MATHS

BOOKS - UNITED BOOK HOUSE

MCQ

Exercise

1. A-B $=\phi$ iff

A. a)$A \neq B$

B. b)$A \subset B$

C. c)$B \subset A$

D. d)$A \cap B = \phi$

Answer:

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2. If n(A)= 3, n (B) = 4 then$(A \times A \times B) =$

A. a)36

B. b)12

C. c)48

D. d)24

Answer:

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3. Total number of relations that can be defined on set X={p,q,r}is

A. a)2^3

B. b)2^9

C. c)3^2

D. d)2^8

Answer:

4. If P = {-2,-1, 0, 1, 2}, Q = {-6,-5,-3, 0, 3} and the mapping f $:P \rightarrow Q$ is defined by $f(x) = 2x^2 + x - 6,$ state which of the following is the image of (-2)?

A. a)-3

B. b)-1

C. c)1

D. d)0

Answer:

5. If f(x)=$\log_3 x$ and $\phi(x) = x^2$,then the value

of $f\{\varphi(3)\}$will be

A. a)2

B. b)3

C. c)4

D. d)0

Answer:

6. Find the minimum value of $\cos^2 \theta + \sec^2 \theta$

A. a)-1

B. b)0

C. c)1

D. d)2

Answer:

7. If $\tan \alpha + \sec \alpha = e^x$,then $\cos \alpha$ equals

A. a)$\dfrac{e^x + e^{-x}}{2}$

B. b)$\dfrac{2}{e^x - e^{-x}}$

C. c) $\dfrac{2}{e^x + e^{-x}}$

D. d) $\dfrac{e^x - e^{-x}}{2}$

Answer:

8. If tan A=3/4 and tan B=4/3 ,the value of (A+b)

is

A. a) $\dfrac{\pi}{4}$

B. b) $\dfrac{\pi}{2}$

C. c)π

D. d)$\dfrac{3\pi}{4}$

Answer:

9. $2\sin 40° \sin 10° =$

A. a)$\cos 30° - \cos 50°$

B. b)$\cos 50° - \cos 30°$

C. c)$\cos 30° + \cos 50°$

D. d)$\sin 50° - \sin 30°$

Answer:

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10. Show that $\dfrac{1}{\sin 10°} - \dfrac{\sqrt{3}}{\cos 10°} = 4$

A. a)0

B. b)1

C. c)2

D. d)4

Answer:

11. $\sin 12°.\sin 48° =$

A. a) $\dfrac{\sqrt{5}-1}{8}$

B. b) $\dfrac{\sqrt{5}+1}{8}$

C. c) $\dfrac{\sqrt{5}-1}{4}$

D. d) $\dfrac{\sqrt{5}+1}{4}$

Answer:

12. The general solution of the equation $\sin \alpha = 1$ is

    A. a)$\alpha = (2n + 1)\dfrac{\pi}{4}$

    B. b)$\alpha = \dfrac{\pi}{2}$

    C. c)$\alpha = (4n + 1)\dfrac{\pi}{2}$

    D. d)$\alpha = \dfrac{n\pi}{2}$

Answer:

13. If in $\triangle ABC, \angle A = 45°, \angle B = 60°$,then

the ratio of its sides is

A. a)$2: \sqrt{6}: (\sqrt{3}+1)$

B. b)3:4:5

C. c)$\sqrt{6}: (\sqrt{3}+1): 2$

D. d)none of these.

Answer:

14. The sum of the cubes of 1st n natural numbers is

A. a)n^3

B. b)$\left[\dfrac{n(n+1)}{2}\right]^3$

C. c)1/6n(n+1)(2n+1)

D. d)$\left[\dfrac{n(n+1)}{2}\right]^2$

Answer:

15. State which of the following is the value of

$$\left(1 + i + 2i^2 + i^3 + i^4\right)[\text{given } i = \sqrt{-1}]$$

A. a)0

B. b)1

C. c)-1

D. d)i

Answer:

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16. If the roots of the equation $5x^2 - 7x - k = 0$ are reciprocal to one another, then which of the following is the value of k?

A. a)-5

B. b)-1/5

C. c)5

D. d)1/5

Answer:

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17. Solution sets of the inequation $-2 \le \dfrac{3x-1}{2} \le 1 [x \in Z]$ is

A. a){0,1,2,3}

B. b){-1,0,1,2}

C. c){0,1,2}

D. d){-1,0,1}

Answer:

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18. Given $^9P_3 = x \ ^9P_5$ then the value of x

is

A. a)20

B. b)30

C. c)27

D. d)15

Answer:

19. If $^{25}C_r = {}^{25}C_{2r+1}$, the value of $^rC_5$ is

A. a)50

B. b)25

C. c)56

D. d)8

Answer:

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20. The. coefficient of 10th term in the expansion of $\left(x + \dfrac{1}{x}\right)^{20}$

A. a) ^ $20C_{10}$

B. b) ^ $20C_9$

C. c)- ^ $20C_{10}$

D. d)- ^ $20C_9$

Answer:

21. The 12th term of the scries-n,(n -1), (n - 2),....

A. a)(n-11)

B. b)(n-12)

C. c)(n-13)

D. d)none of these.

Answer:

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22. If 5.x, 405 are in G.P, then which of the following is the value of x?

A. a)-45

B. b)± 45

C. c)45

D. d)none of these.

Answer:

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23. The perpendicular distance of the straight line 3x + 4y + 15 = 0 from the origin, is

A. a)3 unit

B. b)4 unit

C. c)5 unit

D. d)15 unit

Answer:

24. The angle between the-lines $x + \sqrt{3}y + 7 = 0$ and $\sqrt{3}x - y + 8 = 0$ is

A. a)$45°$

B. b)$90°$

C. c)$30°$

D. d)$60°$

Answer:

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25. The distance between the two-parallel lines

$3x + 4y + 9 = 0$ and $3x+4y+7=0$ is

    A. a)2/5 unit

    B. b)1/5 unit

    C. c)3/5 unit

    D. d)9/7 unit

Answer:

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26. The equation

$$x^2 + y^2 + 2gx + 2fy + c = 0 \quad \text{represents a}$$

point -circle when

A. a) $f^2 - g^2 = C$

B. b) $g^2 + f^2 + C = 0$

C. c) $g^2 - f^2 = C$

D. d) $g^2 + f^2 = C$

Answer:

27. The-equation of the directrix of the parabola $2x^2 = 3y$ is

A. a)8x-3=0

B. b)8x+3=0

C. c)8y-3=0

D. d)8y+3=0

Answer:

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28. If the equation $\dfrac{x^2}{4-m} + \dfrac{y^2}{m-7} + 1 = 0$

represents an ellipse then

A. a)m<4

B. b)m>7

C. c)m>7 or m<2

D. d)4 < m < 7

Answer:

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29. The length of the latus rectum of the hyperbola $9x^2 - 25y^2 = 225$ is

A. a)9/25 unit

B. b)18/5 unit

C. c)3/5 unit

D. d)5/3 unit

Answer:

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30. The points (5, 2, 4), (6, -1, 2) and (8,-7, k) are collinear if k =

    A. a)-2

    B. b)2

    C. c)-3

    D. d)3

Answer:

31. If $|x| \leq y$ then

A. a)-yltxlty

B. b)$-y \leq x < y$

C. c)$-y \leq x \leq y$

D. d)$-y < x \leq y$

Answer:

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32. If $\displaystyle \lim_{x \to 3} \frac{ax^2 - \beta}{x - 3} = 12$, then

A. a)$\alpha = 3, \beta = 9$

B. b)$\alpha = 2, \beta = 18$

C. c)$\alpha = 2, \beta = 1$

D. d)$\alpha = 2, \beta = 2$

Answer:

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33. 5f(x)+3f(1/x)=x+2 and y=xf(x),then dy/dx=

A. a)7/8

B. b)8/7

C. c)7/10

D. d)10/7

Answer:

34. The slope of the tangent to the curve

$$y = 2\sqrt{2}x$$

   A. a)-1

   B. b)-2

   C. c)$2\sqrt{2}$

   D. d)$-2\sqrt{2}$

Answer:

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35. If v is the variance and σ is the standard diveation then

A. a)$v^2 = \sigma$

B. b)$v = \sigma 2$

C. c)$v = \dfrac{1}{\sigma}$

D. d)$v = \dfrac{1}{\sigma^2}$

Answer:

36. A and B be two mutually exclusive events such that P(A)=3/8,P(B)=1/3,then $P[A \cup B]$ is given by

    A. a)5/24

    B. b)11/24

    C. c)17/24

    D. d)7/24

Answer:

37. Define power set of a set A. Find the power set.of A = {{1}, [2, 3}}.

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38. If A ={1, 2, 3, 4, 5} and B = {1, 2, 3, 7, 8, 9},find the value of $n\{(A \times B) \cap (B \times A)\}$

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39. If $f(x) = e^{x+a}, g(x) = x^{b^2}$ and $h(x) = e^{b^2 x}$, show that $\dfrac{g[f(x)]}{h(x)} = e^{ab^2}$

40. Prove that

$$\tan\left(\frac{\pi}{12}\right)\tan\left(\frac{5\pi}{12}\right)\tan\left(\frac{7\pi}{12}\right)\tan\left(\frac{11\pi}{12}\right) = 1$$

41. Prove that $\tan 62° = 2\tan 34° + \tan 28°$

42. If $\cos \alpha + \cos \beta = \dfrac{1}{3}$ and $\sin \alpha + \sin \beta = \dfrac{1}{4}$, show that $\tan\left(\dfrac{\alpha + \beta}{2}\right) = \dfrac{3}{4}$

43. Show that $\dfrac{1}{\sin 10^\circ} - \dfrac{\sqrt{3}}{\cos 10^\circ} = 4$

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

45. Solve : $3 \sin^2 x + 7 \cos^2 x = 6$

46. In $\triangle ABC \angle B = 60°$, $c = 2\sqrt{3}, b = 3\sqrt{2}$ then find $\angle A$.

47. If $\left(2^{2n} - 1\right)$ is divisible by 3, then show that $\left[2^{2(n+1)} - 1\right]$ is also divisible by. 3

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48. Simplify : $(1 + i)^{-2} - (1 - i)^{-2}$

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49. Find a quadratic equation with rational co-efficient whose one root is $4 + \sqrt{7}$

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50. State fundamental theorem of algebra

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51. If^9P_5 + 5. ^ $9P_4$ =^IOP_r`, find r.

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52. If $^nC_4 = 21 \times {}^{(n/2)}C_3$ find n.

53. Find the middle term (or terms) in the following expansions:

(iii) $\left(x^2 - \dfrac{1}{x} \right)^9$

54. The sum to n terms of an A.P. is n^2. Find the common difference.

55. If the slope of the line joining the points (2k,-2) and (1,-k) be (-2) , find k.

56. Find the equation to the circle whose parametric equations are,

$$x = \frac{1}{2}(1 + 5\cos\theta), y = \frac{1}{2}(-2 + 5\sin\theta)$$

57. Find the equation- of the porabola whose co-ordinates of the vertex and focus are (-2, 3) and (1,3) respectively.

58. Find the the co-ordinates of the point on the ellipse $x^2 + 2y^2 = 4$ whose eccentric angle is $60°$.

59. Show that the eccentricities of the two hyperbolas $\dfrac{x^2}{16} - \dfrac{y^2}{9} = 1$ and $\dfrac{x^2}{64} - \dfrac{y^2}{36} = 1$ are equal.

60. Find the co-ordinates of the point of trisection of the line segment joining the points (0, 2, 1) and (2, -1, 5) that is nearer to (0, 2, 1).

61. show that $\lim\limits_{n \to 0} \dfrac{\sqrt[3]{n+1} - 1}{n} = \dfrac{1}{3}$

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

63. if $\lim\limits_{x \to a} f(x) = \lim\limits_{x \to a} g(x)$,then whether

f(x)=g(x) is always true?Justify your answer by

an example

64. From the following array, find out the

mean deviation. 7,9,16,24,26,31,39.

65. Define 'mutually exclusive' and 'mutually exhustive' events and give examples with the help of a sample space

66. Two dice are thrown simultaneously. Find the probability that the sum of the numbers obtained will be 10.

67. For any three sets A,B and C ,prove that

$$A - (B \cup C) = (A - B) \cap (A - C).$$

68. Find the domain of definition of $f(x) = \log_e \left(\dfrac{1 - x}{1 + x} \right)$ Further show that $f(x_1) + f(x_2) = f\left(\dfrac{x_1 + x_2}{1 + x_1 x_2} \right)$, $x_1, x_2 \in (- 1, 1)$

69. $\sin\theta = k\sin(\theta + \phi)$.show that

$$\tan(\theta + \phi) = \frac{\sin\phi}{\cos\phi - K}$$

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70. Prove that

$$\tan 20° \tan 40° \tan 60° \tan 80° = 3$$

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71. If $a \sin \alpha + b \cos \alpha = c$ and $a \cos ec\alpha + b \sec \alpha = c$ show that $\sin 2\alpha = \dfrac{2ab}{c^2 - a^2 - b^2}$

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72. Prove that $4\sin 27° = \sqrt{5 + \sqrt{5}} - \sqrt{3 - \sqrt{5}}$

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73. Solve :tanx+tany=1,$x + y = \pi/4$

74. If $a^4 + b^4 + c^4 + a^2b^2 = 2c^2\left(a^2 + b^2\right)$,,

then show that$\angle C = 60°$ or $120°$

75. Prove using principle of mathematical

induction that sum of the cube three

consecutive natural number is divisible by 9.

76. If $x + iy = \left(\dfrac{a + ib}{c + id}\right)^{1/2}$,show that $\left(x^2 + y^2\right) = \dfrac{a^2 + b^2}{c^2 + d^2}$

77. If one of the root of the equation $px^2 + qx + r = 0$ is the cube of the other, prove that.$rp(r + p)^2 = \left(q^2 - 2rp\right)^2$.

78. Solve graphically the following system of linear inequations - $x - y \le 1, x + 2y \le 8$, 2x + y ge 2. x ge 0, yge 0. '

79. How many 4-digit numbers can be formed from the digits 1, 1, 2, 2, 3, 3,4, 5?

80. Prove that the middle term in the expansion of $(1 + x)^{2n}$ is

$$\frac{1.3.5....... (2n - 1)}{\lfloor n}.2^n.x^n$$

81. If Sn be the sum of n consecutive terms of an A.P. show that

$$S_{n+4} - 4S_{n+3} + 6S_{n+2} - 4S_{n+1} + S_n = 0$$

82. If n th term of a-series be $\left(2.3^{n-1} + 1\right)$,, find the sum of 1st r terms of the series.

83. Show that the four straight lines

$x \cos \alpha + y \sin \alpha = P,$

$x \sin \alpha - y \cos \alpha = -p$ and

$x \sin \alpha - y \cos \alpha = P$ form a square.

84. Applying section formulae show that the points A(4. 7,-6), B (2, 5, -4) and C(1, 4, -3) are colinear.

85. Evaluate : $\lim\limits_{x \to y} \dfrac{\cos^2 x - \cos^2 y}{x^2 - y^2}$

86. Evaluate: $\lim\limits_{x \to 0} \dfrac{\sqrt{1 + x^2} - \sqrt{1 + x}}{\sqrt{1 + x^3} - \sqrt{1 + x}}$

87. Evaluate: $\displaystyle\lim_{x \to 0} \frac{e^{3x} - 1}{\log(1 + 5x)}$

88. Evaluate : $\displaystyle\lim_{x \to \pi/2} \left(x \tan x - \frac{\pi}{2}\sec x \right)$

89. Water is following into a right circular conical vassel. 45 cm deep and 27 cm in diameter at the rate of $11cm^3/$ min . How fast is the water-level rising when th water is 30 cm deep?

90. if y=f{f(x)},f(0)=0and f'(0)=5 find $\left[\dfrac{dy}{dx}\right]_{x=0}$

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

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

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92. Find the mean deviation about median from the following data.

Class interval	10-20	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	4	6	10	20	10	6	4

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93. For any two events A and B prove that

$$P(A \cup B) \leq P\{A) + P(B).$$

94. From 100 tickets numbered 1, 2,3.. ..... 100.four are drawn at random. What is the probability that 2 of them will bear numbers from1 to 40 and the other 2 will- bear any number from 41 to 100?

95. Two balls are drawn at random from a bag containing 6 white and 4 black balls. Find the chance that one is white and the other is black?

96. If the circles $x^2 + y^2 + 2ax + c^2 = 0$ and $x^2 + y^2 + 2by + c^2 = 0$ touch each other,prove that $\dfrac{1}{a^2} + \dfrac{1}{b^2} = \dfrac{1}{c^2}$

97. If $a\cos\phi = b\cos\theta$, show that

$$a\tan\theta + b\tan\phi = (a+b)\tan\left(\frac{\theta+\phi}{2}\right)$$

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98. If $\dfrac{\cot(\alpha-\beta)}{\cot\alpha} + \dfrac{\cos^2\gamma}{\cos^2\alpha} = 1$ show that

$\tan^2\gamma + \tan\alpha\cot\beta = 0$

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99. Solve $:\cos^3 x \cos 3x + \sin^3 x \sin 3x = 0$

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100. In any triangle ABC If sinA : sinB: sinC=4:5:6,then prove that cos A :cosB: cosC=12:9:2.

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101. Find the domain of definition of the function defined by $f(x) = \dfrac{1}{\log_e(2-x)} + \sqrt{x} + 3$

102. Solve : $\bar{z} = iz^2$ (z being a complex number)

103. if x be real, show that the value of

$$\frac{2x^2 - 2x + 4}{x^2 - 4x + 3}$$ cannot lie between(-7) and 1.

104. If α be a root of the quadratic equaiton

$4x^2 + 2x - 1 = 0$ .Prove that $4\alpha^3 - 3\alpha$ is the

other root.

105. solve : |x+2|/x<3where $x \in R$and $x \neq 0$

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

107. If the coefficient of-four successive termsin the expansion of $(1 + x)^n$ be a_1, a_2, a_3

and a_4 respectivel. Show that

$$\frac{a_1}{a_1 + a_2} + \frac{a_3}{a_3 + a_4} = 2\frac{a_2}{a_2 + a_3}$$

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108. If s_1, s_2, s_3 are thesums of n natural

numbers, theirsquares, their cubes

respectively. Show.that$9s_2^2 = s_3(1 + 8s_1)$

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109. Find the sum upto n terms :

12+14+24+58+164+....

110. Find the equation of the parabola whose co-ordinate of vertex is (-2, 3) and the equation of directrix is 2x + 3y + 8 = 0.

111. If $(\alpha + \beta)$ and $(\alpha - \beta)$ are the eccentric angles of the points P and Q respectively on the ellipse $\dfrac{x^2}{25} + \dfrac{y^2}{9} = 1$. Show that the equation of the chord PQ is $\dfrac{x}{5}\cos\alpha + \dfrac{y}{3}\sin\alpha = \cos\beta$

112. The foci of the ellipse $\dfrac{x^2}{25} + \dfrac{y^2}{9} = 1$ coincide with a hyperbola. If e=2 for hyperbola, find the equation of hyperbola.

113. The equation of auxiliary circle of the ellipse $16x^2 + 25y^2 + 32x - 100y = 284$ is

114. Find the area of the parabola $y^2 = 4ax$ bounded by its latus rectum.