

**MATHS****BOOKS - JBD PUBLICATION****MODEL PAPER (11)****Exercise**

1. The set  $(A \cap B')' \cup (B \cap C)$  is equal to:

A.  $A' \cap B$

B.  $A' \cap C'$

C.  $A' \cap B$

D. none of these

**Answer:**



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2. Domain of  $\sqrt{a^2 - x^2}$  ( $a > 0$ ) is:

A.  $(-a, a)$

B.  $[-a, a]$

C.  $[0, a]$

D.  $(-a, 0]$

**Answer:**



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3.  $\sin 36^\circ \sin 72^\circ \sin 108^\circ \sin 144^\circ$  is equal to:

A.  $\frac{1}{16}$

B.  $\frac{3}{16}$

C.  $\frac{5}{16}$

D. none of these

**Answer:**



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4. The value of  $(1 + i)^3 - (1 - i)^3$  is:

A.  $4i$

B. 4

C.  $-4 - 2i$

D. none of these

**Answer:**



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5. Total number of four digit odd numbers that can be formed by using 0,1,2,3,5,7 is:

- A. 180
- B. 240
- C. 720
- D. none of these

**Answer:**



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6. If  $1+2+3+\dots+n=45$ , then  $1^3 + 2^3 + 3^3 + \dots + n^3$  is:

- A.  $45^2$
- B.  $45^3$
- C.  $45^4$
- D. none of these

**Answer:**



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7. If  $p$  be the length of the perpendicular from the origin on the line

$$\frac{x}{a} + \frac{y}{b} = 1, \text{ then}$$

A.  $p^2 = a^2 + b^2$

B.  $p^2 = \frac{1}{a^2} + \frac{1}{b^2}$

C.  $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$

D. none of these

**Answer:**



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8. If the circles  $x^2 + y^2 = 9$  and  $x^2 + y^2 + 8y + c = 0$  touch each other, then  $c$  is equal to:

A. -15

B. 15

C. 16

D. none of these

**Answer:**



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9. If  $f(x) = \frac{x - 4}{2\sqrt{3}}$ , then  $f'(1)$  is equal to?



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10. If A and B are two events, the probability that exactly one of them occurs is given by

A.  $P(A) + P(B)$

B.  $P(A) + P(B) - P(A \cap B)$

C.  $P(A) + P(B) - 2P(A \cap B)$

D. none of these

**Answer:**



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11. Prove that:  $\cos 20^\circ + \cos 100^\circ + \cos 140^\circ = 0$ .



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12. If  $\tan 3A = \frac{3 \tan A + k \tan^3 A}{1 - 3 \tan^2 A}$ , then k is equal to



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13. Evaluate:  $\left[ i^{20} + \left( \frac{1}{i} \right)^{26} \right]^3$ .



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14. Using Binomial theorem prove that:  $(1.1)^{10000} > 10000$



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15. Write the general term in the expansion of  $(x^2 - yx)^{12}$ ,  $x \neq 0$



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16. Let  $(4, 2)$ , B  $(6, 5)$  and C  $(1, 4)$  be the vertices of  $\triangle ABC$ . :- The median from A meets BC at D. Find the coordinates of the point D.



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17. Verify by the method of contradiction that  $\sqrt{7}$  is irrational.



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**18.** Find the component statement of the following and check whether they are true or not.

A square is a quadrilateral and its four sides are equal.



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



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**20.** If  $A \times B = \{(a, x), (a, y), (b, x), (b, y)\}$ . Find A and B



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**21.** Prove that :

$$\sin(A + B)\sin(A - B) = \sin^2 A - \sin^2 B.$$



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**22.** Using principle of mathematical induction, prove that:

$$\frac{1}{1.2} \cdot 3 + \frac{1}{2.3} \cdot 4 + \frac{1}{3.4} \cdot 5 + \dots + \frac{1}{n(n+1)(n+2)} = \left( n \frac{n}{4(n+1)} \right)$$

for all  $n \in N$ .



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**23.** Determine the number of ways of choosing 5 cards out of a deck of 52 cards which include at least one king.



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**24.** A question paper has two parts: Part A and Part B. each part containing ten questions. If the student has to choose 8 questions form part A and 5 questions from part B. In how many ways can he choose the questions?



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25. A.M. between two numbers is 10 and their G.M is 8. Find the numbers.



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26. The sum of first four terms of an A.P is 56. the sum of last four terms is 112. If the first term is 11. find the number of terms.



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27. If  $p$  is the length of perpendicular from the origin to the line whose intercepts on the axes are  $a$  and  $b$ , then show that  $\frac{1}{p^2} = \frac{1}{a^2} + \frac{1}{b^2}$ .



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28. Find the equation of ellipse with major axis along x-axis passes through the points  $(4,3)$  and  $(-1,4)$ .



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**29. Evaluate:**

$$\lim_{x \rightarrow 0} \frac{3 \sin x - \sin 3x}{x^3}$$



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**30.** Find the derivative of the function  $f(x) = 2x^2 + 3x - 5$  at  $x=-1$ . also prove that  $f'(0) + 3f'(-1) = 0$ .



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**31.** State whether is true or false : If E and F are mutually exclusive events then  $P(E \cup F) = P(E) + P(F)$



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**32.** If  $z=x+iy$  and  $|z+6|=|2z+3|$ . Then show that  $x^2 + y^2 = 9$ .



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**33.** If  $z = x + iy$ ,  $x, y$  real, prove that :  $|x| + |y| \leq \sqrt{2}|z|$ .



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**34.** Solve the inequalities given below for real  $x$  :-

$$\frac{1}{2} \left( \frac{3x}{5} + 4 \right) \geq \frac{1}{3}(x - 6)$$



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**35.** To receive Grade 'A' in a course, one must obtain an average of 90 marks or more in five examinations (each of 100 marks). If Sunita's marks in first four examinations are 87, 92, 94 and 95, find minimum marks that Sunita must obtain in fifth examination to get grade 'A' in the course.



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36. Evaluate:  $\lim_{x \rightarrow a} \frac{(x+2)^{\frac{3}{2}} - (a+2)^{\frac{3}{2}}}{x-a}$ .



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37. If  $y = \sqrt{x} + \frac{1}{\sqrt{x}}$ , then show that  $2x \frac{dy}{dx} + y = 2\sqrt{x}$



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38. Find the mean deviation from median of the data:

$x_i$	74	89	42	54	91	94	35
$f_i$	20	12	2	4	5	3	4



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39. Find the mean deviation from the mean for the following data:

Height in cm	95 – 105	105 – 115	115 – 125	125 – 135	135 – 145	145 – 155
Number of boys	9	13	20	30	12	10



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