



MATHS

BOOKS - NTA MOCK TESTS

NTA JEE MOCK TEST 102



1. In the expansion of $(a+b)^n$, first three terms are 243, 810 and 1080 respectively, then the fourth term of the expansion is $(n\in N)$

A. 32

B. 720

C. 510

D. 420

Answer: B



2. If
$$z=x+iy,~orall x,y\in R, i^2=-1, xy
eq 0$$
 and $|z|=2$, then the imaginary part of $rac{z+2}{z-2}$ cannot be

A. 1

B. 3

C. 2

D. 4

Answer: A



3. The number of permutations of the alphabets of the word "GOOGLE"

in which O's are together but G's are separated, is

A. 24

B.48

C. 72

D. 36

Answer: D

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4. If B, C are square matrices of same order such that $C^2 = BC - CB$ and $B^2 = -I$, where I is an identity matrix, then the inverse of matrix (C - B) is

A. C

 $\mathsf{B.}\,C+B$

 $\mathsf{C.}\, C-B$

 $\mathsf{D}.\,I$

Answer: B

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5. The tangent drawn to the hyperbola $\frac{x^2}{16} - \frac{y^2}{9} = 1$, at point P in the first quadrant whose abscissa is 5, meets the lines 3x - 4y = 0 and 3x + 4y = 0 at Q and R respectively. If O is the origin, then the area of triangle OQR is (in square units)

A. 6

B. 12

C. 3

D. 24

Answer: B

6. Two natrual numbers are randomly chosen and multiplied, then the chance that their product is divisible by 3 is

A.
$$\frac{4}{9}$$

B. $\frac{5}{9}$
C. $\frac{2}{3}$
D. $\frac{1}{9}$

Answer: B

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7. If α and β are the roots of the equation $x^2 + x + c = 0$ such that $\alpha + \beta, \alpha^2 + \beta^2$ and $\alpha^3 + \beta^3$ are in arithmetic progression, then c is equal to

A. 1

B. $\frac{4}{3}$

C.
$$\frac{4}{5}$$

D. $\frac{4}{7}$

Answer: D

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8. In a harmonic progression $t_1, t_2, t_3, \ldots, \ldots, t_n$ it is given that

 $t_5\,=\,20\,\,\,{
m and}\,\,\,t_6\,=\,50.$ If S_n denotes the sum of first n terms of this, then

the value of n for which S_n is maximum is

A. 6

B. 7

C. 9

D. 10

Answer: A

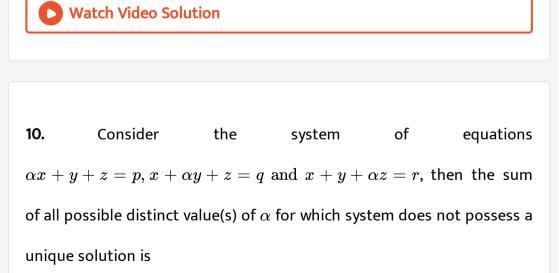
9. The locus of the centre of the circle which makes equal intercepts on

the lines x + y = 1 and x + y = 5 is

A. x-y=2B. x+y=6C. x+y=3

D. x - y = 0

Answer: C



 $\mathsf{A.}-2$

B. 1

 $\mathsf{C}.-1$

D. 0

Answer: C

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11. The normal to the parabola $y^2 = 4x$ at P(9, 6) meets the parabola again at Q. If the tangent at Q meets the directrix at R, then the slope of another tangent drawn from point R to this parabola is

A. 11

B.
$$\frac{11}{3}$$

C. $\frac{3}{11}$

D.3

Answer: B



12. The number of points where $f(x) = \left|x^2 - 3 \left|x\right| - 4
ight|$ is non -differentiable is

A. 1

- B. 2
- C. 3

D. 4

Answer: C



13. The complete set of values of
$$\alpha$$
 for which the lines $\frac{x-1}{2} = \frac{y-2}{3} = \frac{z-3}{4}$ and $\frac{x-3}{2} = \frac{y-5}{\alpha} = \frac{z-7}{\alpha+2}$ are

concurrent and coplanar is

A. $\{2, 3\}$

B. $\{0, 3\}$

 $\mathsf{C}.\,[\,-2,\,3]$

D. R

Answer: D

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14. Let
$$f(x)=2x+1$$
 and $g(x)=\int\!\!\frac{f(x)}{x^2(x+1)^2}dx.$ If $6g(2)+1=0$ then $g\left(-\frac{1}{2}\right)$ is equal to

A. 4

 $\mathsf{B.}-4$

C. 3

D. 2

Answer: A



15. Let f(x) be a cubic function such that f'(1) = f''(2) = 0. If x = 1 is a point of local maxima of f(x), then the local minimum value of f(x) occurs at

A. x = 0

 $\mathsf{B.}\, x=2$

C. x = 4

 $\mathsf{D.}\,x=3$

Answer: D

16. The maximum value of p for which the lines 3x - 4y = 2, 3x - 4y = 12, 12x + 5y = 7 and 12x + 5y = p constitute the sides of a rhombous is

A. 33 B. 19

 $\mathsf{C.}-19$

D. 9

Answer: A

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17. The function $f\!:\!R o R$ defined as $f(x)=rac{x^2-x+1}{x^2+x+1}$ is

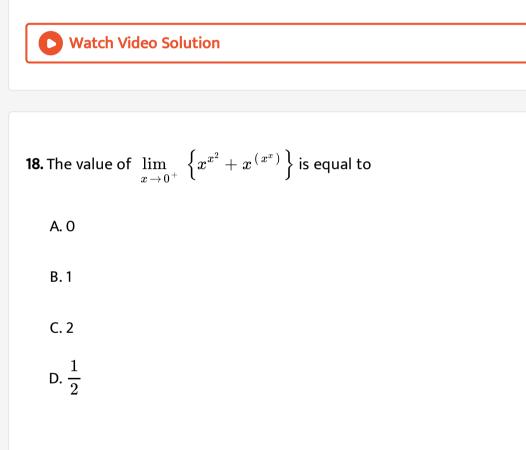
A. injective as well as sujective

B. injective but not surjective

C. surjective but not injective

D. neither injective nor surjective

Answer: D



Answer: B

19. The area (in sq. units) bounded by $y = \ln x, y = rac{x}{e}$ and y - axis is

equal to

A.
$$\frac{e}{2} - 1$$

B. $\frac{e}{2}$
C. $\frac{5e}{2}$
D. $\frac{3e}{2} - 1$

Answer: B



20. Consider three vectors $\overrightarrow{p} = \hat{i} + \hat{j} + \hat{k}, \overrightarrow{q} = 3\hat{i} - \hat{j} + \hat{k} \text{ and } \overrightarrow{r} = \alpha\hat{i} + \beta\hat{j} + \lambda\hat{k}, \forall \alpha, \beta, \lambda \in \mathbb{R}$. If $[\overrightarrow{p} \quad \overrightarrow{q} \quad \overrightarrow{r}]$ is maximum and $[\overrightarrow{r}] = 2\sqrt{6}$, then the value of $\alpha - \beta - \lambda$ is equal to

C. 0

 $\mathsf{D}.-4$

Answer: B

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21. If
$$\sin \theta + \sin^2 \theta = 1$$
, then prove that

$$\cos^{12} heta+3\cos^{10} heta+3\cos^8 heta+\cos^6 heta-1=0$$

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22. If
$$y = f(x)$$
 satisfies the differential equation $\frac{dy}{dx} + \frac{2x}{1+x^2}y = \frac{3x^2}{1+x^2}$ where $f(1) = 1$, then $f(2)$ is equal to

23. If the variance of the first 50 odd natural numbers is V_1 and the variance of next 50 odd natural numbers is V_2 , then $V_1 + V_2$ is equal to



24.

$$I_1 = \int_0^{rac{\pi}{2}} e^{\sin x} (1 + x \cos x) dx ext{ and } I_2 = \int_0^{rac{\pi}{2}} e^{\cos x} (1 - x \sin x) dx,$$

then $\left[rac{I_1}{I_2}
ight]$ is equal to (where $[x]$ denotes the greatest integer less than

or equal to x)

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25. The number of solution of $\cos^2 x + \cos^2 2x = 2$ in [0, 20] is equal to

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