MATHS

BOOKS - UNITED BOOK HOUSE

TECHNO INDIA GROUP ACADEMIA,SOUTH KOLKATA.

Exercise

1. State which of the following statements is true:

A. a)$\{a\} \in \{a, b, c\}$

B. b)$a \notin \{a, b, c\}$

C. c)$a \subset \{a, b, c\}$

D. d)$\{a\} \subset \{a, b, c\}$

Answer:

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2. The A.M of two numbers is 10,if one number is 7,then the other number will be __

A. a)15

B. b)14

C. c)13

D. d)11

Answer:

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3. The vlaue of $\lim_{x \to 16} \frac{x^{1/4} - 16^{1/4}}{x - 16}$ is

A. a)1/32

B. b)1/16

C. c)1/8

D. d)1/4

Answer:

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4. Find the median of the following numbers :8,15,53,49,19,62,7,15,95,77

A. a)33

B. b)34

C. c)35

D. d)36

Answer:

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5. For two mutually exclusive events A and B,P(A)=1/2and $P(A \cup B) = \frac{2}{3}$,then the value of P(B) will be

A. a) $1/4$

B. b) $1/6$

C. c) $1/3$

D. d) $1/5$

Answer:

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6. If $\sin\theta + \sin\phi = 2$,then what is the value of $\cos(\theta + \phi)$?

A. a)0

B. b)1

C. c)-1

D. d)2

Answer:

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7. The roots of the equation $3x^2 - 5x + p = 0$ are equal state which of the following is the value of p?

A. a)25/6

B. b)25/12

C. c)-25/6

D. d)-25/12

Answer:

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8. Determine x so that 2 is the slope of the line passing through P(2, 5) and Q(x, 3).

A. a)25/6

B. b)3

C. c)5

D. d)1

Answer:

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9. Equation of the circle concentric to the circle $x^2 + y^2 + 4x - 2y = 20$and through the origin is

A. a) $x^2 + y^2 + 4x - 2y + 20 = 0$

B. b) $x^2 + y^2 + 4x - 2y - 20 = 0$

C. c) $x^2 + y^2 - 2y + 4x - 2y + 20 = 0$

D. d) $x^2 + y^2 + 4x - 2y = 0$

Answer:

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10. Find the middle term of the expansion $\left(1 - \frac{1}{x}\right)^8$.

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11. Find the power set of A={a,b,c}.

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12. A relation R is defind on the set A={2,3,4,5} as follows $:(x, y) \in R \Rightarrow x \text{ and } y$ are relatively prime,Find domain and range of R.

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13. In $\triangle ABC$,a=2,b=3 and sin A=2/3.Find $\lfloor_B$

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14. Prove that ,$\frac{\sin 2x}{1+\cos 2x} = \tan x$

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15. Express in the form A+iB,(A,B are real),

$$\frac{i}{1+i} + \frac{1+i}{i}$$

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16. If $(2n)C_3$: nC_3=11:1`find n.

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17. The n term of an A.P is 7n-5,find the sum of first 20 terms of the series.

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18. Find the 4the term from the end in the expansion of $\left(\frac{x^3}{2} - \frac{2}{x^2}\right)^9$

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19. Find the equation of the perpendicular bisect or of the line joining the points (2,3)and (6,-5).

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20. Find the ratio in which the line segment joining A(2,4,5) and B(3,5,4) deivided by the yz plane.

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21. Evaluate : $\lim_{h \to 0} \frac{e^h h}{h}$-1

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22. If f(x)=x|x|,prove that f'(x)=2|x|.

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23. In a lottery there are 10 prizes and 25 blanks.Find the probability of getting prize.

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24. Find mean and variance for the following data 5,9,8,12,6,10,6,8.

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25. For any three sets A, B, C. show that

$A \times (B - C) = (A \times B) - (A \times C)$

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26. In any $\triangle ABC$,prove that

$$\frac{\sin(B - C)}{\sin(B + C)} = \frac{b^2 - c^2}{a^2}$$

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27. Prove that, $\frac{\cos x}{1 - \sin x} = \tan\left(\frac{\pi}{4} + \frac{x}{2}\right)$

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28. Prove by mathematical induction that $\frac{1}{1.3}+\frac{1}{3.5}+\frac{1}{5.7}+\ldots+\frac{1}{(2n-1)(2n+1)}$ $=\frac{n}{2n+1},(n\in N)$

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29. If $x+iy=\frac{2}{3+\cos\theta+i\sin\theta}$,show that $2x^2+2y^2=3x-1$

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30. find the co-efficient of (2r+4)th and (r-2)th terms in the expansion of $(1+x)^{18}$. If the co-efficients are equal find r.

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31. If p, q, r are in G.P and the equation $px^2 + 2qx + r = 0$ and $dx^2 + 2ex + f = 0$ have a common root, then show that d/p, e/q, f/r are in AP.

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32. Show that the points (a,0),(0,b)and (3a,-2b)are collinear.Also find the equation of the line containing them.

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33. Find the distance between the parallel lines 4x-3y+5=0 and 4x-3y+7=0.

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34. Find the equation of a circle through origin which cuts of intercepts -2 and 3 units from the x-axis and Y-axis respectively.

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35. Find the value of the limit $\lim_{n \to \infty} \frac{1^2 + 2^2 + \ldots + n^2}{n^3}$

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36. If $y = \sqrt{\frac{1-x}{1+x}}$, prove that $(1-x^2)\frac{dy}{dx} + y = 0$

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37. If x^2 is an odd number then x is also odd number, justify the validity of the statement.

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38. If x and y are odd integers, then xy is also an odd integer r examine its truth value.

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39. In single throw of two dice,the probality of obtaning 'a total of 8' is___

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40. Find S.D from the following data:

x	10	15	18	20	25
f	3	2	5	8	2

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41. Solve : $\sqrt{3}\cos x - \sin x = 1$

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42. Prove that,

$$\cos 20^\circ \cos 40^\circ \cos 60^\circ \cos 80^\circ = \frac{1}{16}$$

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43. Exhibit graphically the solution sets of the following system of linear inequations.

$$x - 2y \leq 3, 3x + 4y \geq 12, x \geq 0, y \geq 0$$

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44. Solve :$3x^2 + 8ix + 3 = 0$

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45. Find the sum of n terms of the series $\frac{1}{2.5} + \frac{1}{5.8} + \frac{1}{8.11}$...to n terms.

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46. There are 10 points in a plane of which 4 are collinear, Find the number of lines

obtained from the pairs of these points.

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47. There are 10 points in a plane of which 4 are collinear, find the number of triangles that can be formed from these points.

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48. The directrix of a parabola is x+y+4=0and vertex is at (-1,-1).Find the position of the focus

and the equation of parabola.

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49. Find the equation of the ellipse whose centre lies at the origin,major axis lines on the x-axis,eccentricity is $2/3$and length of the latus rectum is 5 units.

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50. In each of the find the equations of the hyperbola satisfying the given conditions.

Vertices $(0, \pm 3)$, foci $(0, \pm 5)$

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