$$

$$f'(x) = \frac{4}{(x^x + x^{-x})^2} \times \frac{1}{2}\left[\frac{d}{dx}(x^x) - \frac{d}{dx}(x^{-x})\right]$$

we know that $\dfrac{d}{dx}(x^x) = x^x(1 + \log x)$

and $\dfrac{d}{dx}(x^{-x}) = -x^{-x}(1 + \log x)$

$$f'(x) = \frac{2}{(x^x + x^{-x})}\ [x^x(1 + \log x) + x^{-x}(1 + \log x)]$$

$$f'(x) = \frac{2}{(x^x + x^{-x})^2}\ [(1 + \log x)\ (x^x + x^{-x})]$$

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

42. (C) $C(25, 5) + \displaystyle\sum_{r=1}^{4} C(29 - r, 4)$

$\Rightarrow {}^{25}C_5 + C(28, 4) + C(27, 4) + C(26, 4) + C(25, 4)$

$\Rightarrow {}^{25}C_5 + {}^{25}C_4 + {}^{26}C_4 + {}^{27}C_4 + {}^{28}C_4$

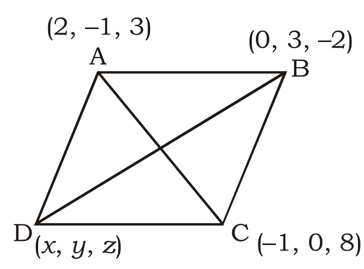
$\Rightarrow {}^{26}C_5 + {}^{26}C_4 + {}^{27}C_4 + {}^{28}C_4$ $[\because {}^{n}C_r + {}^{n}C_{r+1} = {}^{n+1}C_{r+1}]$

$\Rightarrow {}^{27}C_5 + {}^{27}C_4 + {}^{28}C_4$

$\Rightarrow {}^{28}C_5 + {}^{28}C_4$

$\Rightarrow {}^{29}C_5 = C(29, 5)$

43. (D) Let $D = (x, y, z)$




In Rhombus mid-point of diagonals are same.

So mid-point of AC = mid point of BD

$$\left(\frac{2-1}{2}, \frac{-1+0}{2}, \frac{3+8}{2}\right) = \left(\frac{x+0}{2}, \frac{y+3}{2}, \frac{z-2}{2}\right)$$

$$\left(\frac{1}{2}, \frac{-1}{2}, \frac{11}{2}\right) = \left(\frac{x}{2}, \frac{y+3}{2}, \frac{z-2}{2}\right)$$

on comparing

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

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

$\frac{z-2}{2} = \frac{11}{2} \Rightarrow z = 13$

$D(x, y, z) = (1, -4, 13)$

44. (A) Given that

eccentricity $e = \frac{\sqrt{17}}{4}$,

length of latusrectum $= \frac{15}{4}$

$\sqrt{1+\frac{b^2}{a^2}} = \frac{\sqrt{17}}{4}$, $\quad \frac{2b^2}{a} = \frac{15}{4}$ ...(*i*)

$1 + \frac{b^2}{a^2} = \frac{17}{16}$

$\frac{b^2}{a^2} = \frac{1}{16}$

$\frac{b}{a} = \frac{1}{4}$ ...(ii)

put the equation (i)

$2b \times \frac{1}{4} = \frac{15}{4}$

$b = \frac{15}{2}$

from equation (ii)

$a = 30$

length of transverse axis $= 2a = 2 \times 30 = 60$

45. (B) $z = 1 - \sqrt{3}\, i$

argument $(\theta) = \tan^{-1}\left(\frac{b}{a}\right)$ $\left[\because \text{when } z = a + ib \text{ then } \theta = \tan^{-1}\left(\frac{b}{a}\right)\right]$

$\theta = \tan^{-1}\left(-\tan\frac{\pi}{3}\right)$

$\theta = \tan^{-1}\left(\tan\frac{-\pi}{3}\right)$

$\theta = \frac{-\pi}{3}$

46. (B) $3^x = 5^y = 37$ ...(i)

and $3^{x+2} - 5^{y+1} = 218$

$3^x . 9 - 5^y .5 = 218$ ...(ii)

Let $3^x = a$, $5^y = b$

from equation (i) and equation (ii)

$a + b = 32$ and $9a - 5b = 218$

on solving the equation

$b = 5$ and $a = 27$

$5^y = 5$, $3^x = 27$

$y = 1$, $x = 3$

47. (D) 'TRANSVERSE'

Total number of words which is formed from the letters of the given word $= \frac{10!}{2!2!2!}$

$= \frac{10!}{8}$

TRANSVERSE → (AEE) TRNSVRS
↓
as a one letter

Total number of words when vowels comes together

$= \frac{8!}{2!2!} \times \frac{3!}{2!}$

$= \frac{8! \times 3!}{8}$

Total number of words when vowels never comes together.

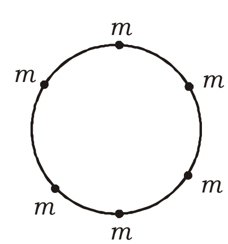
$= \frac{10!}{8} - \frac{8! \times 3!}{8}$

$= \frac{1}{8}[10 \times 9 \times 8! - 8! \times 3 \times 2 \times 1]$

$= \frac{8!}{8} \times 84$

$= \frac{21}{2} \times 8!$

48. (D) Find we fix the alternate position of the men. 6 men can be seated around the circle in (6 – 1)! = 5!




6 women can be seated in 6 vacant place by 6!. Total number of ways = 5! ×6!

49. (C) Given that

$P(A) = \frac{1}{2}$, $P\left(\frac{B}{A}\right) = \frac{1}{2}$ and $P\left(\frac{A}{B}\right) = \frac{1}{4}$

$P\left(\frac{B}{A}\right) = \frac{P(B \cap A)}{\frac{1}{4}}$

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

$P(A \cap B) = \frac{1}{8}$

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

$\frac{1}{4} = \frac{\frac{1}{8}}{P(B)}$

$P(B) \times \frac{1}{4} = \frac{1}{8}$

$P(B) = \left(\frac{1}{2}\right)$

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

**A and B are independent.**

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

$= \frac{P(A')P(B)}{P(B)}$

$= P(A')$

$\boldsymbol{P\left(\frac{A'}{B}\right) = \frac{3}{4}}$ $\qquad \left[\because P(A) = \frac{1}{4}\right]$

50. (A) We know that

$1^3 + 2^3 + 3^3 \ldots + n^3 = \left[\frac{1}{2} + (n+1)\right]^2$

and $1 + 2 + 3 + \ldots n = \frac{1}{2} n(n+1)$

then $n$th term of the series $= \frac{1^3 + 2^3 + 3^3 \ldots n^3}{1 + 2 + 3 + \ldots + n}$

$= \frac{\left(\frac{1}{2}n(n+1)\right)^2}{\frac{1}{2}n(n+1)}$

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

51. (C) Statement (I) :

| | | |
|---|---|---|
| 2 | 305 | |
| 2 | 152 | 1 |
| 2 | 76 | 0 |
| 2 | 38 | 0 |
| 2 | 19 | 0 |
| 2 | 9 | 1 |
| 2 | 4 | 1 |
| 2 | 2 | 0 |
| 2 | 1 | 0 |
| | 0 | 1 |

$(305)_{10} = (100110001)_2$

Statement (I) is correct.

Statement (II) is correct.

52. (B) sin10 sin 30 sin 50 sin 70

= sin 30 (sin 10 sin 50 sin 70)

$= \frac{1}{2} \times \frac{1}{4} \times \sin 30$

[$\sin\theta \sin(60 - \theta) \sin(60 + \theta) = 1/4 \sin 3\theta$]

$= \frac{1}{8} \times \frac{1}{2} = \frac{1}{16}$

53. (C) Given that In ΔBC

∠A, ∠B, ∠C are in A.P.

Let ∠A = B – P, ∠B, ∠C = B + P

then B – P + B + B + P = 130

3B = 180

B = 60

and given that $b : c = \sqrt{3} : 2$

sine rule

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

$\frac{\sin 60}{\sqrt{3}} = \frac{\sin C}{2}$

sin C = 1

C = 90º

54. (D) B = 60º, C = 90º then A = 30º

55. (D) sine rule

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

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

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

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

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

56. (A) A = 30°, B = 60°, C = 90°
ΔABC is a right angle triangle.

57. (A) $\cos^2 A + \cos^2 B + \cos^2 C$

$\Rightarrow \cos^2 30 + \cos^2 60 + \cos^2 90$

$$\Rightarrow \left(\frac{\sqrt{3}}{2}\right)^2 + \left(\frac{1}{2}\right)^2 + (0)^2$$

$$\Rightarrow \frac{3}{4} + \frac{1}{4} + 0$$

$\Rightarrow 1$

58. (C) Angles of a triangle = 1 : 3 : 8
Let angles $x$, $3x$, $8x$

$x + 3x + 8x = 180$

$12x = 180$

$x = 15$

angles 15°, 45°, 120°
Sine Rule

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

then $\frac{a}{\sin A} = \frac{c}{\sin C}$

$$\frac{\text{greatest side}}{\text{least side}}\ \frac{c}{a} = \frac{\sin C}{\sin A}$$

$$\frac{c}{a} = \frac{\sin 120}{\sin 15}$$

$$\frac{c}{a} = \frac{\frac{\sqrt{3}}{2}}{\frac{(\sqrt{3}-1)}{2\sqrt{2}}}$$

$$\frac{c}{a} = \frac{\sqrt{6}}{(\sqrt{3}-1)}$$

$$\frac{c}{a} = \frac{3+\sqrt{3}}{\sqrt{2}}$$

$c : a = (3 + \sqrt{3}) : \sqrt{2}$

59. (D) In ΔABC
Sine Rule

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

$a$ = K sin A, b = K sin B, $c$ = K sin C

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

$$= \frac{\sin A + \sin B}{\sin C}$$

$$= \frac{2\sin\frac{A+B}{2}.\cos\frac{A-B}{2}}{2.\sin\frac{C}{2}.\cos\frac{C}{2}}$$

$$= \frac{2\sin\left[90-\frac{C}{2}\right].\cos\frac{A-B}{2}}{2.\sin\frac{C}{2}.\cos\frac{C}{2}}$$

$$= \frac{2\cos\frac{C}{2}.\cos\frac{A-B}{2}}{2\sin\frac{C}{2}.\cos\frac{C}{2}}$$

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

60. (D) $\tan^{-1}\left[\frac{\sqrt{1-\sin x}-\sqrt{1+\sin x}}{\sqrt{1-\sin x}+\sqrt{1+\sin x}}\right]$

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

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

$$\Rightarrow \tan^{-1}\left[\frac{2(1-\cos x)}{-2\sin x}\right]$$

$$\Rightarrow \tan^{-1}\left[\frac{-2\sin^2\frac{x}{2}}{2\sin\frac{x}{2}.\cos\frac{x}{2}}\right]$$

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

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

$$\Rightarrow -\frac{x}{2}$$

61. (B) Given that

$$\sin^{-1}\left(\frac{1}{\sqrt{7}}\right) = \theta$$

$$\sin\theta = \frac{1}{\sqrt{7}}$$

$\text{cosec}\,\theta = \sqrt{7}$

$\theta = \text{cosec}^{-1}(\sqrt{7})$

$$\theta = \frac{\pi}{2} - \sec^{-1}(\sqrt{7})$$

$$\sec^{-1}(\sqrt{7}) = \frac{\pi}{2} - \theta$$

62. (D) $\cos\left[\cos^{-1}\left(\frac{3}{5}\right)-\sin^{-1}x\right] = 1$

$\cos\left[\cos^{-1}\left(\frac{3}{5}\right)-\sin^{-1}x\right] = \cos 0$

$\cos^{-1}\left(\frac{3}{5}\right) - \sin^{-1}x = 0$

$\sin^{-1}x = \cos^{-1}\left(\frac{3}{5}\right)$

$\sin^{-1}x = \sin^{-1}\left(\frac{4}{5}\right)$

$[\because \cos^{-1}x = \sin^{-1}\sqrt{1-x^2}]$

$x = \frac{4}{5}$

63. (D) $\cot\left[2\tan^{-1}\left(\frac{1}{3}\right)-\frac{\pi}{4}\right]$

$\cot\left[2\tan^{-1}\frac{2\times\frac{1}{3}}{1-\left(\frac{1}{3}\right)^2}-\frac{\pi}{4}\right]$

$\left[\because 2\tan^{-1}x = \tan^{-1}\frac{2x}{1-x^2}\right]$

$\cot\left[\tan^{-1}\left(\frac{3}{4}\right)-\tan^{-1}(1)\right]$

$\cot\left[\tan^{-1}\left(\frac{\frac{3}{4}-1}{1+\frac{3}{4}\times 1}\right)\right]$

$\cot\left[\tan^{-1}\left(\frac{-1}{7}\right)\right]$

$\cot[\cot^{-1}(-7)] = -7$

64. (D) $\cos\left[\tan^{-1}\frac{12}{5}-\tan^{-1}\frac{4}{3}\right]$

$\Rightarrow \cos\left[\tan^{-1}\left(\frac{\frac{12}{5}-\frac{4}{3}}{1+\frac{12}{5}\times\frac{4}{3}}\right)\right]$

$\left[\because \tan^{-1}x-\tan^{-1}y = \tan^{-1}\left(\frac{x-y}{1+xy}\right)\right]$

$= \cos\left[\tan^{-1}\left(\frac{16}{63}\right)\right]$

$= \cos\left[\cos^{-1}\left(\frac{1}{\sqrt{1+\left(\frac{16}{63}\right)^2}}\right)\right]$

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

$= \cos\left(\cos^{-1}\left(\frac{63}{65}\right)\right)$

$= \frac{63}{65}$

65. (C) $\cot\left[\cot^{-1}\frac{7}{3}+\cos^{-1}\frac{3}{5}\right]$

$\Rightarrow \cot\left[\cot^{-1}\left(\frac{7}{3}\right)+\cot^{-1}\left(\frac{3}{4}\right)\right]$

$\Rightarrow \cot\left[\cot^{-1}\left(\frac{\frac{7}{3}\times\frac{3}{4}-1}{\frac{7}{3}+\frac{3}{4}}\right)\right]$

$\left[\cot^{-1}x+\cot^{-1}y = \cot^{-1}\left(\frac{xy-1}{x+y}\right)\right]$

$\Rightarrow \cot\left(\cot^{-1}\frac{9}{37}\right) = \frac{9}{37}$

66. (C) $f(x) = \lim_{x\to\infty}\left\{x^2\sin\frac{2}{x}\right\}$

$= \lim_{x\to\infty}\left\{x\frac{\sin\frac{2}{x}}{\frac{1}{x}}\right\}$

$= \lim_{x\to\infty}\left\{2x\frac{\sin\frac{2}{x}}{\frac{2}{x}}\right\}$

$= \lim_{x\to\infty}\{2x\times 1\}$ $\left\{\because \lim_{x\to\infty}\frac{\sin\frac{1}{x}}{\frac{1}{x}} = 1\right\}$

$= 2\times\infty = \infty$

67. (B) $f(x) = \lim_{x\to 0}\left[\frac{1-\sin x}{1-\tan x}\right]^{\text{cosec}\,x}$ $[1^\infty]$ Form

$= \lim_{x\to 0} \frac{[1-\sin x]^{\frac{1}{\sin x}}}{\left[\left(1-\frac{\sin x}{\cos x}\right)^{\frac{\cos x}{\sin x}}\right]^{\frac{1}{\cos x}}}$

$= \frac{e^{-1}}{e^{-\lim_{x\to 0}\frac{1}{\cos x}}}$ $\left[\because \lim_{x\to 0}(1+\lambda x)^{\frac{1}{x}} = e^{\lambda}\right]$

$= \frac{e^{-1}}{e^{\frac{-1}{\cos 0}}}$

$= \frac{e^{-1}}{e^{-1}}$

$= 1$

68. (A) $f(x) = \begin{Bmatrix} 4x-7, & 0 \le x \le 3 \\ 2x-\lambda, & 3 < x \le 5 \end{Bmatrix}$ is continuous at $x = 3$ then

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

$2 \times 3 - \lambda = 4 \times 3 - 7$

$6 - \lambda = 12 - 7$

$6 - \lambda = 5$

$\lambda = 1$

69. (C) $f(x) = \lim_{x\to\infty}\left(1+\frac{4}{x+2}\right)^{4x-3}$ $(1^\infty)$ form

$f(x) = \lim_{x\to\infty}\left[\left(1+\frac{4}{x+2}\right)^{\frac{x+2}{4}}\right]^{\frac{4}{x+2}(4x-3)}$

$f(x) = e^{\lim_{x\to\infty}\frac{4(4x-3)}{x+2}}$ $\left[\because \lim_{x\to\infty}\left(1+\frac{1}{x}\right)^{x} = e\right]$

$= e^{\lim_{x\to\infty}\frac{x\left(16-\frac{12}{x}\right)}{x\left(1+\frac{2}{x}\right)}}$

$= e^{\frac{16}{1}} = e^{16}$

70. (C) $f(x) = \begin{Bmatrix} 5\times 6^{x}, & x \le 1 \\ 8a-2x, & x > 1 \end{Bmatrix}$ is continuous at $x = 1$

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

$\lim_{x\to 1} 8a - 2x = \lim_{x\to 1} 5 \times 6^{x}$

$8a - 2 \times 1 = 5 \times 6^{1}$

$8a - 2 = 30$

$8a = 32$

$a = 4$

71. (A) Given that

A.M of ($a$ and $b$) : G.M of ($a$ and $b$) = 5 : 4

$\frac{a+b}{2} : \sqrt{ab} = 5 : 4$

$\frac{a+b}{2\sqrt{ab}} = \frac{5}{4}$

$\frac{a+b+2\sqrt{ab}}{a+b-2\sqrt{ab}} = \frac{5+4}{5-1}$ (by componendo and dividendo Rule)

$\frac{\left(\sqrt{a}+\sqrt{b}\right)^2}{\left(\sqrt{a}-\sqrt{b}\right)^2} = \frac{9}{1}$

$\frac{\sqrt{a}+\sqrt{b}}{\sqrt{a}-\sqrt{b}} = \frac{3}{1}$

$\frac{\sqrt{a}}{\sqrt{b}} = \frac{4}{2}$ [again companendo and divideno Rule]

$\frac{\sqrt{a}}{\sqrt{b}} = \frac{2}{1}$

$\frac{a}{b} = \frac{4}{1}$ or $a : b = 4 : 1$

72. (C)

73. (D) $\begin{vmatrix} 1+2\omega^{100}+\omega^{200} & \omega^2 & 1 \\ 1 & 1+\omega^{100}+2\omega^{200} & \omega \\ \omega & \omega^2 & 2+\omega^{100}+2\omega^{200} \end{vmatrix}$

$= \begin{vmatrix} 1+2\omega+\omega^2 & \omega^2 & 1 \\ 1 & 1+\omega+2\omega^2 & \omega \\ \omega & \omega^2 & 2+\omega+2\omega^2 \end{vmatrix}$

$= \begin{vmatrix} -\omega+2\omega & \omega^2 & 1 \\ 1 & -\omega^2+2\omega^2 & \omega \\ \omega & \omega^2 & -2\omega+\omega \end{vmatrix}$ $[\because 1+\omega+\omega^2=0]$

$= \begin{vmatrix} \omega & \omega^2 & 1 \\ 1 & \omega^2 & \omega \\ \omega & \omega^2 & -\omega \end{vmatrix}$

$= \omega(-\omega^3 - \omega^3) - \omega^2(-\omega - \omega^2) + 1(\omega^2 - \omega^3)$

$= -2\omega - 1$

74. (D) Given that $a^{-1} + b^{-1} + c^{-1} = 0$

$\frac{1}{a} + \frac{1}{b} + \frac{1}{c} = 0$

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

$$abc\begin{vmatrix} \frac{1}{a}+1 & \frac{1}{b} & \frac{1}{c} \\ \frac{1}{a} & \frac{1}{b}+1 & \frac{1}{c} \\ \frac{1}{a} & \frac{1}{b} & \frac{1}{c}+1 \end{vmatrix} = \lambda$$

$C_1 \to C_1 + C_2 + C_3$

$$abc\begin{vmatrix} \frac{1}{a}+\frac{1}{b}+\frac{1}{c} & \frac{1}{b} & \frac{1}{c} \\ \frac{1}{a}+\frac{1}{b}+\frac{1}{c} & \frac{1}{b}+1 & \frac{1}{c} \\ \frac{1}{a}+\frac{1}{b}+\frac{1}{c} & \frac{1}{b} & \frac{1}{c}+1 \end{vmatrix} = \lambda$$

$$abc\begin{vmatrix} 1 & \frac{1}{b} & \frac{1}{c} \\ 1 & \frac{1}{b}+1 & \frac{1}{c} \\ 1 & \frac{1}{b} & \frac{1}{c}+1 \end{vmatrix} = \lambda \quad \left[\because \frac{1}{a}+\frac{1}{b}+\frac{1}{c}=0\right]$$

$R_1 \to R_1 - R_2,\ \ R_3 \to R_3 - R_2$

$$abc\begin{bmatrix} 0 & -1 & 0 \\ 1 & \frac{1}{b}+1 & \frac{1}{c} \\ 0 & -1 & 1 \end{bmatrix} = \lambda$$

abc [0 + 1 (1– 0) + 0] = $\lambda$
abc [1] = $\lambda$
$\lambda = abc$

75. (B) Series

$S = 3 + 7 + 13 + 21 + \ldots a_{n-1} + a_n$
$S = \quad 3 + 7 + 13 + \ldots\ldots\ldots + a_{n-1} + a_n$
$\quad - \ \ - \ \ - \ \ - \qquad - \ \ -$

---

$0 = (3 + 4 + 6 + 8 + \ldots + n \text{ term}) - a_n$
$a_n = 3 + 4 + 6 + 8 + \ldots n$ term
$= 3 + (4 + 6 + 8\ldots (n-1)$ term)

$$= 3 + \frac{n-1}{2}[2 \times 4 + (n-2) \times 2]$$

$= 3 + n - 1\ [4 + n - 2]$
$a_n = 3 + (n-1)(n+2)$
$a_n = n^2 + n + 1$
10th term $a_{10} = (10)^2 + 10 + 1$
$= 100 + 11$
$= 111$

76. (A) $\left(-4x^2 + \frac{1}{3x^2}\right)^4$

3rd term in the expansion

$$T_3 = T_{2+1} = {}^4C_2\,(-4x^2)^{4-2}\left(\frac{1}{3x^2}\right)^2$$

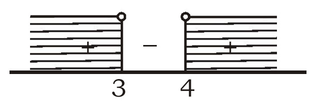
$$= \frac{4!}{2!2!}\,(-4x^2)^2\,\frac{1}{9x^4}$$

$$= 6 \times \frac{16x^4}{9x^4}$$

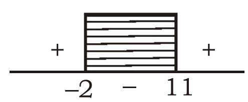
$$= 6 \times \frac{16}{9}$$

$$= \frac{32}{3}$$

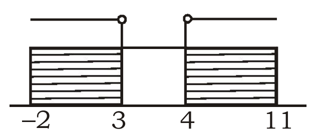
77. (A) $x^2 - 7x + 12 > 0$
$(x-4)(x-3) > 0$
$x = 3, 4$




and $x^2 - 9x - 22 \le 0$
$(x-11)(x+2) \le 0$
$x = 11, -2$




then




$-2 \le x < 3$ and $4 < x \le 11$
$x \in [-2, 3) \cup (4, 11]$

78. (A) $\sin^2 30°$, $\sin^2 45°$ and $\sin^2 60°$

$$\left(\frac{1}{2}\right)^2, \left(\frac{1}{\sqrt{2}}\right)^2 \text{ and } \left(\frac{\sqrt{3}}{2}\right)^2$$

$\frac{1}{4}, \frac{1}{2}$ and $\frac{3}{4}$ are in A.P.

then $\sin^2 30°$, $\sin^2 45°$ and $\sin^2 60°$ are in A.P.

79. (D) $f(x) = \frac{x}{x^2+1}$

for one-one
$f(x_1) = f(x_2)$

$$\frac{x_1}{x_1^2+1} = \frac{x_2}{x_2^2+1}$$

$x_1 x_2^2 + x_1 = x_1^2 x_2 + x_2$

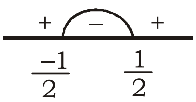
$x_1 - x_2 + x_1x_2^2 - x_1^2x_2 = 0$
$(x_1 - x_2)(1 - x_1x_2) = 0$
$x_1 = x_2,\ x_1x_2 \neq 1$
So, function $f(x)$ is one-one.

Let $y = \frac{x}{x^2+1}$
$yx^2 + y = x$
$yx^2 - x + y = 0$

$x = \frac{-1 \pm \sqrt{(-1)^2 - 4\times y\times y}}{2\times y}$

$x = \frac{-1 \pm \sqrt{1-4y^2}}{2y}$

$1 - 4y^2 \geq 0$ and $y \neq 0$
$(1 - 2y)(1 + 2y) \geq 0$
$(2y - 1)(2y + 1) \leq 0$




$y \in \left[-\frac{1}{2}, \frac{1}{2}\right] - \{0\}$
and codomain = $R$
Range($y$) $\neq$ codomain
so, $f(x)$ is not onto.
Hence $f(x)$ is one-one but not onto.

80. (C) Let $y = 3^{96}$
taking log
$\log_{10}y = 96\log_{10}3$
$= 96 \times 0.4771$
$= 45.8016$
The number of digits in $3^{96}$ = 46.

81.(C) $\sqrt{2+\sqrt{2+\sqrt{2+\sqrt{2+2\cos 8\theta}}}}$

$\Rightarrow \sqrt{2+\sqrt{2+\sqrt{2+\sqrt{2(1+\cos 8\theta)}}}}$

$\Rightarrow \sqrt{2+\sqrt{2+\sqrt{2+\sqrt{2\times 2\cos^2 4\theta}}}}$

$\Rightarrow \sqrt{2+\sqrt{2+\sqrt{2+2\cos 4\theta}}}$

$\Rightarrow \sqrt{2+\sqrt{2+\sqrt{2(1+\cos 4\theta)}}}$

$\Rightarrow \sqrt{2+\sqrt{2+\sqrt{2\times 2\cos^2 2\theta}}}$

$\Rightarrow \sqrt{2+\sqrt{2+2\cos 2\theta}}$

$\Rightarrow \sqrt{2+\sqrt{2(1+\cos 2\theta)}}$

$\Rightarrow \sqrt{2+\sqrt{2\times 2\cos^2\theta}}$

$\Rightarrow \sqrt{2+2\cos\theta}$

$\Rightarrow \sqrt{2(1+\cos\theta)}$

$\Rightarrow 2\cos\frac{\theta}{2}$

82. (D) $f(x) = 2x^3 - 3x^2 - 72x + 6$
$f'(x) = 6x^2 - 6x - 72$ ...(i)
again differentiate w.r.t '$x$'
$f''(x) = 12x - 6$ ...(ii)
for maxima and minima
$f'(x) = 0$
$6x - 6x - 72 = 0$
$(x - 4)(x + 3) = 0$
$x = -3, 4$
On putting the value of $x$ in equation (ii)
$f''(-3) = 12(-3) - 6$ and $f''(4) = 12 \times 4 - 6$
$= -42$ (maxima) $= 42$ (minima)
function is maximum at $x = -3$

83. (B) $I = \int_{-1}^{0} x(1+x)^6\, dx$

$I = \int_{-1}^{0} (-1-x)(1 - 1 - x)^6 dx$

$\left[\text{Property } \int_a^b f(x)\,dx = \int_a^b f(a+b-x)\,dx\right]$

$I = \int_{-1}^{0} (-1-x)x^6\, dx$

$I = \int_{-1}^{0} (-x^6 - x^7)\, dx$

$= \left[-\frac{x^7}{7} - \frac{x^8}{8}\right]_{-1}^{0}$

$= \left[0 - \left(\frac{(-1)^7}{7} - \frac{(-1)^8}{8}\right)\right]$

$= \left[1 - \left(\frac{-1}{7} - \frac{1}{8}\right)\right]$

$= \frac{15}{56}$

84. (A) $\begin{bmatrix} 5 & 0 \\ 3 & 1 \end{bmatrix}\begin{bmatrix} -x \\ y \end{bmatrix} = \begin{bmatrix} -10 \\ 3 \end{bmatrix}$

$\begin{bmatrix} -5x + 0 \\ -3x + y \end{bmatrix} = \begin{bmatrix} -10 \\ 3 \end{bmatrix}$

$\begin{bmatrix} -5x \\ -3x + y \end{bmatrix} = \begin{bmatrix} -10 \\ 3 \end{bmatrix}$

om comparing
$-5x = -10$
$x = 2$
and $-3x + y = 3$
$-3 \times 2 + y = 3$

$y = 9$

85. (B) Given that

5th term in expansion of $\left(\frac{4}{3}x^2 - \frac{3}{2x^2}\right)^n$ is independent of $x$.

then

$$T_5 = T_{4+1} = {}^nC_4 \left(\frac{4}{3}x^2\right)^{n-4} \left(\frac{-3}{2x^2}\right)^4$$

$$= {}^nC_4 \left(\frac{4}{3}\right)^{n-4} \left(\frac{-3}{2}\right)^4 x^{2n-16}$$

then $2n - 16 = 0$

$n = 8$

86. (A) In $\Delta ABC$

Let $B - p$, $B$, $B + p$ are angles of $\Delta ABC$.

$B - p, B, B + p = 180$

$3B = 180$

$B = 60$

then $\cos B = \frac{a^2 + c^2 - b^2}{2ac}$

$\cos 60 = \frac{a^2 + c^2 - b^2}{2ac}$

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

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

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

87.(B) $\lim_{x \to -5} \left(\frac{x+5}{x^3 + 125}\right)$ $\left[\frac{0}{0}\right]$ Form

by L-Hospital's Rule

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

$= \frac{1}{3 \times (-5)^2}$

$= \frac{1}{3 \times 25} = \frac{1}{75}$

88. (D) $I = \int \sec x^o \, dx$

$I = \int \sec \frac{\pi x}{180} \, dx$ $\left[\because 1^o = \left(\frac{\pi}{180}\right)^c\right]$

Let $\frac{\pi x}{180} = t$

$\frac{\pi}{180} dx = dt$

$dx = \frac{180}{\pi} dt$

$I = \frac{180}{\pi} \int \sec t \, dt$

$I = \frac{180}{\pi} \log \tan \left(\frac{\pi}{4} + \frac{t}{2}\right) + C$

$\left[\because \int \sec dx = \log \tan\left(\frac{\pi}{4} + \frac{x}{2}\right) + 1\right]$

$I = \frac{180}{\pi} \log \tan \left(\frac{\pi}{4} + \frac{\pi x}{360}\right) + C$

89. (B) $I = \int_0^{\frac{\pi}{2}} \log \cos x \, dx$ ...(i)

$I = \int_0^{\frac{\pi}{2}} \log \sin x \, dx$ ...(ii) (Property IV)

on adding equation (i) and equation (ii)

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

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

$2I = \int_0^{\frac{\pi}{2}} [\log \sin 2x - \log 2] \, dx$

$2I = \int_0^{\frac{\pi}{2}} \log \sin 2x . dx - \int_0^{\frac{\pi}{2}} \log 2 dx$

Let $2x = t$ when $x \to 0, t \to 0$

$2dx = dt$ $x \to \frac{\pi}{2}, t \to \pi$

$dx = \frac{1}{2} at$

$2I = \int_0^{\pi} \log \sin t \times \frac{1}{2} dt - \log 2 \, [x]_0^{\frac{\pi}{2}}$

$2I = \frac{1}{2} \int_0^{2 \times \frac{\pi}{2}} \log \sin t \, dt - \log 2 \left[\frac{\pi}{2} - 0\right]$

$2I = \frac{1}{2} \times 2 \int_0^{\frac{\pi}{2}} \log \sin t \, dt - \frac{\pi}{2} \log 2$

$$\left[\because \int_0^{2a} f(x) dx = \begin{cases} 2\int_0^a f(x) dx, \text{if } f(2a - x) = f(x) \\ 0, \quad \text{if } f(2a - x) = -f(x) \end{cases}\right]$$

$2I = \int_0^{\frac{\pi}{2}} \sin x \, dx - \frac{\pi}{2} \log 2$ $\left[\because \int_0^a f(x) dx = \int_0^a dt\right]$

$2I = I - \frac{\pi}{2} \log 2$

$I = -\frac{\pi}{2} \log 2$

$\int_0^{\frac{\pi}{2}} \log \cos x dx = -\frac{\pi}{2} \log 2$

90. (C) eccentricities

$e = 0$ for circle

$e = 1$ for parabola

$e < 1$ for ellipse

$e > 1$ for hyperbola

91. (B) $y = e^{\cos\sqrt{x^2+1}}$

differentiate both side w.r.t. $x$.

$$\frac{dy}{dx} = e^{\cos\sqrt{x^2+1}} \frac{d}{dx}\left[\cos\left(\sqrt{x^2+1}\right)\right]$$

$$= e^{\cos\sqrt{x^2+1}}\left(-\sin\sqrt{x^2+1}\right)\frac{1}{2\sqrt{x^2+1}} \times 2x$$

$$= \frac{-x\sin\sqrt{x^2+1}}{\sqrt{x^2+1}} \cdot e^{\cos\sqrt{x^2+1}}$$

92. (B) $y = e^{\tan x}$

differentiate both side w.r.t. $x$.

$$\frac{dy}{dx} = e^{\tan x}.\ \sec^2 x$$

$$= \sec^2 x\ .\ e^{\tan x}$$

93. (A) Let $y = e^{x^2}$ and $z = \log x^2$

$z = 2\log x$

differentiate both w.r.t. $x$.

$$\frac{dy}{dx} = e^{x^2}.(2x) \text{ and } \frac{dz}{dx} = \frac{2}{x}$$

$$\frac{dy}{dx} = 2x.e^{x^2},\ \frac{dx}{dz} = \frac{x}{2}$$

$$\text{then } \frac{dy}{dz} = \frac{dy}{dx} \times \frac{dx}{dz}$$

$$= 2x\, e^{x^2} \times \frac{x}{2}$$

$$= x^2 e^{x^2}$$

94. (A) Given that

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

Projection of the vector $\vec{a}$ on the vector $\vec{b}$

$$= \frac{\vec{a}\cdot\vec{b}}{|\vec{b}|}$$

$$= \frac{2\times4+(-1)\times4+3\times2}{\sqrt{(4)^2+(4)^2+(2)^2}}$$

$$= \frac{10}{6}$$

$$= \frac{5}{3}$$

95. (A) Let $y = \cos\left[2\cot^{-1}\sqrt{\frac{1+x}{1-x}}\right]$

Let $x = \cos\theta$

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

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

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

$$y = \cos\left[2\times\frac{\theta}{2}\right]$$

$y = \cos\theta$

$y = x$

$$\int\cos\left[2\cot^{-1}\sqrt{\frac{1+x}{1-x}}\right]dx = \int y\,dx$$

$$= \int x\,dx$$

$$= \frac{x^2}{2} + C$$

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

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

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

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

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

$$= \tan t + c$$

$$I = \tan\left(x+\frac{1}{x}\right) + c$$

97. (B) $I = \int e^x\left(\cos^{-1}x - \frac{1}{\sqrt{1-x^2}}\right)dx$

$$I = \int e^x\left[\cos^{-1}x + \left(\frac{-1}{\sqrt{1-x^2}}\right)\right]dx$$

$$I = e^x\cos^{-1}x + C$$

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

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

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

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

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

$$I = \int \frac{1}{t}\, dt$$

$$I = \log t + c$$

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

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

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

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

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

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

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

100. (A) $I = \int_0^{\frac{\pi}{2}} \frac{\cot x - \tan x}{1+\sin x.\cos x}\, dx$ ...(i)

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

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

on adding equation (i) and equation (ii)

$2I = 0$

$I = 0$

101. (D) Let teacher's age = $x$ years.

ATQ,

$30 \times 12 + x = (30+1) \times (12+2)$

$360 + x = 31 \times 14$

$360 + x = 434$

$x = 74$

teacher's age = 74 years.

102. (B) Plane $x + 2y - 5z = 0$

direction cosines of the normal to the plane

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

$$= \left(\frac{1}{\sqrt{30}}, \frac{2}{\sqrt{30}}, \frac{-5}{\sqrt{30}}\right)$$

103. (C) $I = \int x^2 .\log x\, dx$

$$I = \log x \int x^2 \cdot dx - \int\left\{\frac{d}{dx}(\log x).\int x^2 dx\right\} dx + C$$

$$I = (\log x) \times \frac{x^3}{3} - \int\left\{\frac{1}{x}.\frac{x^3}{3}\, dx\right\} + C$$

$$I = \frac{x^3}{3}\log x - \frac{1}{3}\int x^2 dx + C$$

$$I = \frac{x^3}{3}\log x - \frac{1}{3}.\frac{x^3}{3} + C$$

$$I = \frac{x^3}{3}\log x - \frac{x^3}{9} + C$$

104. (C) Case - I

Let white ball is drawn from the first bag and placed unseen in the second bag and white ball is drawn from the second bag.

Then probability = $\frac{^6C_1}{^{10}C_1} \times \frac{^4C_1}{^9C_1} = \frac{24}{90} = \frac{8}{30}$

Case-II

Let black ball is drawn from the first bag and placed unseen in the second bag and white is drawn from the second bag.

then probability = $\frac{^4C_1}{^{10}C_1} \times \frac{^3C_1}{^9C_1} = \frac{12}{90} = \frac{4}{30}$

then required probability = $\frac{8}{30} + \frac{4}{30} = \frac{12}{30}$

$= \frac{2}{5}$

105. (B) $2\log_8 2 - \frac{\log_3 9}{3}$

$$\Rightarrow 2 \times \frac{1}{\log_2 8} - \frac{\log_3 3^2}{3}$$

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

$$\Rightarrow \frac{2}{3} - \frac{2}{3} = 0$$

106. (C) $f(x) = \dfrac{1}{(x^2-1)\log(x+2)}$

$x^2 - 1 \neq 0 \qquad x + 2 > 1$

$x^2 \neq 1 \qquad x > -1$

$x \neq \pm 1$

domain $x \in (-1, \infty) - \{1\}$

107. (A) $f(x) = 2 - |x-3|$

for every $x$, $|x - 3| \geq 0$

$-|x-3| \leq 0$

$2 - |x-3| \leq 0 + 2$

$2 - |x-3| \leq 2$

$f(x) \leq 2$

Range of $f(x) = (-\infty, 2]$

108. (B) In an A.P.

$p$th term $T_p = a + (p-1)d$

$\dfrac{1}{q} = a + (p-1)d \quad \ldots\text{(i)}$

$q$th term $\dfrac{1}{p} = a + (q-1)d \quad \ldots\text{(ii)}$

equation (i) and equation (ii)

$d = \dfrac{1}{pq}$, $a = \dfrac{1}{pq}$

sum of (pq) terms

$S_{pq} = \dfrac{pq}{2}(2a + (pq-1)d)$

$= \dfrac{pq}{2}\left(\dfrac{2}{pq} + \dfrac{pq-1}{pq}\right)$

$S_{pq} = \dfrac{1}{2}(pq+1)$

109. (A) Data

20, 20, 20, 20, 21, 21, 22, 22, 22, 23, 23, 23, 24, 24, 25, 25, 22, 22, 24, 23

mode = 22

110. (C) Three observations

2, – 4, 8

$\text{H.M.} = \dfrac{1}{\dfrac{1}{n}\left(\dfrac{1}{x_1} + \dfrac{1}{x_2} + \dfrac{1}{x_3} + \ldots + \dfrac{1}{x^2}\right)}$

then $\text{H.M.} = \dfrac{1}{\dfrac{1}{3}\left(\dfrac{1}{2} - \dfrac{1}{4} + \dfrac{1}{8}\right)}$

$= \dfrac{1}{\dfrac{1}{3}\left(\dfrac{3}{8}\right)}$

$= \dfrac{1}{\dfrac{1}{8}} = 8$

111. (C) $I = \int_0^{2\pi} |\sin x|\, dx$

$= \int_0^{\pi} \sin x dx + \int_0^{2\pi} (-\sin x)\, dx$

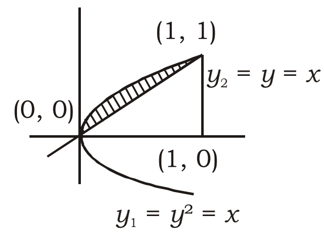
$= [-\cos x]_0^{\pi} + [\cos x]_{\pi}^{2\pi}$

$= [-\cos\pi + \cos 0] + [\cos 2\pi - \cos\pi]$

$= [1 + 1] + [1 + 1]$

$= 4$

112. (A)




curve $y_1 \Rightarrow y = \sqrt{x} \quad \ldots\text{(i)}$

and line $y_2 \Rightarrow y = x \quad \ldots\text{(ii)}$

on solving the equation (i) and equation (ii)

$x = 0, 1$

$y = 0, 1$

$\text{Area} = \int_0^1 (y_1 - y_2)\, dx$

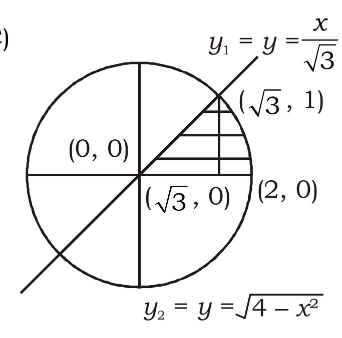
$= \int_0^1 \left(\sqrt{x} - x\right) dx$

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

$= \dfrac{2}{3} - \dfrac{1}{2} - 0$

$= \dfrac{1}{6}$

113. (C)




circle $x^2 + y^2 = 4$

$y_2 \Rightarrow y = \sqrt{4 - x^2} \quad \ldots\text{(i)}$

and line $x = \sqrt{3}\, y$

$y_1 \Rightarrow y = \dfrac{x}{\sqrt{3}} \quad \ldots\text{(ii)}$

on solving equation (i) and equation (ii)

$x = \sqrt{3}$ and $y = 1$

$$\text{Area} = \int_0^{\sqrt{3}} y_1 dx + \int_{\sqrt{3}}^{2} y_2 dx$$

$$= \int_0^{\sqrt{3}} \frac{x}{\sqrt{3}} dx + \int_{\sqrt{3}}^{2} \sqrt{4-x^2}\ dx$$

$$= \left[\frac{x^2}{2\sqrt{3}}\right]_0^{\sqrt{3}} + \left[\frac{1}{2}x\sqrt{4-x^2} + \frac{4}{2}\sin^{-1}\frac{x}{2}\right]_{\sqrt{3}}^{2}$$

$$= \left[\frac{(\sqrt{3})^2}{2\sqrt{3}} - 0\right] + \left[0 + 2\sin^{-1}1 - \left(\frac{\sqrt{3}}{2}\times 1 + 2\sin^{-1}\frac{\sqrt{3}}{2}\right)\right]$$

$$= \frac{3}{2\sqrt{3}} + \left[2\times\frac{\pi}{2} - \frac{\sqrt{3}}{2} - 2\times\frac{\pi}{3}\right]$$

$$= \frac{\sqrt{3}}{2} + \pi - \frac{\sqrt{3}}{2} - \frac{2\pi}{3}$$

$$= \frac{\pi}{3}$$

114. (A) curve $4x^2 + 9y^2 = 1$

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

$$a^2 = \frac{1}{4},\ b^2 = \frac{1}{9}$$

$$a = \frac{1}{2},\ b = \frac{1}{3}$$

this curve is an ellipse.

So area of ellipse = p$ab$

$$= p \times \frac{1}{2} \times \frac{1}{3}$$

$$= \frac{\pi}{6}$$

115. (D) degree = 2

116. (A) differential equation

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

On comparing with general equation

$$\frac{dy}{dx} + Py = Q$$

P = 2tan $x$, Q = sin $x$

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

$$= e^{2\log\sec x}$$

$$= \sec^2 x$$

Solution of the differential equation

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

$$y \times \sec^2 x = \int \sin x.\sec^2 x\, dx + C$$

$$y \times \sec^2 x = \int \sec x.\tan x\, dx + C$$

$$y \times \sec^2 x = \sec x + C$$

$$y = \cos x + C \times \cos^2 x$$

117. (D)Triangle with vertices (2, 3), (0, 3) and (2, $k$)

Area of the triangle = 2

$$\frac{1}{2}\begin{vmatrix} 2 & 3 & 1 \\ 0 & 3 & 1 \\ 2 & k & 1 \end{vmatrix} = 2$$

$$\begin{vmatrix} 2 & 3 & 1 \\ 0 & 3 & 1 \\ 2 & k & 1 \end{vmatrix} = 4$$

$2(3 - k) - 3\ (0 - 2) + 1\ (0 - 6) = 4$

$6 - 2k + 6 - 6 = 4$

$2 = 2k$

$k = 1$

118. (B) Centre of the cricle = (4, –3)

and Area = $49\pi$

$\pi r^2 = 49\pi$

$r = 7$

Equation of the circle

$(x - 4)^2 + (y + 3)^2 = (7)^2$

$x^2 + 16 - 8x + y^2 + 9 + 6y = 49$

$x^2 + y^2 - 8x + 6y - 24 = 0$

119. (A) Equation of the parabola

$y^2 = 16x$

$4a = 16$

$a = 4$

equation of directrix -

$x = -a$

$x = -4$

120. (D) Equation of the parabola

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

$x^2 + 8x + 16 - 16 + 2y + 4 = 0$

$(x + 4)^2 = -2y + 12$

$(x + 4)^2 = -2(y - 6)$

$X^2 = -2Y$ where $X = x + 4$

$4a = 2$ $Y = y - 6$

$$a = \frac{1}{2}$$

focus of the parabola $(X, Y) = (0, -a)$

$X = 0$ and $Y = -a$

$x + 4 = 0$ $y - 6 = -\frac{1}{2}$

$x = -4$ $y = \frac{11}{2}$

focus of the parabola = $\left(-4, \frac{11}{2}\right)$

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# NDA (MATHS) MOCK TEST - 74 (Answer Key)

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

***Note :*** *If your opinion differ regarding any answer, please message the mock test and Question number to 8860330003*

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