



MATHS

BOOKS - UNITED BOOK HOUSE

MODEL QUESTION PAPERS-SET 8

Exercise

1. If $n(X) = 12$, $n(Y) = 10$ and $n(X \cap Y) = 8$, then the value of $n(X \cup Y)$ is

A. a)0

B. b)1

C. c)-1

D. d)2

Answer:



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2. If α, β be the imaginary cube root of unity, then the value of $(\alpha^4 + \alpha^2\beta^2 + \beta^4)$ is

A. a)0

B. b)1

C. c)-1

D. d)2

Answer:



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3. In the expansion of $(2x^2 - 3)^7(x + 1)^3$, the sum of numerical co-efficients is

A. a) 2^7

B. b) 0

C. c) 8

D. d) -8

Answer:



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4. If P , $2P + 2$, $3P + 3$ are in G.P. the 4th term Will be

A. a) $4P+4$

B. b) $-13:5$

C. c) 13.5

D. d) -13

Answer:



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5. Equation of directrix of a parabola $2x^2 = 3y$ is

A. a) $8y+3=0$

B. b) $8y-3=0$

C. c) $8x+3=0$

D. d) $8x-3=0$

Answer:



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6. Equation of a straight line, parallel to x-axis and passes through (0, 5) is

A. a) $x=5$

B. b) $x+5$

C. c) $y=5$

D. d) $y+5=0$

Answer:



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7. The derivative of the function $f(x) = |x|^3$ at $x = 0$ is

A. a) -1

B. b) 0

C. c) 1

D. d) None of these.

Answer:



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8. The value of $\lim_{x \rightarrow 5} \frac{|x - 5|}{x - 5}$ is

A. a)0

B. b)1

C. c)-1

D. d)None of these.

Answer:



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9. If $P(X)=0.65, P(Y)=0.15$, then the value of $P(\overline{X}) + P(\overline{Y})$ is

A. a)1.2

B. b)1.5

C. c)1.4

D. d)1.3

Answer:



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10. The variance of 1st 20 natural number is

A. a) $123/2$

B. b) $133/2$

C. c) $133/4$

D. d) $143/4$

Answer:



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11. A and B are two sets, such that $n(A) = 30$. $n(B) = 25$ and $n(A \cup B) = 40$. calculate $n(A \cap B)$



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12. Find the domain for which the function $f(x) = 3x^2 - 2x$ and $g(x) = 9x - 6$ are equal.



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13. Simplify:
$$\frac{\cos(90^\circ + \theta)\sec(-\theta)\tan(180^\circ - \theta)}{\sec(360^\circ + \theta)\sin(180^\circ + \theta)\cot(90^\circ - \theta)}$$



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14. In $\triangle ABC$, if $\cos A = \frac{\sin B}{\sin C}$, then show that the triangle is right angles triangle.



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15. Calculate the modulus of $(1+2i)/(2-i)$



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16. The sum of the co-efficient of the expansion of $(a^4x^2 - 2a^2x + 1)^{101}$ is zero. find the value of a.



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17. If ${}^{(2n)}C_3 : {}^nC_3 = 11:1$ find the value of n.



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18. Find the value of $9^{\frac{1}{3}} 9^{\frac{1}{9}} 9^{\frac{1}{27}} \dots \infty$



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19. The co-ordinates of three vertices and centroid of a triangle are $(x, 2, 3)$, $(3, y, 5)$, $(-1, 6, z)$ and $(1, 4, 1/3)$. Find x, y, z



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20. The equation of one side of an equilateral triangle is $x + y = 2$ and the co-ordinates of the vertex opposite to

this arm is $(2, -1)$. Find the length of one arm of this triangle.

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21. If $y = x^n \log_a x$ ($a > 0, a \neq 1$), then show that $\log_e a(xy_1 - ny) = x^n$

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22. Evaluate' : $\lim_{x \rightarrow \infty} \frac{1 - \sqrt{x}}{1 + \sqrt{x}}$

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23. If A and B are two events., such that $P(A) = P(B) = 1$, then Prove that $P(A + B) = 1$.



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24. Find that mean deviation from Arithmetic mean of the ' natural numbers from 1 to 5



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25. A market research group conducted a survey of 500 consumers and reported that 400 consumers liked product A and 300 consumers liked product B. What is the least number that must have liked both products



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26. If α and β are positive acute angles and

$\cos 2\alpha = \frac{3 \cos 2\beta - 1}{3 - \cos 2\beta}$, then prove that

$$\tan \alpha = \sqrt{2} \tan \beta$$



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27. In any triangle ABC If $\sin A : \sin B : \sin C = 4 : 5 : 6$, then

prove that $\cos A : \cos B : \cos C = 12 : 9 : 2$.



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28. Prove by mathematical induction :

$$1.2 + 2.2^2 + 3.2^3 + \dots + n.2^n = (n - 1)2^{n+1} + 2, n \in \mathbb{N}$$



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29. If S_1 , S_2 and S_3 be respectively the sum of n , $2n$ and $3n$ terms of a G.P. Prove that

$$S_1(S_3 - S_2) = (S_2 - S_1)^2.$$



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30. Two parallel straight lines contains 5 points and 10 points respectively. How many triangles can be formed

using these points as the vertices of the triangles?



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31. If the coefficients of 2nd, 3rd and 4th terms in the $(1 + x)^{2n}$ are in A.P. show that $2n^2 - 9n + 7 = 0$



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32. Vertices of $\triangle XYZ$ are $X(-2, -3)$, $Y(6, 1)$, and $Z(1, 6)$.

Find the co-ordinate of its orthocentre.



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33. The equations of two sides of a square are $5x+12y-10=0$ and $5x+12y+29=0$ and the third side passes through $(3,5)$:find equations of all other possible sides of the square.



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34. A circle passes through $(1,-2)$ and $(4,-3)$ and its centre lies on the straight line $3x + 4y = 7$. Find the equation of the circle.-



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35. A point divides the line segment joining the point (2, -5.8) and (3, 4. -6) internally in the ratio 3 : 5. Find the .co-ordinate of that point.



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36. Show that $\lim_{x \rightarrow 0} \frac{x^2 \sin\left(\frac{1}{x}\right)}{\sin x} = 0$



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37. Differentiate $\sqrt{\tan x}$, with respect to x. (With the help of 1st principle)



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38. Using contrapositive method show that the compound statement is true or not-If a and b are odd numbers, then ab is odd number



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39. If n is real and $n > 3$, show that $n^2 > 9$ (use the method of contradiction).



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40. In a family, out of 3 children, one of them at least Boy. Find the porbability of two boys in this family.



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41. If the variance of 1st.n even natural numbers is 65, find the value of n



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42.

Show

that

$$\sin \alpha + \sin \beta + \sin \gamma - \sin(\alpha + \beta + \gamma) = 4 \sin\left(\frac{\alpha + \beta}{2}\right) \sin\left(\frac{\beta + \gamma}{2}\right) \sin\left(\frac{\gamma + \alpha}{2}\right)$$

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43. In $\triangle ABC$ show that
$$a^3 \cos(B - C) + b^3 \cos(C - A) + c^3 \cos(A - B) = 3abc$$

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44. Find the number of permutations and the number of combinations in the letters of the word 'EXPRESSION'taken four at a time.

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45. Solve : $3x^2 + (i - 2)x - 4i + 10 = 0$



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46. Find the common solution region of the following system of equations. $2x + y \geq 2, x - y \leq 1, x + 2y \leq 8$
 $, x \geq 0, y \geq 0$



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47. In a series, the rth term is $(2r + 1) \cdot 2r$. Find the sum of 1st n terms of this series.



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48. The axis of a parabola is parallel to x axis. If the the parabola passes through the point (2, 0), (1, -1) and (6, -2), then find the equation of the parabola.



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49. If S and S' are the foci of the hyperbola $4y^2 - 3x^2 = 48$ and P is the any point on this hyperbola, then prove that $|SP - S'P| = \text{constant}$.



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50. The ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ passes through the point of intersection of the lines $7x+13y=87$ and $5x-8y+7=0$ and the length of its latus rectum is $\frac{32\sqrt{2}}{5}$ units. Find the values of a and b .



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