MATHS

BOOKS - UNITED BOOK HOUSE

ANNUAL EXAMINATION QUESTION PAPERS 2016

Exercise

1. If f(x)=$\log_3 x$ and $\phi(x) = x^2$,then the value of $f\{\varphi(3)\}$will be

A. a)0

B. b)1

C. c)2

D. d)3

Answer:

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2. If $\tan\theta = -\frac{4}{3}$,then the value of $\sin\theta$ is

A. a)2/5

B. b)4/5 or -4/5

C. c)4/5 but $\neq -\frac{4}{5}$

D. d)-4/5 but `!=4/5.

Answer:

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3. If the ratio of the sum of first three terms to the sum of next three terms of a geometric series be 125:27,then the common ratio of the series be

A. a)5/3

B. b)1/4

C. c)3/5

D. d)1/2

Answer:

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4. If the point $(\lambda, 1+\lambda)$be lying inside the circle x^2+y^2=1 then

A. a) $\lambda = -\frac{1}{2}$

B. b) $\lambda < 0$

C. c) $-1 < \lambda < 0$

D. d) $\lambda > 0$

Answer:

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5. The distance between the points A(5,1,2) and B(4,6,-1)is

A. a) $\sqrt{35} units$

B. b) $\sqrt{53} units$

C. c) $\sqrt{5} units$

D. d) $\sqrt{3} units$

Answer:

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6. If the points $A(2, \beta, 3), B(\alpha, -5, 1)$ and C(-1,11,9) are collinear,then, find the values of alpha and beta.

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7. The value of $\lim_{x \to 0} \frac{\sin 5x}{\tan 3x}$ is

A. a)2

B. b)5

C. c)5/3

D. d)3/5

Answer:

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8. If $y = \sqrt{\frac{1 - \cos 2x}{1 + \cos 2x}}$,then the value of dy/dx will be

A. a)$\tan^2 x$

B. b)$\sec^2 x$

C. c)sec x

D. d)tan x

Answer:

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9. 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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10. If $i^2 = -1$,then the value of modulus of $(3i - 1)^2$will be

A. a)9

B. b)10

C. c)8

D. d)6

Answer:

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11. Find the domain of the function $f(x) = \frac{x^2 + 3x + 5}{x^2 - 5x + 4}$

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12. If $f(x) = e^{px+q}$,then shoq that $f(a).\ f(b).\ f(c) = f(a+b+c).\ e^{2q}$

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13. if $13\theta = \pi$,then show that $\cos 3\theta + \cos 5\theta + 2\cos\theta.\cos 9\theta = 0$

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14. Show that $\sec\alpha - \tan\alpha = \cot\left(\frac{\pi}{4} + \frac{\alpha}{2}\right)$

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15. Find the square root of i

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16. Find the (r+1)th term from the end in the expansion of $(1-3x)^n$.

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17. Prove that by using the principle of mathematical induction for all $n \in N$:

$10^{2n-1} + 1$ is divisible by 11

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18. Let the sum of n, 2n, 3n terms of an A.P. be S_1, S_2 and S_3, respectively, show that $S_3 = 3(S_2 - S_1)$

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19. Find the locus of the mid-point of the portion of the line $x\cos\alpha + y\sin\alpha = 4$intercepted between the axes of

coordinates.

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20. If the coordinates of a point lies on the ellipse $9x^2 + 16y^2 = 144$ be $\left(2, \frac{3\sqrt{3}}{2}\right)$,find the eccentric angle of that point.

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21. If $y = \frac{e^x}{1+x^2}$,determin dy/dx.

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22. Evaluate : $\lim_{x \to \frac{\pi}{4}} \frac{1 - \tan x}{x - \frac{\pi}{4}}$

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23. can $\frac{7}{2}$ be the probability of an event? Explain.

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24. Two variables x and y are related by y=10-3x.If the standard deviation of x be 4,find the standard deviation of y.

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25. For any three sets A,B and C prove that $A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$

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26. Find the value of

$$16\cos\left(\frac{\pi}{15}\right).\cos\left(\frac{2\pi}{15}\right).\cos\left(\frac{4\pi}{15}\right).\cos\left(\frac{8\pi}{15}\right)$$

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27. Show that

$$\sin^3\alpha+\sin^3(120^\circ+\alpha)+\sin^3(240^\circ+\alpha)=-\frac{3}{4}\sin 3\alpha$$

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28. Prove that by using the principle of mathematical induction

for all $n \in N$:

$$1.2+2.3+3.4+\ldots..+n(n+1)=\left[\frac{n(n+1)(n+2)}{3}\right]$$

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29. If the P^{th} and q^{th} terms of an A.Pare a and b respectively,then show that the sum of first (p+q) terms of thath A.P is 1/2(p+q)$\left(a+b+\frac{a-b}{p-q}\right)$

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30. Find the probability of drawing 4 cards from a pack of 52 cards such that at least two cardswill be aces.

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31. Find the sum of n-terms of the following series: $\left(x+\frac{1}{x}\right)^2+\left(x^2+\frac{1}{x^2}\right)^2+\left(x^3+\frac{1}{x^3}\right)^2+\left(x^4+\frac{1}{x^4}\right)^2+\ldots$

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32. 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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33. Find the equation of the circle passes through the points (4,3) and (-2,5) and whose centre lies on the lin 2x-3y=4

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34. 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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35. Find the value of cos B for the triangle formed by joining the points A(6,11,2),B(1,-1,2)and C(1,2,6).

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36. Evlauate $\lim_{x \to 0} \frac{\cot 2x - \cos ec2x}{x}$

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37. Find from the first principle,the derivative of $f(x) = e^{x^2}$ at x=1.

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38. Prove the following by contradiciton ."The sum of a rational and an irrational number is an irrational number?".

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39. Check the validity of the following compound propostions :"72 is a multiple of both 4 and 9"

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40. Check the validity of the following compound propostions :"120 is a multiple of both 15 and 9"

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41. Two students Anil and Ashima appeared is an examination. The probability that Anil will qualify the examination is 0.05 and that Ashima will qualify the examination is 0.10. The probability qualify the examination is 0.02. Find the probability that

(a) Bothe Anil and Ashima will not qualify the examination.

(b) Atleast one of them will qualify the examination and (c) Only one of them will qualify the examination.

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42. Find the coefficient of variation of the following data:

Makrs :	0-10	10-20	20-30	30-40	40-50
No. of students	4	10	16	12	8

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43. Find the general solution of x and y satisfying the equation 5sinx.cosy=1 and 4 tanx=tany.

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44. Find the domain of definition and range of the function $f(x) = \frac{x}{1+x^2}$.

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45. If $f(x) = ax^2 + bx + c$and f(2)=1,f(3)=6,f(-1)=10,then find the value of f(1).

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46. If z=x+iy and |z-1|+|z+1|=4,then show that $3x^2 + 4y^2 = 12$,where $i = \sqrt{-1}$

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47. In how many ways can 6 boys and 4 girls be seated in a round table so that two girls never be seated together.

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48. If $a_1, a_2, a3, \ldots, a_n$ are in A.P then show that $\frac{1}{a_1 a_2} + \frac{1}{a_2 a_3} + \frac{1}{a_3 a_4} + \ldots + \frac{1}{a_{n-1} a_n} = \frac{n-1}{a_1 a_n}$

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49. Solve : $\frac{|x|-2}{|x|-3} \geq 0$,where $x \in R$ and $x \neq \pm 3$

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50. If the extremitied of a focal chord of the parabola $y^2 = 4ax$ be $\left(at_1^2, 2at_1\right)$and $\left(at_2^2, 2at_2\right)$,show that $t_1 t_2 = -1$

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51. The number of tangents that can be drawn from the point (6, 2) on the hyperbola $\frac{x^2}{9} - \frac{y^2}{4} = 1$ is

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