



MATHS

BOOKS - JBD PUBLICATION

MODEL PAPER (10)

Exercise

1. The number of non-empty subsets of the set $\{1, 2, 3, 4\}$ is

A. 15

B. 14

C. 16

D. 17

Answer:



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2. If $f(x) = \frac{2^x + 2^{-x}}{2}$, then $f(x+y) f(x-y)$ is equal to:

A. $\frac{1}{2} [f(2x) + f(2y)]$

B. $\frac{1}{2}[f(2x) - f(2y)]$

C. $\frac{1}{3}[f(2x) + f(2y)]$

D. $\frac{1}{3}[f(2x) - f(2y)]$

Answer:



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3. If $\alpha + \beta = \frac{\pi}{2}$, then the maximum value of $\cos \alpha \cos \beta$ is:

A. 0

B. 1

C. $\frac{1}{2}$

D. $\frac{1}{4}$

Answer:



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4. The amplitude of $\frac{1}{i}$ is equal to:

A. π

B. $-\frac{\pi}{2}$

C. $\frac{\pi}{2}$

D. none of these

Answer:



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5. The value of ${}^{10}C_3$ is:

A. 720

B. 120

C. $\frac{10}{3}$

D. none of these

Answer:



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6. The sum of first 30 natural numbers is:

A. 465

B. 900

C. 930

D. none of these

Answer:



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7. The distance between the points

$A(a \cos \theta, a \sin \theta)$ and $B(a \cos \phi, a \sin \phi)$ is:

A. $2a \frac{\sin(\theta + \phi)}{2}$

B. $a \frac{\cos(\theta - \phi)}{2}$

C. $2a \frac{\sin(\theta - \phi)}{2}$

D. none of these

Answer:



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8. The general equation

$$ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$$

represents a circle if:



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9. The value of $\lim_{x \rightarrow 0} \frac{\sin 2x}{\sin 3x}$ is:

A. 0

B. $\frac{3}{2}$

C. $\frac{2}{3}$

D. none of these

Answer:



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10. Two dice are thrown together, the probability that at least one will show its digit greater than 3 is

A. $\frac{1}{4}$

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

C. $\frac{2}{5}$

D. none of these

Answer:



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11. If $\sin x = -\frac{5}{13}$ and x lies in IIIrd quadrant.

Find the value of $\sec x + \tan x$.



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12.

Prove

that:

$$2\frac{\sin^2(3\pi)}{4} + 2\frac{\cos^2 \pi}{4} + 2\sec^2 \frac{\pi}{3} = 10$$



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13. If $x + iy = \frac{a + ib}{a - ib}$, then prove that

$$x^2 + y^2 = 1$$



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14. Find $(a + b)^4 - (a - b)^4$. Hence evaluate :

$$(\sqrt{3} + \sqrt{2})^4 - (\sqrt{3} - \sqrt{2})^4.$$



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15. Find the r th term from the end in the expansion of $(x + a)^n$.



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16. Show that the points $A(2,3,4)$, $B(3,4,2)$, $C(4,2,3)$ form the vertices of an equilateral triangle.



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17. Identify the quantifier in the following statements and write the negation of the statements

There exists a capital for every state in india.



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18. Find the component statements of the following and check whether it is true or not. "24 is a multiple of 2, 4 and 8".

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19. Let A , B , and C be the sets such that $A \cup B = A \cup C$ and $A \cap B = A \cap C$. Show that $B = C$.

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20. If $f(x) = \log_e \left(\frac{1+x}{1-x} \right)$, prove that:

$$f(x) + f(y) = f\left(\frac{x+y}{1+xy} \right).$$
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21. Prove the following by using the principle of mathematical induction for all $n \in N$:-

$$1^3 + 2^3 + 3^3 + \dots + n^3 = \left(\frac{n(n+1)}{2} \right)^2.$$



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22. If ${}^nC_r : {}^nC_{r+1} = 1:2$ and

${}^nC_{r+1} : {}^nC_{r+2} = 2:3$, find n and r.



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23. Find the number of different signals that can be generated by arranging two or more flags on a vertical staff, if 5 different flags are available.



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24. Find the sum of all natural numbers lying between 100 and 1000, which are multiples of 5.



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25. Find the three number is G.P. such that their sum is 19 and sum of their squares is 133.



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26. P(a,b) is the mid-point of a line segment between axes. Show that the equation of the line is $\frac{x}{a} + \frac{y}{b} = 2$.



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27. Find the equations of the ellipse whose length of the major axis is 20 and foci are $(0, \pm 5)$.



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28. Evaluate: $\lim_{x \rightarrow 5} \frac{1 - \sqrt{x - 4}}{5}$.



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29. If $\sin y = x \sin(a + y)$, prove that

$$\frac{dy}{dx} = \frac{\sin^2(a + y)}{\sin a}$$



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30. An integer is chosen from the first 200 integers. Find the probability that it is divisible by 6 or 8.



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31. Find the square root of $-15 - 8i$.



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32. If $(a+ib)(c+id)(e+if)(g+ih)=A+iB$, then show that:

$$(a^2 + b^2)(c^2 + d^2)(e^2 + f^2)(g^2 + h^2) = A^2 + B^2$$



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33. Ravi obtained 70 and 75 marks in first two unit test. Find the minimum marks he should get

in the third test to have an average of at least 60 marks.



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34. If $x \sin (a+y) + \sin a \cos (a+y) = 0$, then prove

that :
$$\frac{dy}{dx} = \frac{\sin^2(a + y)}{\sin a}$$



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35. Find the derivative of $\frac{px^2 + qx + r}{ax + b}$.



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36. Find the median of the data:

wages ₹	125	130	135	140	145	150	160	180
frequency	6	20	24	28	16	4	2	1



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37. Find the mean deviation about median for the following data:

marks obtained	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50	50 - 60
Number of girls	11	6	8	14	16	4



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