MATHS

BOOKS - NTA MOCK TESTS

JEE MOCK TEST 6

Mathematics

1. $\sin \alpha x + \cos \alpha x$ and $|\cos x| + |\sin x|$ are periodic functions of same fundamental period, if α equals

A. 0

B. 1

C. 2

D. 4

Answer: D

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2. Differential coefficient of $\log_{10} x$ w.r.t $\log_x 10$ is

A. 1

B. $-(\log_{10} x)^2$

C. $(\log_x 10)^2$

D. $\frac{x^2}{100}$

Answer: B

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3. If A,B and C are the angles of a triangle and

$$\begin{vmatrix} 1 & 1 & 1 \\ 1+\sin A & 1+\sin B & 1+\sin C \\ \sin A+\sin^2 A & \sin B+\sin^2 B & \sin C \sin^2 C \end{vmatrix} = 0$$

then Δ ABC must be .

A. right angled isosceles

B. isosceles

C. equilateral

D. scalene

Answer: B

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4. The contrapositive of the statement "If two triangles are identical, then they are similar" is

A. If two triangles are not similar, then they are not identical

B. If two triangles are not identical, then they are not similar

C. If two triangles are not identical, then they are similar

D. If two triangles are not similar, then they are identical

Answer: A

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5. If $f(x) = a - (x - 3)^{8/9}$, then the maximum value of $f(x)$ is

A. 3

B. $a - 3$

C. a

D. none of these

Answer: C

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6. Write the value of $\sin\left(\cot^{-1} x\right)$.

A. $\sqrt{1+x^2}$

B. x

C. $\frac{1}{\sqrt{1+x^2}}$

D. $\sqrt{1-x^2}$

Answer: C

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7. The area bounded by the curves $y = x^2$ and $y = \frac{2}{(1+x^2)}$ is

A. $\left(\pi - \frac{1}{3}\right)$ sq. units

B. $\left(\pi - \frac{2}{3}\right)$ sq. units

C. $\frac{(2\pi - 1)}{3}$ sq. units

D. none of these

Answer: B

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8. Evaluate: $(\text{Lim})_{x \to 0} \frac{x^{6000} - (\sin x)^{6000}}{x^2 (\sin x)^{6000}}$

A. 1000

B. 100

C. 1100

D. 1010

Answer: A

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9. If [x] stands for the greatest integer function, the value of $\int_4^{10} \frac{[x^2]}{[x^2-28x+196]+[x^2]}dx$, is

A. $\frac{1}{3}$

B. 6

C. 7

D. 3

Answer: D

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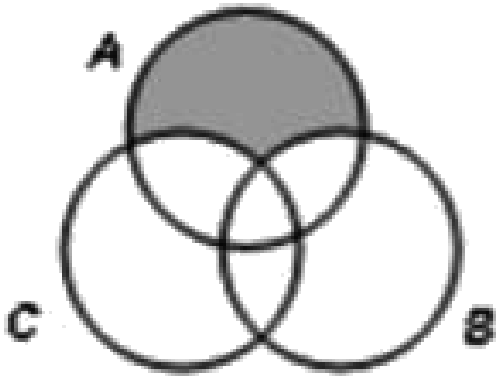
10. The shaded region in the give figure represents



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

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

C. $A \cap (B - C)$

D. $A - (B \cup C)$

Answer: D

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11. If $a\sin^2 x + b\cos^2 x = c, b\sin^2 y + a\cos^2 y = d$ and $a\tan x = b\tan y$ then $\frac{a^2}{b^2} = \ldots\ldots\ldots \left(0 < x, y < \frac{\pi}{2}\right)$

A. $\frac{(b-c)(d-b)}{(a-d)(a-b)}$

B. $\frac{(a-d)(c-a)}{(b-c)(d-b)}$

C. $\frac{(d-a)(c-a)}{(b-c)(d-b)}$

D. $\frac{(b-c)(b-d)}{(a-c)(a-d)}$

Answer: B

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12. Number of points from where perpendicular tangents can be drawn to the curve $\frac{x^2}{16} - \frac{y^2}{25} = 1$ is

A. 1

B. 2

C. 0

D. infinte

Answer: C

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13. The sum of the first 20 terms common between the series 3 +7+11+15+... and 1+6+11 +16+... is

A. 4000

B. 4200

C. 4220

D. 4020

Answer: D

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14. Let 10 vertical poles standing at equal distances on a straight line , subtend the same angle of elevation α at a point O on this line and all the poles are on the same side of O. If the height of the longest pole is h and the distance of foot the smallest pole form O is α then the distance between two consecutive poles, is

A. $\frac{h\sin\alpha + a\cos\alpha}{9\cos\alpha}$

B. $\frac{h\cos\alpha - a\sin\alpha}{9\sin\alpha}$

C. $\frac{h\sin\alpha + a\cos\alpha}{9\sin\alpha}$

D. $\frac{h\cos\alpha - a\sin\alpha}{9\cos\alpha}$

Answer: B

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15. Let $\vec{u}, \vec{v}$ and $\vec{w}$ be vectors such that $\vec{u} + \vec{v} + \vec{w} = 0$ if $\left|\vec{u}\right| = 3, \left|\vec{v}\right| = 4$ and $\left|\vec{w}\right| = 5$ then $\vec{u} . \vec{v} + \vec{v} . \vec{w} + \vec{w} . \vec{u}$ is

A. -25

B. -27

C. 28

D. 25

Answer: A

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16. The total number of ways in which 5 balls of different colours can be distributed among 3 persons so that each person gets at least one ball is

A. 75

B. 150

C. 210

D. 243

Answer: B

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17. The order of the differential equation whose general solution is given by $y = (C_1 + C_2)\cos(x + C_3) - C_4 e^{x + C_5}$, where C_1, C_2, C_3, C_4, C_5 , are arbitrary constants, is

A. 5

B. 4

C. 3

D. 2

Answer: C

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18. In a competitive examination, an examinee either guesses or copies or knows the answer to multiple choice question with four choices. The probability that he makes a guess is $\frac{1}{3}$ and the probability that he copies the answer is 1/6. The probability that the answer is correct, given that he copies it, is $\frac{1}{8}$. Find the probability that he knows the answer to the question, given that he correctly answered

A. $\frac{24}{31}$

B. $\frac{17}{24}$

C. $\frac{24}{29}$

D.

Answer: C

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19. The number of values of $\theta \in \left[\frac{-3\pi}{2}, \frac{4\pi}{3}\right]$ which satisfies the system of equations.

$2\sin^2\theta + \sin^2 2\theta = 2$ and

$\sin 2\theta + \cos 2\theta = \tan\theta$ is

A. 2

B. 4

C. 6

D. 8

Answer: C

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20. If the three distinct lines

$x + 2ay + a = 0, x + 3by + b = 0$ and

$x + 4ay + a = 0$ are concurrent , then the point (a,b)

lies on a .

A. circle

B. straight line

C. parabola

D. hyperbola

Answer: B

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21. If the line y - 2 =0 is the directrix of the parabola $x^2 - ky + 32 = 0, k \neq 0$ and the parabola intersects the circle $x^2 + y^2 = 8$ at two real distinct points, then the absolute value of k is .

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22. If z_1, z_2, z_3 are complex numbers such that $|z_1| = |z_2| = |z_3| = \left|\frac{1}{z_1} + \frac{1}{z_2} + \frac{1}{z_3}\right| = 1$, Then find the value of $|z_1 + z_2 + z_3|$ is :

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23. If the 4^{th} term of $\left\{\sqrt{x^{\frac{1}{1+\log_{10}x}}}+\sqrt[12]{x}\right\}^{6}$ is equal to 200, $x>1$and the logarithm is common logarithm, then x is not divisible by

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24. If $\int\frac{dx}{\sqrt{x}+\sqrt[3]{x}}=a\sqrt{x}+b\left(\sqrt[3]{x}\right)+c\left(\sqrt[6]{x}\right)+d$ In being an arbitary constant then the value of $20a+b+c+d$ is

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25. Given

$$f(x) = \begin{cases} x^2 \times e^{2(x-1)} & 0 \leq x \leq 1 \\ a \quad sgn(x+1)\cos(2x-2) + bx^2 & 1 < x \leq 2 \end{cases}$$

is differentiable at $x = 1$, then the value of $|a - b|$ is

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