



MATHS

BOOKS - NTA MOCK TESTS

NTA TPC JEE MAIN TEST 37

Mathematics

1. The coefficient of x^{10} in the expansion of:

$$\left(3x^2-rac{1}{x^2}
ight)^{15}$$
 is:

A.
$$\frac{15!}{10!5!} 3^{10}$$

B. $-\frac{15!}{10!5!} 3^{10}$
C. $-\frac{15!3^5}{10!5!}$
D. $\frac{15!}{7!8!} 3^8$

Answer: B

View Text Solution 2. Given that z_1, z_2 and z_3 are complex

numbers with $ert z_1 ert = ert z_2 ert = ert z_3 ert = 1, \, z_1 + z_2 + z_3 = 1$ and

 $z_1z_2z_3=1$, then $|(z_1+2)(z_2+2)(z_3+2)|$ is

equal to:

A. 14

B. 15

C. 20

D. 9

Answer: B



3. Let
$$f(x) = \ln\left(x + \sqrt{x^2 + 1}\right)$$
, then the
value of determinant:
 $\begin{vmatrix} f(\sin 2017\pi) & f\left(\frac{\sin \pi}{6}\right) & f(e^x) \\ f\left(\frac{\cos(2\pi)}{3}\right) & f\left(\frac{\cos(2017\pi)}{2}\right) & f\left(\frac{\tan \pi}{3}\right) \\ f(-e^x) & f\left(\frac{\cot(5\pi)}{6}\right) & f(0) \end{vmatrix}$ is:

A. 0

 $\mathsf{B.}\,\sqrt{3}$

$$\mathsf{C}. e^{\sqrt{3}}$$

D. π

Answer: A



4. Which of the following is correct ?

A. f A and B are square matrices of order 3 such that |A| = -1, |B| = 3, then the determinant of 3AB is equal to 27. B. If A is an invertible matrix, then det (A^{-1}) is equal to det (A) C. If A and B are matrices of the same

order,

then

$$\left(A+B\right)^2 = A^2 + 2AB + B^2$$

is

possible if AB = 1.

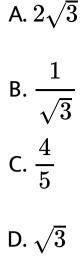
D. None of these

Answer: D

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5. A line is drawn from A(-4, 0) to intersect the curve $\frac{x^2}{8} + \frac{y^2}{4} = 1$ at P and Q above zaxis. If $\frac{1}{AP} + \frac{1}{AQ} \ge \frac{\sqrt{3}}{2}$, then the

maximum value of the slope of line is:



Answer: B

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6. If
$$n(A) = 1000, n(B) = 500$$
 and if $n(A \cap B) \geq 1$ and $n(A \cup B) = p$, then

A. $500 \leq p \leq 1000$

B.
$$1001 \le p \le 1498$$

 $\mathsf{C.}\,1000 \leq p \leq 1498$

D. $1000 \le p \le 1499$

Answer: D



7. A circle passes through the points of intersection of the parabola $y+1=(x-4)^2$

and x-axis. Then the length of tangent from

origin to the circle is:

A. 8

B. 15

 $C.\sqrt{8}$

D. $\sqrt{15}$

Answer: D



8. An equilateral triangle is inscribed in ellipse whose equation is $x^2 + 4y^2 = 4$, one vertex of triangle is (0, 1) and one altitude is contained in y -axis and length of each side is $\sqrt{\frac{m}{n}}$ (where m and n are relatively prime), then m + n is:

A. 937

B. 973

C. 793

D. 739

Answer: A



9. The number of integral values of a for which

three distinct chords of the ellipse $rac{x^2}{2a^2}+rac{y^2}{a^2}=1$ passing through the point $\left(20a,\ -rac{a^2}{2}
ight)$ are bisected by the parabola $y^2=4ax$ is:

A. 14

C. 6

D. 20

Answer: A

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10. If $ax^2 + 2hxy - ay^2 = 0, a > 0$, represents a pair of straight lines forming with 2x + 3y = -8 an isosceles triangle which is right angled at origin, then (a + h) is: A. 7

B. 17

C.-7

D. - 17

Answer: C

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11. If $x \cos \alpha + y \sin \alpha = p$ is tangent to the

curve $y = -\sqrt{x}$, then range of a is:

$$\begin{array}{l} \mathsf{A}. \ \cup_{n \in N} \ (2n\pi, (2n+1)\pi) \\\\ \mathsf{B}. \ \cup_{n \in N} \ \left(n\pi, \left(n+\frac{1}{2}\right)\pi\right) \\\\ \mathsf{C}. \ \cup_{n \in N} \ \left(\frac{n\pi}{2}, (n+1)\frac{\pi}{2}\right) \\\\ \mathsf{D}. \ (-\infty, \infty) \end{array}$$

Answer: C

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12. Let P = (-1,0), Q = (0,0) and $R = \left(3, 3\sqrt{3}\right)$ be

three point. The equation of the bisector of

the angle PQR is:

A.
$$rac{\sqrt{3}}{2}x+y=0$$

B.
$$x+\sqrt{3}y=0$$

C.
$$\sqrt{3}x+y=0$$

D.
$$x+rac{\sqrt{3}}{2}y=0$$

Answer: C

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13. If
$$\sum_{n=1}^k \left[rac{1}{3} + rac{n}{90}
ight] = 21$$
, where [x] denotes

the integral part of x, then is equal to

A. 84

B. 80

C. 85

D. 86

Answer: B

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14. If the tangent at any point on the curve $x^4+y^4=a^4$ cuts off intercepts p and q on

the co-ordinate axes then the value of $p^{-4/3} + q^{-4/3}$ is: A. $a^{-4/3}$ B. $a^{-1/2}$ C. $a^{1/2}$

D. None

Answer: A



15. A continuous function $f\!:\!R o R$ satisfies

the differential equation
$$f(x)=ig(1+x^2ig)igg[1+rac{f_0^x{(f(t))}^2}{1+t^2}dtigg],$$
 then f(-3) is:

A.
$$\frac{13}{10}$$

B. $\frac{8}{5}$
C. $\frac{10}{13}$
D. $\frac{5}{8}$







16.

$$\int \sqrt{2} \sqrt{1+\sin x} dx = -4\cos(ax+b)+C$$

lf

then the value of (a,b) is :

A.
$$\left(\frac{1}{2}, \frac{\pi}{4}\right)$$

B. $\left(1, \frac{\pi}{2}\right)$

C. (1,1)

D. None of these

Answer: A



17. p : Every quadratic equation has one real root and q Every quadratic equation has two real roots, then truth value of p and q are:

A. p is true and q is false

B. p is false and q is true

C. p and q both true

D. p and g both false

Answer: D



x_{i}	140	145	150	155	160	165
f_i	4	6	15	30	36	24

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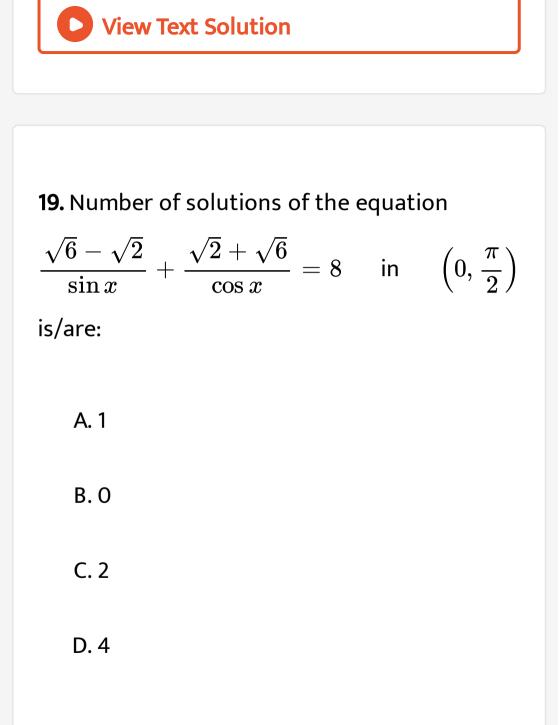
A. 8.64

B. 7.26

C. 7.05

D. None

Answer: B



Answer: C



20. Number of solutions of the equation $\sin^{-1}(\sin 6x) = x$ in $x \in [0,\pi]$ is:

- A. 4
- B. 5
- C. 6
- D. 7

Answer: A





21. The tens digit of 1! + 2! + 3! + ... + 49! Is:

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22. Let k_1 and k_2 are two values of k for which the equation $4x^2 - 4(5x + 1) + k^2 = 0$ has one root equals to two more than the other, then find the value of: $\left(k_1^2 - k_2^2\right)$

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23. Let
$$\overrightarrow{a}$$
, \overrightarrow{b} and \overrightarrow{c} be three vectors such that $\left|\overrightarrow{b}\right| = 2\left|\overrightarrow{a}\right|$ and $3\left|\overrightarrow{a}\right|$. The Angle between each pair of vectors is 60° such that $\left|\overrightarrow{a} + 2\overrightarrow{b} + 3\overrightarrow{c}\right| = \sqrt{21}$, then $\sqrt{7}\left|\overrightarrow{c}\right|$ is

equal to:



24. Let
$$(\lim)_{h \to 0} \left(\frac{1}{h \sqrt[3]{8+h}} - \frac{1}{2h} \right) = k$$
,

then find 96k + 3.

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25. Let
$$L = \lim_{n o \infty} rac{1}{n^3} \sum_{k=1}^n k^2 e^{rac{k}{n}}$$
, then find

the value of e-L

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26. If $f(x) \ge 0 \forall x \in (0, 2)$ and y = f (x) makes positive intercepts having length 2 and 1 unit(s) on coordinate axes respectively and encloses an area of $\frac{3}{4}$ sq. units with axes, then the value of $3 - 4 \int_0^2 x f(x) dx$ is:



27. Find $f(x) = rac{\left(a^x-1
ight)^3}{\sin(x\log a)\log\left(1+x^2\log a^2
ight)}$ and $f(0) = m\log a$. Find m such that f is continuous at x=0.

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28. If x = 9 is the chord of contact of the hyperbola $x^2 - y^2 = 9$, then the equation of

the pair of tangents forming the chord of contact is $ax^2 - by^2 - 18x + 9 = 0$. Find the value of a + b.

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29. If
$$\tan(\pi\cos\theta) = \cot(\pi\sin\theta)$$
, then $2\cos^2\left(\theta - \frac{\pi}{4}\right)$ is:

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30. An urn contains 6 white and 4 black balls. A fair die is rolled and that number of balls are chosen from the urn. Find the probability that balls selected are white.

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