MATHS

BOOKS - JBD PUBLICATION

MODEL PAPER (2)

Exercise

1. Which is the false statement?

A. $\{x : 9 < x < 11, x \in N\}$ is a singleton

B. $\{x : 9.1 < x < 9.2, \xi nQ\}$ is a singleton

C. $\{x : x^2 = 9, x \in N\}$ is a singleton

D. $\{x : 9 < x < 10, \xi nR\}$ not a singleton.

Answer:

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2. The range of the function $f(x) = \dfrac{1 + x^2}{x^2}$ is given by:

A. $(1, \infty)$

B. $[1, \infty)$

C. $[0, \infty)$

D. none of these

Answer:

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3. If $A - B = \frac{\pi}{4}$ the (1+tanA)(1-tanB) is equal to:

A. 2

B. 1

C. 0

D. 3

Answer:

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4. If α and β are the roots of the equation $x^2 + x + 1 = 0$, then $\alpha^2 + \beta^2$ is equal to:

A. 3

B. 2

C. -1

D. none of these

Answer:

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5. If $^{\wedge} nC_{12} =^{n} C_8$, then n is equal to:

A. 20

B. 4

C. 8

D. none of these

Answer:

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6. If (p+q)the term of A.P is m and (p-q)the term is n, then the pth term is:

A. $\frac{1}{2}(m-n)$

B. mn

C. $\sqrt{mn}$

D. $\frac{1}{2}(m+n)$

Answer:

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7. The angle between the lines $2x - y + 3 = 0$ and $x + 2y + 3 = 0$ is

A. 30°

B. 60°

C. 90°

D. none of these

Answer:

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8. The eccentricity of the conic $9x^2 - 16y^2 = 144$ is:

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

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

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

D. none of these

Answer:

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9. $\lim_{x \to a} \frac{x^n - a^n}{x - a}$ is equal to:

A. na^n

B. na^{n-1}

C. 1

D. none of these

Answer:

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10. One card is drawn from a pack of 52 cards. The probability that it is the card of a king or spade is:

A. $\frac{1}{26}$

B. $\frac{3}{26}$

C. $\frac{4}{13}$

D. none of these

Answer:

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11. Prove the following:

$$\frac{\sin x + \sin 3x}{\cos x + \cos 3x} = \tan 2x$$

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12. In a circle of radius 21 cm, an arc subtends an angle of 60° at the centre. Find the length of the arc

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13. Represent the complex number $z = 1 + \sqrt{3}i$ in the polar form.

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14. Find the 13th term in the expansion of $\left(9x - \frac{1}{3\sqrt{x}}\right)^{18}$

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15. Find the 6th term in the expansion of $(x+3)^9$.

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16. Verify that (0, 7, 10) , (-1,6,6) and (-4, 9,6) are the vertices of a right angled triangle.

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17. Write down the truth value (T or F) of the following statement:

Every set is an infinite set.

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18. Write down the truth value (T or F) of the following statement:

Zero is a complex number.

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19. Prove that $\sqrt{5}$ irrational.

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20. In a survey of 600 students in a school, 150 students were found to be taking tea and 225 taking coffee, 100 were taking both tea and coffee. Find how many students were taking neither tea nor coffee?

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21. The relation 'f' is defined by $f(x) = \begin{cases} x^2 & 0 \leq x \leq 3 \\ 3x & 3 \leq x \leq 10 \end{cases}$ The relation 'g' is

defined by $g(x) = \begin{cases} x^2 & 0 \leq x \leq 2 \\ 3x & 2 \leq x \leq 10 \end{cases}$ Show that 'f' is a function and 'g' is not a function.

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22. Prove that:

$$2\cos\frac{\pi}{13}\cos\frac{9\pi}{13} + \cos\frac{3\pi}{13} + \cos\frac{5\pi}{13} = 0$$

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23. If $\sin x = -\frac{5}{13}$ and x lies in IIIrd quadrant. Find the value of secx+tanx.

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24. Using mathematical induction , show that $n(n+1)(n+5)$ is a multiple of 3.

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25. Determine the number of 5 card combinations out of a deck of 52 cards if there is exactly one ace in each combination.

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26. If $\frac{1}{6!} + \frac{1}{7!} = \frac{x}{8!}$, find x

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27. Find the sum of all natural numbers lying between 100 and 1000, which are multiple of 10.

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28. Find the sum of n terms of the following sequences:

8+88+888+.....up to n terms.

29. Find the angle between x-axis and line joining points (5,-1) and (3,-4).

30. Find the equation of the circle with the centre $\left(\frac{1}{2}, \frac{1}{4}\right)$ and radius $\frac{1}{2}$.

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31. Evaluate:

$$\lim_{x \to 1} \left[\frac{x-2}{x^2 - x} - \frac{1}{x^3 - 3x^2 + 2x} \right].$$

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32. Find the derivative of $5x^3(x-1)$.

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33. Three coins are tossed once. Find the probability of getting

at least two heads.

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34. Three coins are tossed once. Find the probability of getting

at most two tails.

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35. If $(5-3i)^2 = a+ib$ then find the values of a and b.

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36. If $x-iy = \sqrt{\frac{a-ib}{c-id}}$ prove that $(x^2+y^2)^2 = \frac{a^2+b^2}{c^2+d^2}$.

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37. Solve the following system of inequalities graphically: $2x + y \geq 6, 3x + 4y \leq 12$

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38. Solve the system of inequalities and show that solution graphically on the number line:

$(5x - 7) < 3(x + 3), 1 - \frac{3x}{2} \geq x - 4.$

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39. Evaluate: $\lim_{x \to 2} \frac{x^3 - 4x^2 + 4x}{x^2 - 4}$.

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40. Find the derivative of $x^{-4}(3 - 4x^{-5})$.

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41. The mean and standard deviation of a group of 100 observations were found to be 20 and 3 respectively. Later on it was found

that three observations were incorrect, which were recorded as 21, 21 and 18. Find the mean and standard deviation if the incorrect observations were omitted.

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