MATHS

BOOKS - UNITED BOOK HOUSE

MODEL QUESTION PAPERS-SET 3

Exercise

1. If. b $\sin\beta$ =$a\sin(2\alpha+\beta)$ then the.value of $\frac{\cot(\alpha+\beta)}{\cot\alpha}$

A. a) $\frac{a-b}{a+b}$

B. b) $\frac{b-a}{a+b}$

C. c) $\frac{a+b}{a-b}$

D. d) $\frac{a+b}{b-a}$

Answer:

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2. $5^{2n+1}+3^{4n+2}(n \in N)$ is divisible by

A. a) 4

B. b)8

C. c)14

D. d)16

Answer:

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

A. a)-27/2

B. b)27/2

C. c)-27

D. d)27

Answer:

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4. If $\left(\frac{1-i}{1+i}\right)^r$ is always real then the least value of r is

A. a)8

B. b)6

C. c)4

D. d)2

Answer:

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5. The straight line $3x+y=9$ divides the straight line segment joining the points (1, 3) and (2, 7) are in ratio

A. a)3:4

B. b)-3:4

C. c)4:5

D. d)-4:5

Answer:

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6. If the point $P\left(at^2, 2at\right)$ is a end point of a chord of the parabola $y^2 = 4ax$ which is passes

through the focus, then the length of the chord is

A. a) $\left(t+\frac{1}{t}\right) unit$

B. b) $\left(t+\frac{1}{t}\right)^2 unit$

C. c) $a\left(t+\frac{1}{t}\right) unit$

D. d) $a\left(t+\frac{1}{t}\right)^2 unit$

Answer:

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7. The value of $\lim_{x \to \pi} \frac{\sin x}{x - \pi}$ is

A. a)0

B. b)-1

C. c)1

D. d)undefines.

Answer:

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8. If $y = \sin x \sin \alpha, then \frac{dy}{dx} =$

A. a) $\cos x \cos \alpha$

B. b) $\cos x \sin \alpha$

C. c) $\sin x \cos \alpha$

D. d) 0

Answer:

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9. The median of 22,20, 22, 25, 19, 30, 27 is

A. a)19

B. b)20

C. c)22

D. d)30

Answer:

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10. variance of 1st n natural number is

A. $\frac{n^2+1}{12}$

B. b) $\frac{n^2-1}{10}$

C. c) $\frac{n^2-1}{6}$

D. d) $\frac{n^2-1}{12}$

Answer:

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11. $(A^c \cup A)^c = \phi$ is the relation true of false? Give reason.

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12. If the realtion R defined as the set S = {1.-2, 3, 4}„$\forall, a, b \in s, aRb$, if and- only if b is the double of a. Find the set R.

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13. Show that$\sec\theta + \tan\theta = \tan\left(\frac{\pi}{4} + \frac{\theta}{2}\right)$

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14. In $\triangle ABC$, if a = 3. b = 5 and c =7, show that the triangle is obtused.

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15. If $|z+2| + |z-2| \leq 6$, find the maximum value of I z I.

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16. If m=^nC_2$showt\hat{}\ \hat{}\ mC_2 = 3^{n+1}C_4$

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17. If a+b=3,then show that the minimum value of |a+ib|=is $\frac{3}{\sqrt{2}}$

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18. Find the sum of the following infinite G.P series 0.9+0.81+0.792+....

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19. Show that the distance between (1,-1) and $\left(\frac{2m^2}{1+m^2}, \frac{(1-m)^2}{1+m^2}\right)$ is not depend on m

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20. Find the radius of sphere passing through (2,0,1) and having centre(0,-4,1).

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21. Prove that $\lim_{x \to \infty} \left(1 + \frac{1}{x}\right)^x = e$

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22. For all real values of x and y, if f(x+y)=f(x)f(y), f(5)=4, f'(0)=2, find f'(5).

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23. IfP(A)=1/2,P(B)=1/3)and $P(A \cap B) = \frac{1}{4}$find $(A' \cap B')$

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24. In.an examination. 50%of the condidates have passed in mathematics 50% have passed in physics, while 41% have passed in both the subjects. Find the total number of candidates

if..41 of them have failed in both subjects. (By., using set theory).

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25. If A,B,(A - B)are positive acute angles, then prove that geometrically : cos (A - B) = cos A cos B + sin A sin B

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26. Show that

$$\cos\left(\frac{2\pi}{7}\right)+\cos\left(\frac{4\pi}{7}\right)+\cos\left(\frac{6\pi}{7}\right)=-\frac{1}{2}$$

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27. Show that $a^6+a^4+a^2+1=0$,when $a=\frac{1}{\sqrt{2}}(1+i)$

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28. Prove by mathematical induction: $\left(3^{4n+1}+2^{2n+2}\right)$ is divisible by 7.

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29. Show that the co-efficient of the middle term of the expansion of $(1+x)^{12}$ is equal to the sum of the co-efficient of middle terms of.'the expansion of $(1+x)^{11}$.

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30. If $\left(\frac{y}{z}\right)^a . \left(\frac{z}{x}\right)^b . \left(\frac{x}{y}\right)^c = 1$and a,b,c are in A.P ,show that x,y,z are in G.P.

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31. In $\triangle XYZ$the equation of the perpendicularbisector of XY and XZ arc x-y + 5 = 0 and x + 2y= 0, If the coordinate of x is (1.-2),■ then find the equation of YZ.

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32. Find the distance of the point (3. 5) from the line 2x + 3y = 14measured parallel to th line x - 2y= 1,

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33. The end' points of a rod having length l are moving a long with two straight line which are perpendicular toeach othcr. Find the equation -of the locus of the point which divides the rod are in ratio 2:1.

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34. Find the equation of a circle .which passes through (-2. 1) and touches the straight line 3x - 2y= 6 at (4. 3).

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35. Evaluate: $\lim_{x-0} \frac{(e^x - 1)\log_5(1+5x)}{\sin^2 x}$

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36. Differentiate a^x with respect to x (a> 0) with the help 1st principle.

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37. '180 is the multiple of 4 or 5 examine the validity of the compound statement.

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38. 'x is such a real number that $4x^3 + 3x = 0$, then $x = O$'. Find the truth value of this compound statement by the method of contra-diction.

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39. The AM and SD of the marks obtained in the subjects' Bengali, .English and History of 50 students',in a class are given below

	Bengali	English	History
AM	42	32	40·9
SD	12	15	20

Find the maximum and minimum variability of the subjects with respect to obtained marks.-

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40. If $\cos\alpha = \frac{\sin y}{\sin x}, \cos\beta = \frac{\sin z}{\sin x}$ and $\cos(\alpha - \beta) = \sin y \sin z$. Show that $\tan^2 x = \tan^2 y + \tan^2 z$

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41. Solve : $16^{\sin^2 x} + 16^{\cos^2 x} = 10.\ [0 \leq x \leq \pi]$

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42. Find the common solution region by. the graphical method. $3x + 2y \leq 18, x + 2y \leq 10,$ $x \geq 0, y \geq 0$

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43. Solve : $x^2 + \frac{x}{\sqrt{2}} + 1 = 0$

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44. Find the sum upto nth term : ,1 + 4 + 13 .+ 40 + ...

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45. Find the rank of the word MOTHER when its letters are arranged as in a dictionary

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46. An equilateral triangle inscribe a parabola $y^2 = 4ax$. such that oneof the vertex of the triangle lies on the vertex of the parabola-. Find the,length of,the each side. of the triangle:

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47. If the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$passes through the intersecting points of two straight lines 7x + 13y -87=0 and 5x -8y + 7 = 0 and the'length of

its latus rectum is $\frac{32\sqrt{2}}{5}$ then find the value of a and b and also find its eccentricity

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48. PQ is the double ordinate of the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ and O is the centre of the hyperbola. If triangle OPQ is an equilateral triangle, then show that the eccentricity of this hyperbola is e) $e^2 > \frac{4}{3}$

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