MATHS

BOOKS - UNITED BOOK HOUSE

MODEL QUESTION PAPERS-SET 14

Exercise

1. If A = {2, 3, 9} and B = {2, 3, 4, 5, 6} then $A \cap B$ is

A. a){2,3,4,5,6,9}

B. b){2,3}

C. c){4,5,6,9}

D. d){2,3,4,5,6}

Answer:

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2. If $(i)^{-n} = 1(n \in N)$,then least value of n will be

A. a)0

B. b)2

C. c)3

D. d)4

Answer:

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3. If n is natural number & $n \geq 1, then\left(3^{2n}-1\right)$ is always divisible by

A. a)$3^n - 1$

B. b)$2^n + 2$

C. c)$2^{2n} + 1$

D. d)$2^n - 2$

Answer:

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4. In a $G.P.$ $T_{10} = 9$ and $T_4. = 4, T_7$ will be

A. a)13

B. b)5

C. c)6

D. d)9/4

Answer:

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5. The normal to-be circle $x^2 + y^2 - 4x + 6y - 12 = 0$ passes through the point

A. a)(-2,-3)

B. b)(2,-3)

C. c)(-2,3)

D. d)(2,3).

Answer:

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6. The angle between the two straight line of a pair of straight line$x^2 - y^2 - 2y - 1 = 0$ is

A. a)30°

B. b)60°

C. c)75°

D. d)90°

Answer:

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7. Value of $\lim_{x \to 2} [x]$ is

A. a)-2

B. b)1

C. c)2

D. d)no existence.

Answer:

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8. If $x^{1008}.\ Y^{1006} = (x+y)^{2014}$, then dy/dx=

A. a)y/x

B. b)x/y

C. c) $\frac{x}{x+y}$

D. d) $\frac{y}{x+y}$

Answer:

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9. Three dice are thrown at a time. The probability of the same number in every dice is

A. a)1/6

B. b)1/3

C. c)1/36

D. d)1/9

Answer:

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10. Median of 1st n natural numbers is

A. a)(n+1)/(n-1)

B. b)(n+1)/n

C. c)(n-1)/(n+1)

D. d)(n+1)/2

Answer:

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11. Let R be the relation defined on the set N of natural numbers as R $=\{(x, y) \mid 4x + 5y = 50, x, y \in N\}$ .Express R and R^{-1}as set of ordered pairs

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12. If set A and set B are the sub-set of X. show that $X - (A \cap B) = (X - A) \cup (X - B)$.

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13. Show that $\sin\left(\frac{7\pi}{12}\right) = \frac{1}{4}(\sqrt{6}+\sqrt{2})$

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14. In $\triangle ABC$. if b cos A -a cos B = 0, show that the triangle isosceles.

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15. If $Z_1 = -3+4i$, $Z_2 = 12-5i$, prove that $|z_1+z_2| < |z_1-z_2|$

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16. How many solutions are there in the equation xyz = 2y where the solutions are positive integers.

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17. If n (> 1)is a positive integer, then show that $2^{2n} - 3n - 1$is divisible by 9.

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18. If a. b, c are in A.P, then show that $\frac{1}{bc}, \frac{1}{ca}, \frac{1}{ab}$ are also in A.P.

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19. Find the perpendicular bisector of AB, where the co-ordinates of A and B are (0, -5) and (2,- 3) respectively.

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20. If the co-ordinate of three vertices of a- triangle are (9, 1, -3), (1.- 1, -5) and (3, 1, 3). Show that the triangle is equilateral

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21. Evaluate : $\lim_{x \to \frac{\pi}{2}} \left(\frac{\pi}{2} - x\right) \tan x$

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22. If f(x + 2) = $2x^2 - 3x - 1$, find the value of f(x + 1)

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23. Three dice are thrown simultaneously. Find the probability that the sum of the numbers obtained will be 15.

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24. Two variables x and y are related by $y = 8 + 2x$, if the S.D. of x is 3, then the S.D. of y will be-

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25. In three sets P,Q,R if $P \cup R = P \cup Q$and $P \cap Q = P \cap R$,then show that Q=R.

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26. $\sin\theta = k\sin(\theta + \phi)$.show that $\tan(\theta + \phi) = \frac{\sin\phi}{\cos\phi - K}$

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27. In $\triangle ABC$if$\frac{1}{a+c} + \frac{1}{b+c} = \frac{3}{a+b+c}$,show that $\angle C = \frac{\pi}{3}$

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28. Using mathematical induction, prove that $\frac{1}{5}n^5 + \frac{1}{3}n^3 + 7\frac{n}{15}$ is a natural number where $n \in N$.

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29. An equilateral triangle in the Argan plane has vertix as z_1,$z_2$and $z_3$which are there complex no show that $\frac{1}{z_1 - z_2} + \frac{1}{z_3 - z_1} + \frac{1}{z_2 - z_3} = 0$

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30. How many arragements can be made out of the letters of the word FAILURE at a time, such that the two vowels do not come together?

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31. Calcualte the sum of the series :1+3/2+7/4+15/8+31/16+....+t_n

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32. The equation of three sides of a triangle are x + 2y - 5 = 0, x +y = 6 and y + 2x-4 = 0. Find the co-ordinate of its ortho centre

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33. Show that the area of the triangle formed by the lines $y = m_1x + c_1, y = m_2x + c_2$ and $x = 0$ is $\frac{(c_1 - c_2)^2}{2|m_1 - m_2|}$

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34. Find the equation, centre, and radius of a circle which is passes through the points (3, 4), (3, -6) and (-1, 2).

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35. By using section formula, show that the points .(1, 2, 3), (-2, 4, 2) and (7, -2, 5) are colinear

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36. Evaluate $\lim_{x \to \pi/4} \frac{4\sqrt{2} - (\cos x + \sin x)^5}{1 - \sin 2x}$

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37. If $f(x) = \sqrt{2}x - \sqrt{\frac{2}{x}} + \frac{4 - x}{4 - x}$, find the value of f(2)

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38. If $2x^3 + 5x = 0$, where x is a real number, then x = 0' examine the statement by contrapositive method.

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39. 'If for any real no x, $x^3 + x = 0$, then x =0' prove this by the method of contradiction

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40. A,B,C and D are four mutually exclusive and exhuastive events. If the odds against the events B,C and D are 7 : 2 , 7 : 5 , and 13:5 respectively, find the odds in favour of the event A.

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41. Prove that $\cos^2\alpha + \cos^2(120^\circ - \alpha) + \cos^2(120^\circ + \alpha) = \frac{3}{2}$

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42. Prove that $\tan 70^\circ = \tan 20^\circ + 2\tan 50^\circ$.

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43. Prove that with the help of mathemetical induction.

4+44+444+...upto nth term $= \frac{4}{81}\left(10^{n+1} - 9n - 10\right)$

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44. If the roots of the equation $ax^2 + bx + c = 0$ are α,β and the roots of the equation $Ax^2 + Bx + C = 0$are

$(\alpha + \delta)$and $(\beta + \delta)$then show that

$$\frac{b^2 - 4ac}{a^2} = \frac{B^2 - 4AC}{A^2}$$

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45. Draw the graph and find the common region of the following system of incquations : $x + 2y \leq 3$, $3x + 4y \geq 12, x \geq 0$, y ge 0`

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46. Show that there are 136 ways of selecting 4 letters from the word EXAMINATION.

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47. Prove that the least focal chord of a parabolaa is it rectum.

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48. Find the eccentricity and the equation of directix of the ellipse $\frac{x^2}{100}+\frac{y^2}{36}=1$Show that the sum of the focal distances at any point on the ellipse$\frac{x^2}{100}+\frac{y^2}{36}=1$ is constant.

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49. Show that the difference of the focal distances of any point on the hyperbola $9x^2 - 4y^2 = 36$ is equal to its transverse axis.

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