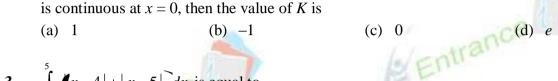
## 

	MIAIN	EMATICS
1.	R is the set of real numbers and $f: R \to R$	R and $g: R \to R$ are defined by $f = 3x^2 + 2$ and
	$g = 3x - 1$ for all $x \in \mathbb{R}$ . Then	
	(a) $(6g) = 27x^2 - 18x + 5$	(b) $(6g) = 27x^2 + 18x - 5$
	(c) (of ) $= 9x^2 - 5$	(d) $\oint of \int \oint = 9x^2 + 6$
	SENII	RELITE
2.	If the function $f(x) = \cos x^{-1/x}$ , $x \neq 0$	



= K, x = 0.

3. 
$$\int_{4}^{5} |(x-4)| + |x-5| dx \text{ is equal to}$$
(a) 1 (b) 2 (c) 0 (d) 4

The area of the figure bounded by the curves  $y = \cos x$  and  $y = \sin x$  and the ordinates x = 04. and  $x = \frac{\pi}{4}$  is

(a) 
$$\sqrt{2}-1$$
 (b)  $\sqrt{2}+1$  (c)  $\frac{1}{\sqrt{2}}\sqrt{2}-1$  (d)  $\frac{1}{\sqrt{2}}$ 

Given that 'a' is a fixed complex number, and ' $\lambda$ ' is a scalar variable, the point z satisfying **5.**  $z = a(1 + i\lambda)$  traces out

- (a) a straight line through the point 'a'
- (b) a circle with centre at the point 'a'
- (c) a straight line through the point 'a' and perpendicular to the join of 0 and that point 'a'
- (d) none of these

(c)  $a \ge 0$ 

The value of a for which  $2x^2 - 2(a+1) + a(4+1) = 0$  may have one root less than a and **6.** other root greater than a are given by

other root greater than 
$$a$$
 are given by

(a)  $1 > a > 0$ 

(b)  $-1 < a < 0$ 

If the quadratic equations  $ax^2 + 2cx + b = 0$  and  $ax^2 + 2bx + c = 0$   $\phi \neq c$  have a common 7. root, then a+4b+4c is equal to

(d) a > 0 or a < -1

root, then 
$$a + 4b + 4c$$
 is equal to  
(a)  $-2$  (b)  $-1$  (c) 0 (d) 1

The number of non-negative integral solutions of  $x + y + z \le n$ , where  $n \in N$  is 8. (a)  $^{n+3}C_3$ (b)  $^{n+4}C_4$ (d) none of these

The straight line x + y = k touches the parabola  $y = x - x^2$ , if k is equal to 9. (a) 0 (b) -1 (c) 1 Maximum value of  $\sin x \sin 60^{\circ} - x \sin 60^{\circ} + x$  is (d) none of these **10.** 

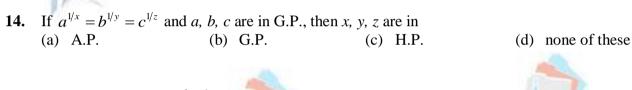
(a) $-\frac{1}{4}$	(b) $\frac{1}{4}$	(c) $\frac{3}{4}$	(d) none of these
The straight line pa	assing through the point of	intersection of the s	traight lines $x-3y+1=0$
and $2x + 5y - 9 = 0$	and having infinite slope a	and at a distance 2 ur	nits form the origin has the
equation (a) $x = 2$	(b) $3x+4y-1=0$	(c) $y = 1$	(d) none of these
The equation of the	e circle which touches the a	exes of co-ordinates a	and the line $\frac{x}{3} + \frac{y}{4} = 1$ and
whose centre lies in	the Ist quadrant is $x^2 + y^2$	$-2cx - 2cy + c^2 = 0,$	where $c$ is equal to
(a) 1	(b) 2	(c) 3	(d) none of these
A line is drawn thro	ough a fixed point $P(\alpha, \beta)$	to cut the circle $x^2$	$-y^2 = r^2$ at A and B. Then
PA.PB is equal to		1	
(a) $(\alpha + \beta)^2 - r^2$	(b) $\alpha^2 + \beta^2 - r^2$	(c) $(\alpha-\beta)^2+r^2$	(d) none of these

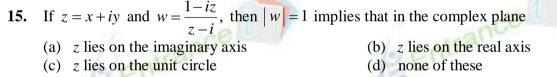
(d) none of these

11.

12.

13.





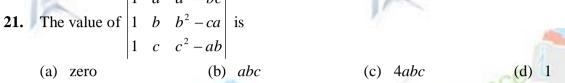
**16.** If 
$$(+x)^n = c_0 + c_1 x + c_2 x^2 + \dots + c_n x^n$$
, then for  $n$  odd,  $c_1^2 + c_3^2 + c_5^2 + \dots + c_n^2$  is equal to

(a)  $2^{2n-2}$  (b)  $2^n$  (c)  $\frac{2n!}{2!}$  (d)  $\frac{2n!}{!}$ 

- $\lim_{x\to 2} \left( -1 \right)^{[x]}$ , where [x] is the greatest integer function, is equal to (a) 1 (b) -1 (c)  $\pm 1$  (d) does not exist 138. Assuming that f is continuous everywhere  $\frac{1}{c} \int_{ac}^{bc} f\left(\frac{x}{c}\right) dx$  is equal to
- The value of the integral  $\int_{0}^{\pi/2} \int_{ac}^{\pi/2} \int_{a$

(c)  $\pi$ 

20.	If the roots $\alpha$ , $\beta$ of the equal.	ation $\frac{x^2 - bx}{ax - c} = \frac{\lambda - 1}{\lambda + 1}$	are such that $\alpha + \beta =$	= 0, then the value of $\lambda$
	is (a) $\frac{1}{c}$ (b)	) 0	(c) $\frac{a-b}{a+b}$	(d) $\frac{a+b}{a-b}$
21.	The value of $\begin{vmatrix} 1 & a & a^2 - ba \\ 1 & b & b^2 - ca \end{vmatrix}$	is	展	450



- 22. The equation of the directrix of the parabola  $y^2 + 4y + 4x + 2 = 0$  is

  (a) x = -1 (b) x = 1 (c)  $x = -\frac{3}{2}$  (d)  $x = \frac{3}{2}$
- 23. The equation of the plane passing through the line  $\frac{x-1}{5} = \frac{y+2}{6} = \frac{z-3}{4}$  and the point (4, 3, 7) is

  (a) 4x+8y+7z=41(b) 4x-8y+7z=41
  - (a) 4x + 8y + 7z = 41(b) 4x - 8y + 7z = 41(c) 4x - 8y + 7z = 39
- 24. The value of a so that the volume of parallelepiped formed by vectors  $\hat{i} + a\hat{j} + \hat{k}$ ,  $\hat{j} + a\hat{k}$ ,  $a\hat{i} + \hat{k}$  becomes minimum is

  (a)  $\sqrt{3}$  (b) 2 (c)  $\frac{1}{\sqrt{2}}$  (d) 3
- **25.** If  $x = a\left(t + \frac{1}{t}\right)$ ,  $y = a\left(t \frac{1}{t}\right)$ , then  $\frac{dy}{dx}$  is equal to

  (a)  $\frac{t^2 1}{t^2 + 1}$  (b)  $\frac{t^2 + 1}{t^2 1}$  (c)  $\frac{t^2 + 1}{1 t^2}$  (d) none of these
- 26. If  $x \notin (x) = 6$ , f(3) = 1, then f'(3) is equal to

  (a) -1(b)  $-\frac{1}{2}$ (c)  $-\frac{1}{4}$ (d)  $-\frac{1}{6}$
- 27. A mapping is selected at random from all the mappings of the set  $A = \{2, ..., n \text{ into itself.} \}$ The probability that the mapping selected is one-one is  $(a) \quad (b) \quad 1 \quad (c) \quad (n-1)!$
- (a)  $\frac{1}{n^n}$  (b)  $\frac{1}{n!}$  (c)  $\frac{(n-1)!}{n^{n-1}}$  (d)  $\frac{n!}{n^{n-1}}$ 28. The equation of the plane parallel to the line  $\frac{x+3}{-3} = \frac{y-3}{2} = \frac{z+2}{1}$  and passing through the point (0,7,-7) is

  (a) x+y+z=1 (b) x-y-z=0

(c) 
$$x + y + z = 0$$

(d) 
$$x+y-z=14$$

- If in any  $\triangle ABC \frac{r}{r_1} = \frac{r_2}{r_3}$ , then (where  $r, r_1, r_2, r_3$  have usual meaning)

- (a)  $A = 90^{\circ}$  (b)  $B = 90^{\circ}$  (c)  $C = 90^{\circ}$  (d) none of these

  If the ellipse  $\frac{x^2}{k^2 a^2} + \frac{y^2}{a^2} = 1$  and the hyperbola  $\frac{x^2}{a^2} \frac{y^2}{a^2} = 1$  are confocal, then the value of k is
- (b)  $\pm \sqrt{2}$
- (c)  $\pm \sqrt{3}$
- (d) none of these
- The minimum value of P = x + 3y, subject to  $2x + y \ge 6$ ,  $x + y \ge 4$ ,  $x \ge 0$ ,  $y \ge 0$ , is
  - (a) 8

- (b) 7
- (c) 6
- The value of p such that the vectors  $\hat{i} + 3\hat{j} 2\hat{k}$ ,  $2\hat{i} \hat{j} + 4\hat{k}$  and  $3\hat{i} + 2\hat{j} + p\hat{k}$  are coplanar is

- (c) 8
- (d) 10

- If  $A = \begin{bmatrix} 1 & 1 & 1 \\ 1 & 1 & 1 \\ 1 & 1 & 1 \end{bmatrix}$ , then  $A^2$  is equal to
  - (a) A

- (c) unit matrix

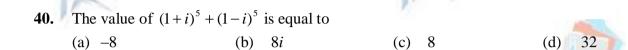
- The roots of the equation  $\begin{vmatrix} x-1 & 1 & 1 \\ 1 & x-1 & 1 \\ 1 & 1 & x-1 \end{vmatrix} = 0 \text{ are }$ 34.
  - (a) 1, 2
- (b) -1, 2
- (c) 1, -2

- The inverse of  $\begin{vmatrix} 3 & -2 \\ -7 & 5 \end{vmatrix}$  is
  - (a)  $\begin{bmatrix} 3 & -7 \\ -2 & 5 \end{bmatrix}$  (b)  $\begin{bmatrix} 5 & -2 \\ -7 & 3 \end{bmatrix}$  (c)  $\begin{bmatrix} 5 & 2 \\ 7 & 3 \end{bmatrix}$  (d)  $\begin{bmatrix} -3 & 7 \\ -2 & 5 \end{bmatrix}$

- k is a scalar and A is a n-square matrix. Then |kA| is equal to
  - (a)  $k|A|^n$
- (b) k|A|
- (d)  $k^n |A|$
- 37. Let  $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$ . Then  $A^n$  is equal to Let  $A = \begin{bmatrix} 1 & 2 \\ 0 & 1 \end{bmatrix}$ . Then  $A^n$  is equal to

  (a)  $\begin{bmatrix} 1 & 2n \\ 0 & 1 \end{bmatrix}$  (b)  $\begin{bmatrix} 2 & n \\ 0 & 1 \end{bmatrix}$  (c)  $\begin{bmatrix} 1 & 2^n \\ 0 & 1 \end{bmatrix}$  (d)  $\begin{bmatrix} 1 & n \\ 0 & 2 \end{bmatrix}$

38.	In a triangle ABC if a	$=2, B=60^{\circ} \text{ and } \circ$	$C = 75^{\circ}$ , then b is equal to	
	(a) $\sqrt{3}$	(b) $\sqrt{6}$	(c) $\sqrt{9}$	(d) $1+\sqrt{2}$
39.	The value of $\cos^{-1} \frac{2}{\sqrt{5}}$	$\frac{1}{3} + \tan^{-1} \frac{1}{3}$ is equal	1.0	nce T



41. The value of 
$$\cos[\tan^{-1}{\{\sin(\cot^{-1}x)\}}]$$
 is equal to

(a)  $\left(\frac{x^2+2}{x^2+3}\right)^{\frac{1}{2}}$  (b)  $\left(\frac{x^2+3}{x^2+4}\right)^{\frac{1}{2}}$  (c)  $\left(\frac{x^2+1}{x^2+2}\right)^{\frac{1}{2}}$  (d)  $x$ 

42. The angle between the pair of lines given by 
$$3x^2 + 5xy - 2y^2 + x + 9y - 4 = 0$$
 is

(a)  $\tan^{-1} 7$  (b)  $\tan^{-1} 5$  (c)  $90^{\circ}$  (d)  $\tan^{-1} \frac{1}{3}$ 

For the circles  $x^2 + y^2 - 2x + 3y + k = 0$  and  $x^2 + y^2 + 8x - 6y - 7 = 0$  to cut each other **43.** orthogonally the value of k must be (a) -10(b) 1

**44.** The equation to the parabola with focus (2, 0) and the directrix 
$$x+3=0$$
 is

(a)  $y^2-10x+5=0$ 

(b)  $y^2-10x-5=0$ 

(c)  $x^2-10y+5=0$ 

(d)  $x^2-10y-5=0$ 

If P is any point on the ellipse  $9x^2 + 36y^2 = 324$  whose foci are S and S'. Then SP + S'P is **45.** equal to (d) 36 (a) 9 (b) 12 (c) 27

46. The value of 
$$\int_{0}^{\pi/2} \frac{dx}{a^2 \cos^2 x + b^2 \sin^2 x}$$
 is equal to

**47.** 

(a)  $2\pi ab$ The value of  $\int_{0}^{\pi/2} \log \sin x \, dx$  is equal to

(a) 
$$\frac{\pi}{2} \log \frac{1}{2}$$
 (b)  $\frac{\pi}{2} \log 2$  (c)  $\pi \log 2$  (d)  $-\pi \log 2$ 

48.	$\lim_{n\to\infty} \left[ \frac{1}{n+1} + \frac{1}{n+1} \right]$	$\frac{1}{n+2}$ + to <i>n</i> terms	is equal to
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- (a) log2
- log3
- (c)  $\log \frac{1}{2}$
- 2log2

The area enclosed within the curve |x|+|y|=1 is 49.

- (a)  $\sqrt{2}$
- (b)
- 4 (d)

The area bounded by the curve  $y = x^2 - 7x + 10$  and the x-axis is **50.** 

(a)  $\frac{5}{2}$ 

If  $\vec{a} = \hat{i} + \hat{j}$ ,  $\vec{b} = \hat{j} + \hat{k}$  and  $\vec{c} = \hat{k} + \hat{i}$ , then a unit vector parallel to  $\vec{a} + \vec{b} + \vec{c}$  is

- (a)  $2\hat{i} + 2\hat{j} + 2\hat{k}$  (b)  $\frac{\hat{i} + \hat{j} + \hat{k}}{\sqrt{2}}$  (c)  $\frac{\hat{i} + \hat{j} + \hat{k}}{2\sqrt{2}}$

 $\lim_{n\to\infty} \left[1+\frac{2}{n}\right]^{2n}$  is equal to

(a) *e* 

- $e^2$ (b)
- (d)

If  $x^y = e^{x-y}$ , then  $\frac{dy}{dx}$  is equal to

(a)  $\frac{\log x}{(1+\log x)^2}$  (b)  $\frac{1-x}{y+x\log y}$ 

- (d)

The length of the sub-tangent to the curve  $x^m y^n = a^{m+n}$  at any point  $(x_1, y_1)$  on it is 54.

- (a)  $\left| \frac{mx_1}{n} \right|$
- (c)  $\left| \frac{my_1}{n} \right|$

The angle between the curves xy = 2 and  $y^2 = 4x$  at their point of intersection is 55.

- (a)  $\tan^{-1} \frac{1}{3}$
- $tan^{-1}3$ (b)
- (c)  $\tan^{-1} 2$
- (d)

**56.** The locus of the centre of a circle which touches externally two given circles is

(a) a hyperbola

(b) an ellipse

(c) a parabola

circle (d)

57. The eccentricity of the rectangular hyperbola is

- $\sqrt{3}$

<b>58.</b>	1.1! + 2.2! + 3.3! +	$\dots + n \cdot n!$ is equal to				
	(a) $(n+1)!$	(b) $(n+1)!+1$	(c) $(n+1)$	-1)!-1	(d) $n(n+1)!$	
59.	A parallelogram parallelograms thu		797		sides, the number	of
	(a) $\frac{m^2}{4}$ (c) $\frac{(m+2)^2}{4}$		(b) $\frac{(m)}{m}$	$\frac{(+1)^2}{4}$		
,	(c) $\frac{(m+2)^2}{4}$		(d) $\frac{(m)}{m}$	$(m+2)^2(m+2)^4$	2)2	
60.	The last digit of the	e number $6^{500}$ is		-1		
	(a) 8	(b) 2	(c) 6	entra	(d) 0	
61.	Let $t_r$ denote the	$r^{\text{th}}$ term of an A.P. If	$t_m = \frac{1}{n}$ and $t_n = \frac{1}{m}$	, then $t_{mn}$	equal to	
	(a) $\frac{1}{mn}$	(b) 2 $r^{\text{th}}$ term of an A.P. If  (b) $\frac{1}{m} + \frac{1}{n}$	(c) 1	(	d) 0	
62.					o numbers, then $a, b$	, c
	are in (a) A.P.	(b) G.P.	(c) H.P.	(	d) none of these	
			, ,	`		
<b>63.</b>	The minimum va	lue of $4^x + 4^{1-x}$ , $x \in R$			rell	
	(a) 2	(b) 4	(c) 1	ntran	(d) none of these	
64.	The sum of the re	eal roots of the equatio	on $x^2 +  x  - 6 = 0$ i	S		
	(a) 4	(b) 0	(c) - 1		(d) none of these	
65.		(where [.] denotes gre	atest integer functi	on), then x	must not be	
	(a) $x = 2, -1$	(b) $x \in [2, 3)$	(c) $x \in [-1]$	-1,0) (	d) none of these	
66.	If one root of the	equation $(k^2+1)x^2+$	13x + 4k = 0  is rec	iprocal of t	the other, then $k$ can be	e
	(a) $-2 + \sqrt{3}$		(c) 1	- atra	(d) none of these	
<b>67.</b>	The value of (1+	$(i)^3 + (1-i)^6$ is	R	Elin		
	(a) <i>i</i>	$(i)^3 + (1-i)^6$ is (b) $2(-1+5i)$	(c) $1-56$	į (	d) none of these	
68.	If $ z  = 1$ , then $\frac{1}{1}$	$\frac{+z}{+\overline{z}}$ is equal to				
	(a) z	(b) $\overline{z}$	(c) $z + \overline{z}$	(	d) none of these	
69.	The number of 5-	digit numbers in whic	h no two consecut	ve digits a	re identical is	
	(a) $9^2 \times 8^3$	(b) $9 \times 8^4$	(c) $9^5$	-110	(d) none of these	
70.	Account to the control of the contro	= =			pers than the number vays in which he can	

71. The value of 
$$\begin{vmatrix} x & x^2 - yz & 1 \\ y & y^2 - zx & 1 \\ z & z^2 - xy & 1 \end{vmatrix}$$
 is

(a) 1 (b) -1

(b) 
$$-1$$

$$(d) - xvx$$

A value of c for which the system of equations x + y = 1, (x + 2)x + (x + 4)y = 6, (+2)x + (+4)y = 36 is solvable (consistent) is

(b) 
$$-2$$

(c) 4

(d) none of these

In the expansion of  $\left(x^3 - \frac{1}{x^2}\right)^n$ ,  $n \in \mathbb{N}$ , if the sum of the coefficients of  $x^5$  and  $x^{10}$  is 0, **73.** then n is

(a) 25

(d) none of these

The middle term in the expansion of  $\left(\frac{2x}{3} - \frac{3}{2x^2}\right)^{2n}$  is 74.

(b)  $(-1)^n \frac{(2n)!}{(n!)^2} \cdot x^{-n}$  (c)  $^{2n}C_n \cdot \frac{1}{x^n}$  (d) none of these

If  $A = \begin{bmatrix} 0 & c & -b \\ -c & 0 & a \\ b & -a & 0 \end{bmatrix}$  and  $B = \begin{bmatrix} a^2 & ab & ac \\ ba & b^2 & bc \\ ca & cb & c^2 \end{bmatrix}$ , then AB is equal to **75.** 

(d) none of these

If  $\begin{bmatrix} x+y & y \\ 2x & x-y \end{bmatrix} \begin{bmatrix} 2 \\ -1 \end{bmatrix} = \begin{bmatrix} 3 \\ 2 \end{bmatrix}$ , then xy is equal to

(c) 4

(d) 6

If  $\cos (x - y)$ ,  $\cos x$  and  $\cos (x + y)$  are in H.P., then  $\left|\cos x \sec \frac{y}{2}\right|$  equals 77. (a) 1 (b) 2

(d) none of these

If  $\cos \alpha = \frac{1}{2} \left( x + \frac{1}{x} \right)$ ,  $\cos \beta = \frac{1}{2} \left( y + \frac{1}{y} \right)$ , then  $\cos (\alpha - \beta)$  is equal to **78.** 

(a)  $\frac{x}{v} + \frac{y}{x}$ 

(b)  $xy + \frac{1}{xy}$  (c)  $\frac{1}{2} \left( \frac{x}{y} + \frac{y}{x} \right)$  (d) none of these

The number of solutions of  $\sin^2 \theta + 3\cos \theta = 3$  in  $[-\pi, \pi]$  is **79.** 

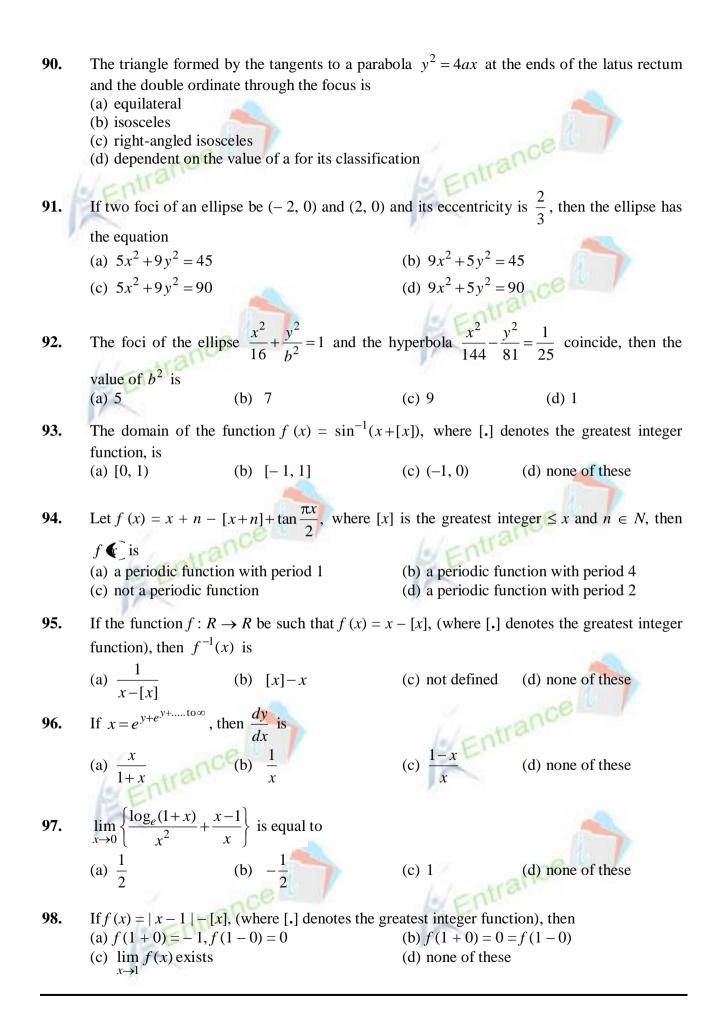
(a) 4

(b) 2

(d) none of these

80.	The principal value o	of $\cos^{-1} \left\{ \frac{1}{\sqrt{2}} \left( \cos \frac{9\pi}{10} - \sin \frac{9\pi}{10} \right) \right\}$	$\left.\frac{9\pi}{10}\right\}$ is	
		_	<i>'</i> )	
	(a) $\frac{3\pi}{20}$	(b) $\frac{7\pi}{20}$	(c) $\frac{7\pi}{10}$	(d) none of these
81.	The solution set of lo	$\log_2  4 - 5x  > 2$ is	6/Entra	700
6	(a) $\left(\frac{8}{5},\infty\right)$		(b) $\left(\frac{4}{5}, \frac{8}{5}\right)$	
,	(c) $(-\infty, 0) \cup \left(\frac{8}{5}, \infty\right)$		(d) none of these	ce li
82.		(a + b - c) = ab, then the	e measure of $\angle C$ is	inco
	(a) $\frac{\pi}{3}$	(b) $\frac{\pi}{6}$	(c) $\frac{2\pi}{3}$	(d) none of these
83.	1.5 m tall man starts	6 m high, stands at a control to walk away from the waximum distance to which	all on the other sid	e of the wall, in line with
	(a) $\frac{5}{2}$ m	(b) $\frac{3}{2}$ m	(c) 4 m	(d) none of these
84.	The equation of the s	straight line which bisects	the intercepts mad	e by the axes on the lines
	x + y = 2 and $2x + 3y(a) 2x = 3$	= 6 is (b) $y = 1$	(c) $2y = 3$	(d) $x = 1$
85.		3x + 4y = 1 and $y = mx + 3$	3 are concurrent, the	
	(a) $\frac{19}{5}$	(b) 1	(c) $\frac{5}{19}$	(d) none of these
86.	A point on the line y	= x whose perpendicular of	distance from the li	ine $\frac{x}{4} + \frac{y}{3} = 1$ is 4, has the
	co-ordinates (a) $\left(\frac{8}{7}, \frac{8}{7}\right)$	(32 32)	(3 3)	
	(a) $\left(\frac{7}{7}, \frac{7}{7}\right)$	(b) $\left(\frac{32}{7}, \frac{32}{7}\right)$	(c) $\left(\frac{1}{2}, \frac{1}{2}\right)$	(d) none of these
87.	If $2(x^2+y^2)+4\lambda x+$	$\lambda^2 = 0$ represents a circle	of meaningful rad	ius then the range of real
	values of $\lambda$ is (a) $R$	(b) $(0, \infty)$	(c) $(-\infty, 0)$	(d) none of these
88.	If the line $\lambda x + \mu y = 1$	1 is a normal to the circle 2	$2x^2 + 2y^2 - 5x + 6y$	y-1=0, then
	(a) $5\lambda - 6\mu = 2$	(b) $4 + 5\mu = 6\lambda$	(c) $4 + 6\mu = 5\lambda$	(d) none of these
89.	If $(2, -8)$ is an end o	of a focal chord of the para	bola $y^2 = 32x$ , the	en the coordinates of other
	end of the chord is (a) (32, 32)	(b) (32, –32)	(c) (-2, 8)	(d) none of these

80.



- **99.** Let  $h(x) = \min \{x, x^2\}$  for every real number x. Then which of the following is false?
  - (a) h is continuous for all x

(b) h is differentiable for all x

(c) h'(x) = 1 for all x > 1

- (d) h is not differentiable at two values of x
- 100. The equation of a curve is given by  $x = e^t \sin t$ ,  $y = e^t \cos t$ . The inclination of the tangent to the curve at the point  $t = \frac{\pi}{4}$  is
  - (a)  $\frac{\pi}{4}$
- (b)  $\frac{\pi}{3}$

- (c)  $\frac{\pi}{2}$
- (d) 0

