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India's Number 1 Education App

## MATHS

## BOOKS - JBD PUBLICATION

## MODEL PAPER (1)

## Exercise

1. Let $n(U)=500$. If $A$ and $B$ are such that
$\mathrm{n}(\mathrm{A})=200, \mathrm{n}(\mathrm{B})=300$ and $n(A \cap B)=100$ then
$n\left(A^{\prime} \cap B^{\prime}\right)$ is equal to:
A. 200

B. 300

C. 100

D. 150

## Answer:

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2. If $f(x)=a x+b$, where $a$ and $b$ are integers, $f(-1)=-7$ and $f(2)=8$, then $a$ and $b$ are equal to:
3. $\sin ^{2} 45^{\circ}-\sin ^{2} 30^{\circ}$ is equal to:
A. 0
B. $\frac{1}{4}$
C. $\frac{1}{\sqrt{3}}$
D. $\frac{\sqrt{3}}{2}$

Answer:

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4. ${ }^{\wedge} 5 C_{1}+{ }^{5} C_{2}+{ }^{5} C_{3}+{ }^{5} C_{4}+{ }^{5} C_{5}$ is equal to
A. 30
B. 31
C. 32
D. None of these

Answer:

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5. If $g_{1}, g_{2}$ are two G.M's between two numbers
a and b , then $\frac{g_{1}^{2}}{g_{2}}+\frac{g_{2}^{2}}{g_{1}}$ is equal to:
A. $a b$
B. $\frac{a+b}{a b}$
C. $a+b$

## D. None of these

## Answer:

6. The area of a triangle with vertices at $(-4,-1)$,
$(1,2)$ and $(4,-3)$ is:
A. 17
B. 16
C. 15
D. None of these

Answer:
7. The distance between the directrices of the ellipse $\frac{x^{2}}{4}+\frac{y^{2}}{9}=1$ is:

$$
\begin{aligned}
& \text { A. } \frac{16}{\sqrt{3}} \\
& \text { B. } \frac{21}{\sqrt{5}} \\
& \text { C. } \frac{18}{\sqrt{5}}
\end{aligned}
$$

D. None of these

## Answer:

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8. If $y=\frac{1+\tan x}{1-\tan x}$, then value of $\frac{d y}{d x}$ is:
A. $\sec ^{2}\left(\frac{\pi}{4}+x\right)$
B. $\cos ^{2}\left(\frac{\pi}{4}+x\right)$
C. 1

## D. None of these

Answer:

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9. If $P(A)=P(B)=x$ and
$P(A \cap B)=P(\bar{A} \cap \bar{B})=\frac{1}{3}$, then the value of $x$ is:

> A. $\frac{1}{2}$
> B. $\frac{1}{3}$
> C. $\frac{1}{4}$
D. None of these

Answer:

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that:
$(\cos x-\cos y)^{2}+(\sin x-\sin y)^{2}=4 \sin ^{2} \frac{x-y}{2}$

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12. Show that: $1+i^{10}+i^{100}+i^{1000}=2$

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13. Find the coefficients of $x^{4}$ in the expansions
of
$\left(2-x+3 x^{2}\right)^{6}$.

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14. Show that the points $(-1,2,1),(1,-2,5),(4,-7,8)$ and $(2,-3,4)$ are vertices of a parallelogram.
15. Find out which of the following sentences
are statements and which are not, justify your answer

The number 6 has three prime factors.

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16. Find out which of the following sentences
are statements and which are not, justify your answer

The moon revolves round the sun.
17. Combine the following statements using "if and only if'
p : if the sum of digit of a number is divisible by 3 , then the numebr is divisible by 3.

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18. Combine the following statements using "if and only if'
p : if the sum of digit of a number is divisible by 3 , then the numebr is divisible by 3.

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19. Assume that $P(A)=P(B)$. Show that $A=B$

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20. Let $A=\{1,2,3\}, B=\{2,3,4\}$ and $C=\{4,5,6\}$.verify
that:
$A \times(B \cap C)=(A \times B) \cap(A \times C)$

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21. Prove that:
$\tan 4 \theta=\frac{4 \tan \theta\left(1-\tan ^{2} \theta\right)}{1-6 \tan ^{2} \theta+\tan ^{4} \theta}$.

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22. If $\sin x=\frac{3}{5}, \cos y=-\frac{12}{13}$, where x and y both lie in second quadrant, find the value of $\sin (x+y)$.
23. Use principle of mathematical induction to prove that:
$1+2+3+\ldots \ldots \ldots+n=\frac{n(n+1)}{2}$

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24. In how many ways can 6 girls and 4 boys be seated in a row so that no two boys are together?

## 25. Determine the value of $n$ if

${ }^{\wedge}(n) C_{3}:{ }^{n} C_{2}=5: 1$.

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26. Which term of the sequence $24,{ }^{`} 231 / 4,22$
$1 / 2,213 / 4, \ldots .$. is the first negative term ?

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27. If the G.P's 5,10,20,...........and 1280,640,
320..............have their nth terms equal, find the value of $n$.

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28. The base of an equilateral triangle with side

2a lies along the $y$-axis such that the mid-point of the base is at the origin. Find the vertices of triangle.
29. Find the equation of the circle passing through ( 0,0 ) and making intercepts 'a' and 'b' on the coordinate axes.

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30. Evaluate: $\lim _{x \rightarrow 0} \frac{\sin 5 x}{\sin 8 x}$
31. Find the derivative of cosx from first principle.

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32. In class XI of a school $40 \%$ of the students
study Mathematics and 30\% study Biology 10\%
of the class study both Mathematics and Biology. If a student is selected at random from the class, find the probability that he will be studying Mathematics or Biology.
33. If $3\left(\frac{\cos \pi}{6}+i \frac{\sin \pi}{6}\right)=\mathrm{a}+\mathrm{ib}$, then find the values of $a$ and $b$.

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34. Give the graphical solution of the following system of inequalities:
$2 x+y \leq 24, \quad x+y \leq 11, \quad 2 x+5 y \leq 40$,
$x, y \geq 0$.
35. Evaluate: $\lim _{x \rightarrow 0}(\cos e c x-\cot x)$.

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36. Find the derivative of $\left(a x^{2}-b^{2}\right)^{2}$.
