



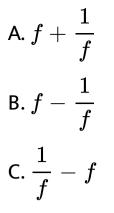
MATHS

BOOKS - NTA MOCK TESTS

NTA TPC JEE MAIN TEST 105

Mathematics

1. If $R = (\sqrt{2} + 1)^{2n+1}$ where [f] and f = R - [R] denotes the greatest integer function and fractional part of R respectively, then the value of [R] is equal to:



D. None of these

Answer: C



2. The locus of the mid points of the chords of the ellipse $x^2/a^2 + y^2/b^2 = k, k > 0$, making equal intercepts on the coordinate axes, is: A. x = y

B.
$$x + y = 0$$

C.
$$x \, / \, a^2 = y \, / \, b^2$$

D.
$$x/a^2 + y/b^2 = 0$$

Answer: C



3. If the boolean expression $(p \land -r) \Rightarrow (r \lor q)$

is false and q and r are both false, then p is

4. If A and B are square matrices of order 3×3 , then which of the following is true ?

A.
$$AB = O \Rightarrow A = O$$
 or B = O

B. det (2AB) = 8 det (A) det (B)

C. $A^2 - B^2 = (A + B)(A - B)$

D. det (A + B) = det (A) + det (B)

Answer: B

5. If A, B and C are non-empty sets, then $(A - B) \cup (B - A)$ equals A. $(A \cup B) - B$ B. $A - (A \cap B)$ $\mathsf{C}.\,(A\cup B)-(A\cap B)$ $\mathsf{D}.\,(A\cap B)\cup(A\cup B)$ **Answer: C**

6. 2 C of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ to the tangent drawn at a point R on the hyperbola If S & S'are the two foci of the hyperbola, then find the value of $(RS + RS')^2$

A.
$$4a^2\left(1+rac{b^2}{a^2}
ight)$$

B. $a^2\left(1+rac{b^2}{a^2}
ight)$
C. $2a^2\left(1+rac{b^2}{a^2}
ight)$

D. None of these

Answer: A

7. The sum of first 12 terms of an A.P. having its two middle terms equal to 1 and 7 respectively, is equal to:

A. 24

B. 36

C. 48

D. 96

Answer: C



8. A and B are events such that
$$P(A \cup B) = \frac{3}{4}$$

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

 $Pig(\overline{A}\cap Big)$ is:

A.
$$\frac{5}{12}$$

B. $\frac{3}{8}$
C. $\frac{5}{8}$
D. $\frac{1}{4}$

Answer: A



9. If the image of the point A (1,2, -3) in the plane 2x + 3y - z = 8 measured parallel to the line $\frac{x}{1} = \frac{1-y}{1} = \frac{z}{2}$ is B, then AB is equal to: A. $\sqrt{6}$ B. $\sqrt{24}$ C. $2\sqrt{66}$ D. $\sqrt{66}$

Answer: B



10. For a given integer k, in the interval $\left[2\pi k+rac{\pi}{2},2\pi k-rac{\pi}{2}
ight]$ the graph of sin x is:

A. increasing from -1 to 1

B. decreasing from -1 to 0

C. decreasing from 0 to 1

D. None of these

Answer: A

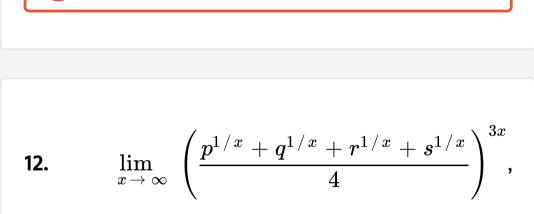


11. Two circles C_1 and C_2 on Argand plane represented by |z+1| = 3 and |z-2| = 7respectively. If a variable circle $|z-z_0| = r$ be inside circle C_2 such that it touches circle C_1 externally and circle C_2 internally, then locus of z_0 describes a conic C whose eccentricity is equal to:

A.
$$\frac{1}{10}$$

B. $\frac{3}{10}$
C. $\frac{5}{10}$
D. $\frac{7}{10}$

Answer: B



where p, q, r, s > 0 is equal to:

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A. pqrs

- $\mathsf{B.}\left(pqrs\right)^{3}$
- C. $\left(pqrs
 ight)^{3\,/\,2}$
- D. $\left(pqrs
 ight)^{3\,/\,4}$

Answer: D



Consider

 $f(x)=px^2+qx+r, p>0, q<0, r>0,$ and $q^2>4pr$, then number of points where |f(|x|)| is not differentiable is:

A. 1

B. 3

C. 5

D. 7

Answer: C

14. If
$$\int \frac{1-2019\cos^2 x}{(\sin x)^{2019}\cos^2 x} dx = \tan x. \ f(x) + C$$

where 'C' is an integral constant then $f\left(\frac{\pi}{2}\right) + f'\left(\frac{\pi}{2}\right) + f\left(-\frac{\pi}{2}\right)$ is equal to:

A. 3

B. 1

C. 0

 $\mathsf{D.}-1$

Answer: C



15. The circle passing through (1, -2) and touching the axis of x at (3, 0). Then which of the following points lie on the circle.

A.
$$(5, -2)$$

B. $(-2, 5)$
C. $(-5, 2)$
D. $(2, -5)$

Answer: A



16. The area of the region bounded by two parabolas $y=x^2$ and $x=y^2$ is:

A.
$$\frac{1}{4}$$
 sq. unit
B. $\frac{1}{3}$. Sq unit

C. 4 sq. unit

D. 3 sq. unit

Answer: B



17. Find the value of
$$\sin^{-1}\left(\frac{\sin(4\pi)}{3}\right)$$

A.
$$\frac{\pi}{6}$$

B. $\frac{4i}{5}$
C. $\frac{\pi}{3}$
D. $\frac{\pi}{5}$

Answer: D



18. A ray of light coming along the line
$$x + y - 2 = 0$$
 gets reflected from the line $2x - y + 1 = 0$ and goes along the line $ax + by - 12 = 0$ then

A.
$$a+b=6$$

$$\mathsf{B}.\,b-a=8$$

$$\mathsf{C.}\,a\,/\,b=7$$

D.
$$b imes a=7$$

Answer: D

19. The differential equation:

 $(x\cot y + \ln(\cos x))dy + (\ln(\sin y) - y\tan x)dx = 0$ general solution as :

A.
$$(\sin x)^y (\cos y)^x = c$$

$$\mathsf{B.} (\sin y)^x (\cos y)^y = c$$

$$\mathsf{C}_{\cdot} (\sin x)^y (\sin y)^x = c$$

D.
$$(\cot x)^y (\cot y)^x = c$$

Answer: B

20. $3^n > n^3$ is true for (where $n \in N$)

A. n>2

 $\mathsf{B.}\,n\geq 3$

 $\mathsf{C.}\,n\geq 4$

 $\mathsf{D.}\,n<4$

Answer: C

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21. The differentiable functions f, g and h such that:

f'(x) = g(x), g'(x) = h(x), h'(x) = f(x)

f(0) = 1, g(0) = 0 = h(0) find:

$$[f(x)]^3 + [g(x)]^3 + [h(x)]^3 - 3f(x)g(x)h(x)$$
 at x
= 7.

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22. Consider the word ALLAHABAD. Let p and q represent the number of words formed from the letters of the word ALLAHABAD in which vowels occupy the even positions and the words in which two L are not together, respectively. Find $\frac{q}{p}$



23. If -9 is a root of the equation $\begin{vmatrix} x & 3 & 7 \\ 2 & x & 2 \\ 7 & 6 & x \end{vmatrix} = 0,$

then find the sum of other two roots.



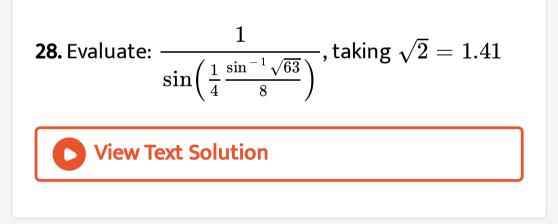
24. A continuous function f satisfies $x^2+ig(f(x)-4\sqrt{2}+2ig)x+6-2\sqrt{2}-\sqrt{2}f(x)=0$ $x\in R-\{\sqrt{2}\}$, then the value of $ig|fig(3\sqrt{2}ig)ig|$ is:

25. Consider the a,b and c be three non-zero vectors such that c is a unit vector perpendicular to both a and b. If the angle between a and b be $\frac{\pi}{2}$ and $[abc]^2 = k|a|^2|b|^2$ then k is equal to:



26. Let $f: R \to R$ be a function defined by $f(x) = \begin{cases} [x] & x \leq 2 \\ 0 & x > 2 \end{cases}$, where [x] denotes the greatest integer function. If $I = \int_{-1}^{2} \frac{xf(x^2)}{2+f(x+1)} dx$, then find the value of 2I

27. In a right angled triangle
$$\triangle ABC, C = \frac{\pi}{2}, s - a = 10, s - b = 3$$
 find s. View Text Solution



29. The A.M. of the series 1,5,9,13,..., (4n - 3) is 29. Find the value of n.



30. If x is rational and $4\left(x^2+rac{1}{x^2} ight)+16\left(x+rac{1}{x} ight)-57=0$, then the

positive integral value of # is equal to: