MATHS

BOOKS - UNITED BOOK HOUSE

MODEL QUESTION PAPERS-SET 1

Exercise

1. For any sets P and Q.$P \cap (P \cup Q)$is equal to

A. a)ϕ

B. b)p

C. c)$P \cap Q$

D. d)Q

Answer:

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2. In the expansion of $\left(1+2x+x^2\right)^7$,the number of terms will be

A. a)15

B. b)8

C. c)7

D. d)14

Answer:

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3. Number of roots of the equation $\sqrt{y+1} - \sqrt{4y-1} = \sqrt{y-1}$ are

A. a)15

B. b)2

C. c)3

D. d)0

Answer:

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4. If z=-i-1 is a complex number,then arg (z) will be

A. a) $-\frac{\pi}{4}$

B. b)-(3pi)/4

C. c) $\frac{\pi}{4}$

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

Answer:

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5. One double ordinate makes a right angle at the vertex of a $parabola\ y^2 = 8x$.the length of the double ordinate will be

A. a)4 unit

B. b)8 unit

C. c)16 unit

D. d)32 unit

Answer:

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6. If the perpendicular distance from origin to the straight line $4x-3y+P=0$ is 2 unit,then the value of P is

A. a)-5

B. b)5

C. c)-10

D. d)10

Answer:

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7. If y= $\frac{1}{n-x}$ then $\frac{dy}{dx}$=

A. a)$(x-n)^{-2}$

B. b)$(x-n)^{2}$

C. c)$-(x+n)^{2}$

D. d)$(x+n)^{-2}$

Answer:

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8. If $\lim_{x \to 3} \frac{x^n - 3^n}{x - 3} = 108$,then the value of n is

A. a)5

B. b)4

C. c)3

D. d)2

Answer:

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9. A con is tossed two times.The probability of getting tail in both times is

A. a)1/4

B. b)1/2

C. c)1/8

D. d)1

Answer:

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10. The median of given data 6,8,7,18,10,6,26,9,4,32,40 is

A. a)40

B. b)16

C. c)10

D. d)4

Answer:

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11. If universal set $U = \{x : x \in N, 1 \leq x \leq 10\}$

$A = \{x : x \in N, 2 \leq x \leq 6\}$and

$B = \{x : x \in N, 3 \leq x \leq 8\}$find $A^c \cup B^c$

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12. Let P={1,2,„3},Q={1,8,27}and $f: P \to Q$be given by $f(x) = x^3$and $g(x) = 6x^2 - 11x + 6$.State whether f=g or not.

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13. Find the value of $\cos^2 48^\circ - \sin^2 12^\circ$

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14. Prove that ,In $\triangle ABC$ a(bcosC-ccosB)=$b^2 - c^2$

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15. If $\omega$is an imaginary cube root of unity then prove that

$$\frac{x\omega^2+y\omega+z}{x\omega+y+z\omega^2}=\left(\frac{x\omega+y+z\omega^2}{x\omega^2+y\omega+z}\right)^2$$

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16. 1st,2nd,and 8th term of a G.P are a^{-4},a^m,a^{52}.Find the value of m.

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17. If the 5th term of the expansion of $\left(x^{2/3}+x^{-1}\right)^n$ is the term independet of x,then find th value of n.

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18. Prove that $\forall n, 14^n - 13n - 1$ is divisible by 13. $(n \in N)$

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19. Find the distance between the lines 3x+4y=9 and 6x+8y+15=0.

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20. Find the ratio in which the plane 2x+3y+5z=1 divides the line segment joining the points (1,0,-3)and (1,-5,7).

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21. From 1st principle differentiate $f(x) = \sqrt{x}$with respect to x.

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22. If f(x)=$\frac{1}{x}$ $(x \neq 0)$,Show that f'(1)-f'(-1)=0.

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23. Show that the SD of two variables is half of their optimum value.

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24. P(A)=1/2,P(B)=1/3,P(C)=1/4,are these true?when A,B,C are mutually disjoint events.(give reason).

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25. For any two sets,prove that $n(A \cup B) = n(A) + n(B) - n(A \cap B)$.

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26. If $\cos ec\theta + \sec\theta = \cos ec\alpha + \sec\alpha$,then show that $\tan\left(\frac{\theta + \alpha}{2}\right) = \cot\theta \cot\alpha$

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27. Solve :$\cos^8\alpha + \sin^8\alpha = \frac{17}{32}$

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28. If x=a+b,$y = aw + bw^2$,$z = aw^2 + bw$,show that $xyz = a^3 + b^3$

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29. If ,p,q,a,b are 6th,7th,8th and 9th term of the expansion of $(x + r)^n$,then show that $\frac{q^2 - ap}{a^2 - bq} = \frac{4p}{3a}$

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30. By using mathematical induction prove that $3^{2n} - 8n - 1$is divisible by 64 when n is an integer.

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31. If a,b,c are in G.P and x,y are the arithmetic mean of a and b aand b,c prove that a/x+c/y=2and 1/x+1/y=2/b.

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32. Prove that the straight lines ax+by+c=0,bx+cy+a=0and cx+ay+b=0 are concurrent if a+b+c=0.When $a \neq b \neq c$.

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33. Find the equation of the straight line which divides perepndicularly the striaght line segment joining the points (7,9)and (-1,-7) internally in the ratio 3:5.

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34. If the image of the co-ordinate of a point $(x_1, y_1)$is $(x_2, y_2)$with respect to the straight line lx+my+n=0,then show that $\frac{x_2 - x_1}{l} = \frac{y_2 - y_1}{m} = \frac{-2(lx_1 + my_1 + n)}{l^2 + m^2}$

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35. 3x+y=5 and x+y-1=0 are the equations of two diamters to the circle,which passes through the point (-2,2).Find

the equation of the circle.

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36. Evaluate : $\lim_{x \to 1} \frac{x + x^2 + x^3 + \ldots + x^n - n}{x - 1}$

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37. If $\sqrt{1 - x^4} + \sqrt{1 - y^4} = k\left(x^2 - y^2\right)$, show that $y_1 = \frac{x\sqrt{1 - y^4}}{y\sqrt{1 - x^4}}$

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38. Prove that the cpmpound statement “If x and y are odd integers, then xy is odd integer” is valid, using contrapositive method

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39. Prove by method of contradiction that $\sqrt{5}$is an irrational number

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40. 6 boys and 6 girls occuppy seats ina row at random.What is the probability that the 6 girls occupy side by side?

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41. Two samples of sizes 60 and 90 have 52 and 48 as the respective A.Ms. and 9 and 12 as the respective S.Ds. Find the A.M and S.D. of the combined sample of size 150.

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42. Prove that $\tan 6^\circ \tan 42^\circ \tan 66^\circ \tan 78^\circ = 1$

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43. Solve :$\sin^3\theta \cos\theta - \cos^3\theta \sin\theta = \frac{1}{4}$

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44. Draw the graph and find the solution (common) region of the following system of equations:$x + 2y \leq 10$, $x + y \geq 1$,$x - y \leq 0$,$x \geq 0$,$y \geq 0$

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45. Solve $12ix^2 - x + 6i = 0$

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46. Find the sum upto nth term : $1 + \frac{4}{5} + \frac{7}{5^2} + \frac{10}{5^3} + \ldots .$

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47. How many ways of selecting 4 letters from the words $EXAMINATION.$

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48. If the length of the double ordinate of a parabola $y^2 = 4ax$ is 8a.Prove that the line joining the vertex to its two ends are at right angle.

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49. If the eccentric angles of the any two points P,Q on the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$are $(\alpha+\beta)$and $(\alpha-\beta)$ resp.Show that the equation of chord PQ is $\frac{x}{a}\cos\alpha+\frac{y}{b}\sin\alpha=\cos\beta$

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50. If the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ passes through the interesecting point of two straight lines $x=3\sqrt{5}$ y and $\sqrt{5}x-2y=13$ and the length of latus rectum is 4/3 unit,the find the co-ordinate of its focus.

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51. For any two sets P and Q, if $P \cap Q = P \cup Q$ then

A. a)$P = \phi$

B. b)$Q = \phi$

C. c)$P \neq Q$

D. d)P=Q.

Answer:

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52. The value of $i^9 + \frac{1}{i^5}$ is

A. a)1

B. b)2i

C. c)-2i

D. d)0

Answer:

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53. In the expansion of $(a+b)^{15}$.the co-efficient of$a^8b^7$is

A. a)8C_7`

B. b)15C_8`

C. c)15C_7`

D. d)15C_9`

Answer:

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54. In an A.P., the 1st term, last term and the sum of all term are 3, 39 and 525 respectively. Then the common difference will be

A. a)3/2

B. b)1

C. c)1/2

D. d)2/3

Answer:

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55. The equation $y^2 + 2ax + 2by + c = 0$ represent the conic

A. a)ellipse

B. b)Hyperbola

C. c)Parabola

D. d)None of these.

Answer:

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56. The perpendicular distance from (2, -1) to the equation $12x - 5y = 3$ is

A. a)3 unit

B. b)2 unit

C. c)5/3 unit

D. d)12/5 unit

Answer:

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57. The domen of the function $f(x) = \log | \log x |$ is

A. a)$(1, \infty)$

B. b)$[1, \infty)$

C. c)$(0, 1) \cup (1, \infty)$

D. d)$(0, \infty)$

Answer:

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58. The value of $\lim_{x \to 0} \frac{1 - \cos x}{x}$ is

A. a)-4

B. b)0

C. c)4

D. d)1/4

Answer:

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59. A coin is tossed several times.If we get ‘tail’ in 1st three times.then the probability of getting ‘head’ in 4 th times, is

A. a)1/2

B. b)1/4

C. c)1/8

D. d)2/3

Answer:

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60. In a room, every body handshake each other. If the number of handshake are 66, then the number of men in the room will be

A. a)33

B. b)22

C. c)12

D. d)11

Answer:

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61. Using set operation, prove that 3 + 4 = 7.

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62. Find the domain of defination of the function $f(x) = \frac{x+3}{\sqrt{3-2x-x^2}}$

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63. Calculate the value of $\sec(-1680^\circ)\sin 330^\circ$.

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64. In $\triangle ABC$, a = 5 cm, b = 7 cm and c = 3 cm. Find its circumradius.

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65. Find the argument of (-3 - 3i).

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66. In how many way can give 4 prizes qut of 10 students for which no one can get inofe than one prize.

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67. In the expansion of $\left(x^3 - \frac{1}{x^2}\right)^{15}$,find the constant term.

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68. In an infinite G.P. series $\frac{s_n}{s_\infty} = \frac{1}{3}$,find its common ratio, [simbols are usual meaning]

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69. Find the ratio in- which the straight line 3x + 4y = 21 divides the line join of (-9, 5) and (7, 9).

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70. The cor-ordinate of three consecutive verties of a parallelogram ar (3, -1, 2), (I, 2, -4) and (-1, 1, 2). Find the co-ordinate of 4th vertex.

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71. Differentitate $\left(\frac{1}{t^3}+2\sqrt{t}\right)$ with respect to t.

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72. Evaluate: $\lim_{x\to 0}\frac{\sqrt{1+x+x^2}-1}{x}$

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73. If P(A - B) = 1/3,P(A) =1/2 and P(B) =1/3 ,find the probability that out of the events A and B. Only the event B occurs.

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74. Calculate the variance of 1st h natural numbers.

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75. For any three sets A, B, C. show that $A \times (B - C) = (A \times B) - (A \times C)$

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76. Show that $\tan 6^\circ \tan 42^\circ \tan 66^\circ \tan 78^\circ = 1$

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77. Solve :$2 + 2\cos 2x . \cos 5x = \sin^2 2x$

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78. Prove that by mathematical induction,$4^n + 15n - 1$is divisible ny 9 when $n \in N$.

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79. Prove that $\left(\frac{i-\sqrt{3}}{i+\sqrt{3}}\right)^{200}+\left(\frac{i+\sqrt{3}}{-i+\sqrt{3}}\right)^{200}=-1$

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80. If the sum of 1st n tenn of a GP is $S_n=1$ and $S_{2n}=4$,show that $S_{3n}:S_n=13:1$

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81. In the expansion of $(x+P)^n$,the 6th ,7th,8th and 9th terms are a,b,c and d resp,show that $\frac{b^2-ac}{c^2-bd}=\frac{4a}{3c}$

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82. Show that the straight lines x/a+y/b=1/c, x/b+y/c=1/a and x/c+y/a=1/b will be concurrent if ab+bc+ca=0

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83. The co-ordinates of the end points of a diagonal of a rectangle are (6, 1) and (12. 9) and other diagonal is parallel to x axis. Find the co-ordinates of the. end point of the other diagonal.

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84. Find the equation of a circle which is passes through the point (4,3) and (-2,.5) and the centre lies on the

straight line 2x - 3y = 4.

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85. Show that the points (0. 7, 10), (-1, 6, 6) and (-4, 9, 6) form a right angled isoscles. triangle.

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86. Differentiate (from 1st principle) sinx/xwith respect to x

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87. Prove that the statement , “If all the angles of a triangle are equal, then the triangle is a right angled triangle” is false.

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88. Prove that $\sqrt{2}$ irrational, (use the method of contradiction).

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89. Two unbiased dice are thrown. Find the probability that the upper faces of 1st die occurs in even number or the sum of the numbers of upper faces of .two dice is 8

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90. If $x\cos\theta = y\cos\left(\theta + \frac{2\pi}{3}\right) = z\cos\left(\theta + \frac{4\pi}{3}\right)$ show that xy + yz+ zx = 0

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91. if $\tan\left(\frac{\theta}{2}\right) = \sqrt{\frac{1-e}{1+e}}\tan\left(\frac{\varphi}{2}\right)$,then prove that $\cos\varphi = \frac{\cos\theta - e}{I - e\cos\theta}$

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92. If $x = -1 + i\sqrt{2}$ and the value of $x^4 + 4x^3 + 6x^2 + 4x + 9$.

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93. If p, q. r in G.P and $\frac{1}{p-a}, \frac{1}{r-p}, \frac{1}{q-r}$ are in AP.show that p+4q+r=0

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94. Solve graphically and find the common solution region of the system of inequations : $x - 2y \geq 0$, $2x - y + 2 \leq 0, x \geq 0, y \geq 0$

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95. If the vertices of an equilateral traingle be represented by the complex numbers z_1, z_2,z_3 , then prove that $z_1^2 + z_2^2 + z_3^2 = 3z_0^2$and z_0 be the circumcenter of the triangle.

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96. 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

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97. Prove that the locus of the point of iter section of the lines $\sqrt{3}x - y - 4\sqrt{3}k = 0$ and $\sqrt{3}kx + ky = 4\sqrt{3}$ for different values of'k is hyperbola whose eccentricity is 2

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98. Find the locus of the midpoints of the all chords drawn from the ends points of the minor axis of an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

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99. Which is null set?

A. a){0}

B. b)$\{\phi\}$

C. c)$\{x : x \in I \text{ and } 4 \leq x \leq 5\}$

D. d)$\{x : x \in R \text{ and } x^2 + 9 = 0\}$

Answer:

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100. z is a complex number. The minimum value of |z | + I z - 2| is

A. a)0

B. b)1

C. c)2

D. d)3

Answer:

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101. The value of m, statisfy the equation $|m-2|^2+|m-2|-6=0$is

A. a)1

B. b)2

C. c)3

D. d)4

Answer:

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102. In an AP, if the mth and (m + n) th terms are n.and 0 resp then nth term will be

A. a)m

B. b)-m

C. c)m+n

D. d)m-n

Answer:

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103. x axis divides the line segment containing two endpoints (3, 6) and (2,-5) in the ratio is

A. a)-6:5

B. b)6:5

C. c)5:6

D. d)-5:6

Answer:

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104. The radius of the circle $(p-1)x^2+y^2-x-py=0$ is

A. a) $\frac{\sqrt{5}}{2} unit$

B. b) $\frac{\sqrt{3}}{2} unit$

C. c) $\sqrt{3} unit$

D. d) 1 unit

Answer:

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

A. a) 16

B. b) 1/16

C. c) 32

D. d)1/32

Answer:

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106. If $y = \frac{1+x^2}{1+x}$,then $\frac{dy}{dx}$ at x=0 is

A. a)1/2

B. b)-1/2

C. c)-1/4

D. d)-1

Answer:

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107. A bag contains 5 red caps and 4 blue caps. The probability that two drawn caps are on same colour is

A. a)1/3

B. b)1/9

C. c)2/9

D. d)None of these.

Answer:

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108. The median of 1st 67 natural number is

A. a)34

B. b)2^{67}

C. c)$\frac{67 \times 68}{2}$

D. d)67^2

Answer:

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109. If $A = \{x : -1 \leq x \leq 2\}, B = \{x : 0 \leq x \leq 4\}$Find A-B.

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110. If $f: fR \to R^+$ defineed as $f(x) = x^2$,show that f is surjective.

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111. If $\cot\alpha \cot\beta = 3$,show that $\frac{\cos(\alpha - \beta)}{\cos(\alpha + \beta)} = 2$

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112. 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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113. Express $\frac{\sqrt{3}-i}{1-\sqrt{3}i}$ in modulus amplitude form

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114. show that ^nC_r+ ^ $(n-1)C_{r-1}$ + ^(n-1)C_(r-2)= ^ $(n+1)C_r$

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115. Find the middle term of the expansion of $\left(P^2-\frac{1}{P}\right)^9$

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116. Show that the sum of 4 + 12 + 20 + 28 + ... up to n the term is a square of even number

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117. If the distance from- origin to- the straight line 3x + 5y + a = 0 is $3\sqrt{17}$ units,then find the value of 'a'

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118. Find the co-ordinate of the image of (3, 2, -4) on xy plane.

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119. If f(x)=$x^5 + x^3 - 2x + 3$,Prove that f'(1)+f'(-1)=4f(0).

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120. Evaluate : $\lim_{x \to \infty} \frac{1 + 2 + 3 + \ldots + n}{n^2}$

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

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122. For any two positive acute angles θ and ϕ if $\sin(\theta+\phi)=k\sin(\theta-\phi)$and

$33(\cos 2\phi-\cos 2\theta)+\cos 2\theta\cos 2\phi=1$

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123. Solve :$\sqrt{3}\sin x+\cos x=2$

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124. Prove by mathematical induction. $1.1!+2.2!+3.3!+\ldots+n.n!=(n+1)!-1, where$ n ∈ N`.

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125. If z = x + iy then | z - 8| + |z + 8| = 20. represents a ellipse

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126. If $(1+x)^n = c_0 + c_1 x + c_2 x^2 + ... + c_n x^n$,then show that $\frac{c_0}{1} + \frac{c_2}{3} + \frac{c_4}{5} + ... = \frac{2^n}{n+1}$

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127. If the ath and bth term of an AP are $\frac{1}{b}$ and $\frac{1}{a}$,then show that (ab)th term is 1 and the sum upto first (ab) term Is $\frac{1}{2}(ab+1)$.

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128. In $\triangle XYZ$ the co-ordinate of Y and Z are (-a, 0) and (a, 0), and $\angle XZY - \angle XYZ = 2\theta$ (constant). Prove that the locus of the point X is $x^2 - y^2 + 2xy\cot 2\theta = a^2$

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129. If the three straight lines ax + 2y + 1 = 0, 3y + bx + 1 = 0 and cx+ 4y + 1=0 are concurrent, then show that- a. b, c are in AP.

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130. 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 $\frac{1}{a^2} + \frac{1}{b^2} = \frac{1}{c^2}$

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131. Find the co-ordinate of a point equidistance from the points' (0, 0. 0), (4, 0, 0), (0, -6. 0) and (0, 0, 8).

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132. Prove that $\lim_{x \to 1} \frac{x^2 - \sqrt{x}}{\sqrt{x} - 1} = 3$

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133. Prove that $\sqrt{5}$ is irrational, (use the method of contradiction).

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134. In xy plane, |x — y | = 1 represents an equation of a circle and one diagonal'dividies a quadrilateral into 4 parts" write the negation ofthe statements and check whether the resulting statements are true or false

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135. Find the mean diaviation with respect to median of the frequency distribution table :

Daily wages (Rs.)	95-105	105-115	115-125	125-135	135-145	145-150
No. of worker	9	13	16	26	30	12

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136. If $\frac{a\cos\theta\sec\phi - x}{a\sin(\theta+\phi)} = \frac{y - b\sin\theta\sec\phi}{b\cos(\theta+\phi)} = \tan\phi$ show that $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$

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137. If $\sin\alpha + \sin\beta = \frac{1}{2}, \cos\alpha + \cos\beta = \frac{5}{4}$ find the value of $\tan\alpha + \tan\beta$

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138. Solve :(x+1)(x+2)(x+3)(x+4)=120

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139. In a polygon, the mesurement of least internal angle is 120°. If theall internal angles fohn an AP with common difference 5°, then find number of sides of the polygon

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140. Out of 15 boys, 7 are skaut. In how mariy different way can 12 boys be selected from them so as. to (a) always 6 boys are skaut (b) at least 6 boys are skaut.

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141. Draw the graph of the following system of inequation and show the common region.$4x + 5y \leq 40, x \geq 2, y \geq 3$

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142. Find the equation of a parabola having the co-ordinate,of vertex is (-1, -1) and the equation of direction is x + y + 4 = 0.

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143. Find the equation of an ellipse having vertices (-1, 2)- and (9, 2) . and the eccentricities is$4/5$.

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

Foci $\left(0, \pm\sqrt{10}\right)$, passing through $(2, 3)$

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145. Which of the following sets have only one subset

A. a){0}

B. b)$\{\phi, 0\}$

C. c)$\{\phi\}$

D. d){1}

Answer:

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146. The value of $1 + i^2 + i^4 + i^6 + ... + i^{16}$ is

A. a)-1

B. b)1

C. c)0

D. d)2

Answer:

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147. No of diagonals of a 12 sided polygon are

A. a)12

B. b)49

C. c)54

D. d)62

Answer:

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148. If the sum of theree cosecutive numbers of an AP is 45, then the middle number will be

A. a)19

B. b)15

C. c)20

D. d)22.5

Answer:

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149. The acute angle between the two lines' 7x - 4y = 0 and 3x -11y = 2 will be

A. a) $\frac{\pi}{3}$

B. b) $\frac{\pi}{4}$

C. c) $\frac{\pi}{6}$

D. d) $\frac{2\pi}{6}$

Answer:

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150. The circle $x^2 + y^2 - 2x - 2y + k = 0$represents a point circle when k.=

A. a)0

B. b)-1

C. c)1

D. d)2

Answer:

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151. The value of $\lim_{x \to 3} \frac{\sqrt{x+3} + \sqrt{x-3}}{x}$ is

A. a) $\frac{\sqrt{6}}{3}$

B. b) $-\frac{\sqrt{6}}{3}$

C. c) 3

D. d) 0

Answer:

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152. If f(x)=$2x^3 - 3x^2 + 4x - 2$,then the value of $f'(3)$ is

A. a)0

B. b)30

C. c)40

D. d)50

Answer:

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153. Two dice are thrown at a time.The probability that the sum of two numbers is equal to 5 is

A. a)1/5

B. b)1/9

C. c)2/5

D. d)2/9

Answer:

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154. The median of 1st 2013 natural number is

A. a)1007

B. b)1090

C. c)1008

D. d)None of these.

Answer:

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155. For any two sets A and B, if $A \cup B = A \cap B$, then show that A = B.

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156. A = {1, 2, 3, 4, 5}, B = {1, 3, 4} and the relation R from set A to set B where $(x, y) \in R$ implies x > y. Find the ordered pairs of R^{-1}

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157. Show that $\tan 67^\circ - \tan 22^\circ - \tan 67^\circ \tan 22^\circ = 1$

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158. In $\triangle ABC$, if $\angle C = 90^\circ$,. then find the value of tan A + tan B.

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159. If ^nP_r=120 ^nC_(n-r) , find the value of r.

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160. x.and y are- real and if x + iy.=$\frac{5}{-3+4i}$,find the value of x and y.

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161. Find the constant term of the expansion of $\left(a^3 - \frac{1}{a^2}\right)^{15}$

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162. If the P th term of an AP is (3P - 5), then find the common difference and 15th term of this AP.

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163. Find the equation of a straight fine passes through the middle ofthe straight lines 2x - 3y + 1 =0 and 2x- 7= 3y.

Watch Video Solution

164. Find the ratio in which the plane xy divides the join of A(2, 3. 5) and B(-2, -5, -3).

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165. If $y = xe^x$,show that xdy/dx=(1+x)y.

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166. $f(x) = x^2 + ax$,when $0 \leq x \leq 1$ and $f(x) = 3 - bx^2$,when $1 \leq x \leq 2$ if $\lim x \to 1 f(x) = 4$,then find the value of a and b.

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167. A unbiased coin tossed three times. Find the probability of getting 1 head

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168. If the variance of a distribution is 4 coefficient of variation is 5%,then mean of the distribution is ___

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169. For any two sets, show that $(A \cap B) \cup (A - B) = A$.

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170. If $\tan^2\alpha = 1 + 2\tan^2\beta$, show that $\cos 2\beta = 1 + 2\cos 2\alpha$.

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171. Solve :sin x 4 cos x = sin 2x 4 cos 2x.

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172. Prove by mathematical induction, $1 + \frac{1}{4} + \frac{1}{9} + \ldots + \frac{1}{n^2} < 2 - \frac{1}{n}$ when $n \geq 2$, is a integer.

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173. If $\arg\left(\frac{z-1}{z+1}\right) = \frac{\pi}{4}$„ then show that in complex plane, the locus of z is a cricle.

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174. Find the term independent of x of the expansion of $(1+x)^3\left(x-\frac{1}{x}\right)^6$

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175. If pth, qth and rth terms of on AP are a. b and c, then show that $a(q - r) + b(r - p) + c(p - q) = 0$.

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176. A straight line form a right angled triangle with the axes. If the length of hypotenus and area of this triangle are 13 unit and 30 sq unit, find the equation of this straight line.

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177. If the co-ordinate of vertices of a triangle are (10, 4), (-4, 9) and (-2, -1). Find the the co-ordinate of its ortho

centre.

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178. Find the co-ordinate of a point on the circle $x^2 + y^2 - 4x + 2y - 20 = 0$ nearest to $\left(2, \frac{3}{2}\right)$.

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179. The co-ordinate of the vertices of a triangle are A(0, 2, -3), B(- 2, 0, -4) and C(3, 6, -3). Find the ratio in which the bisector of $\angle BAC$ divides BC and also find the co-ordinate of that point

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180. Differentiate $x + \frac{1}{x}(x \neq 0)$ at x = 1, with respect to x, with the help of 1st principle

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181. Evaluate : $\lim_{x \to 0} \frac{\sin\left(x^2 + 4x\right)}{x^3 - 5x^2 + 2x}$

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182. 'If p' and q are rational numbers, then pq is also rational convert this compound statement into a simple statement and check whether the statement is true of false.

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183. 'Square of a whole number is positive or negative'- find the validity of this compound statement.

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184. If two numbers a and b are-chosen at random from the 1st 30 natural numbers, find the probability that the expresion $\left(a^2 - b^2\right)$ is divisible by 3.

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185. Find A.M. and SD of the following distribution table :

Class interval	0-10	10-20	20-30	30-40	40-50
friqueincy	5	8	15	16	6

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186. Using vector method in a triangle , prove that,

(i) $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ and

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187. If α,β positive acute angles and $\sec(\alpha+\beta) - \sec(\alpha-\beta) = 2\cos ec\alpha$ show that $\sin\alpha = \cos\left(\frac{\beta}{2}\right) - \sin\left(\frac{\beta}{2}\right)$

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188. Draw the graph and find the common region of the system of following inequations : $x + y \leq 5, 2x - 3y \geq 6$, $x \geq 2$.

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189. if $z_1 = 1 + i\sqrt{3}, z_2 = \sqrt{3} - i$ show that (a) $arg(z_1 z_2) = arg(z_1) + arg(z_2)$ and (b) $arg(z_1 / z_2) = arg(z_1) - arg(z_2)$

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190. Find the vlaue of $47C_4 + \sum_{r=0}^{3} (50 - {}^{r}C_3)$

Watch Video Solution

191. Find the length of the normal chord of a parabola $y^2 = 4x$, which makes an angle 45° with its axes.

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192. If θ and ϕ are the eccentric angles of the end points of a chord which passes through the focus .of an ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$.Show that

$\tan(0/2)\tan(\phi/2) = \left(\frac{e-1}{e+1}\right)$,where e is the eccentricity of the ellipse.

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193. Find the equation of a hyperbola, having foci (± 7.0) and its eccentricity is $4/3$.

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194. If n(x) = 4, n (Y) = 3 and $n(X \times Y \times Z) = 24$, then the value of n(Z) is

A. a)1

B. b)2

C. c)3

D. d)4

Answer:

Watch Video Solution

195. m is a positive integer. If $\left(\frac{1+i}{1-i}\right)^m = 1$,then least value of m will be

A. a)4

B. b)3

C. c)2

D. d)1

Answer:

Watch Video Solution

196. In the expansion $\left(P+\frac{1}{P}\right)^{10}$,the middle term will be

A. a)^10C_4P^2`

B. ^10C_41/P^2`

C. c)^10C_5`

D. d)^10C_6 1/P^6`

Answer:

Watch Video Solution

197. Sum of 1st pth natural odd number is

A. a) $\frac{P(P+1)}{2}$

B. b)P^2`

C. c)P/2

D. d) $\frac{P^2}{4}$

Answer:

Watch Video Solution

198. The distance between the two straight lines 4x + 3y= 11 and 8x+ 6y = 15 is

A. a)1/2 unit

B. b)4/11 unit

C. c)7/10 unit

D. d)11/3 unit

Answer:

Watch Video Solution

199. If two cricles $x^2 + y^2 + 2gx + 2fy = 0$ and $x^2 + y^2 + 2g'x + 2f'y = 0$ touch each other, then

A. a)ff' = gg'

B. b)f'g = fg'

C. c)fg = fg'-

D. d) $ff = gg^{'2}$.

Answer:

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200. The value of $\lim_{x \to 7} \frac{x-7}{|x-7|}$ is

A. a) 0

B. b) 1

C. c) -1

D. d) none of these.

Answer:

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201. If $y = x + 1/x$, then $dy/dx = 0$ at the point

A. a)(2,1/2)

B. b)(2,-1)

C. c)(1,-2)

D. d)(1,2)&(-1,-2).

Answer:

Watch Video Solution

202. Two dice are thrown at a time. The probability that the sum of two numbers are 3 or 5or 11 is

A. a)1/9

B. b)2/9

C. c)3/19

D. d)11/19.

Answer:

Watch Video Solution

203. Arithmetic mean of 1, 2, 3,..-..... , 100 (1st 100 positive integers) is

A. a)50

B. b)50.5

C. c)51.5

D. d)49.5

Answer:

Watch Video Solution

204. If R = $\{(x, y) : x \in N, y \in N \text{ and } 2x + y = 10\}$.

then find R^{-1}

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205. Write P = {2, 4, 8, 16, 32, 64} in set builder form.

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206. Find the viaue of

$\tan 28^\circ + \tan 17^\circ + \tan 28^\circ \tan 17^\circ$

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207. Solve :$\sin 3\theta = \cos 3\theta (0 < \theta < \pi)$

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208. Find the amplitude of i/(1-i).

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209. In how many different ways 4 boys and 3 girls can be sitted in one row so that two girls are not together?

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210. Find the middle term of the expansion of $\left(\frac{a^2}{3}+\frac{3}{a^2}\right)^8$

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211. The sum of the 1st m terms of an AP is n and the sum of the 1st n terms of the same AP is m. Find the sum of the 1st (m + n) terms of the AP.

Watch Video Solution

212. The co-ordinate of the vertices of a triangle are (2, -2), (4, 2) and (-1. 3). Find the equation of the median which passes through (-1. 3).

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213. Find the co-ordinate of that point which divides the line segment joining the points (-2, 5, 1) and (3.-5, 6) in the

ratio 3 : 2 internally.

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214. show that $\lim_{n \to 0} \frac{\sqrt[3]{n+1}-1}{n} = \frac{1}{3}$

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215. If y = $\frac{x}{x+a}$,show that x dy/dx = y (1- y)

Watch Video Solution

216. A box contains 50 articles of which 4 are defective. One article is taken at random from the box. Find the

probability of that article is not defective. .

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217. Find the mean deviation of 36, 72, 46,60, 42, 45, 53. 46, 51, 49.

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218. For any three sets A, B, C, Prove that $A \cap (B \cup C) = (A \cap B) \cup (A \cap C)$.

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219. If $\tan\left(\frac{\theta}{2}\right) = \tan^3\left(\frac{\phi}{2}\right)$ and $\tan\phi = 2\tan\alpha$,then prove that $\theta + \phi = 2\alpha$

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220. In a triangle ABC if $a\cos^2\left(\frac{C}{2}\right) + c\cos^2\left(\frac{A}{2}\right) = \left(\frac{3b}{2}\right)$ show that sides of the trianglea are in A.P.

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221. Prove that by mathematical induction : $3^{2n+2} - 8n - 9$ is divisible by 64 where$n \in N$.

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222. If x=a+b,$y = aw + bw^2$,$z = aw^2 + bw$,show that $xyz = a^3 + b^3$

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223. if the ratio of the sum of n terms of two A Ps is (3n + 5) : (5n - 9). Show that their 4th terms are equal.

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224. The coefficient of three consecutive terms in the expansion of $(1 + x)^n$ are a, b, c respectively prove that

$$\frac{2ac + b(a + c)}{b^2 - ac} = n.$$

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225. Show that the straight line (a + 2b) x + (a -3b)y + b -a = 0 always passes through a fixed point. Find the co-ordinate of that point.

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226. Find the equations of straight line which are perpendicular to the straight line 4x-3y+7=0 and at a distance 3 unit from the origin.

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227. y = 2x is a chord of the circle$x^2 + y^2 - 10x = 0$. Find the equation of a circle whose diameter is the chord of, given circle

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228. Find the ratio in which the plane 2x + 2y - 2z = 1 divides the line segment joining the points A(2,1, 5) and B(3, 4, 3). Find the co ordinate of point of contact.

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229. Evaluate : $\lim_{x \to \infty} \left[\frac{1^{1/x} + 2^{1/x} + 3^{1/x}}{3} \right]$

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230. Differentiate $x^{-\frac{2}{3}}$ with respect to x, with behalf of definition.

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231. Prove that $\sqrt{3}$is irrational, (use the method of contradiction)

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

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233. The probability of occurrence of at least one event of two events X and Y is 0.6.-If the probability of occurrence both is 0.2, find $P(\overline{X}) + P(\overline{Y})$

Watch Video Solution

234. If the co-efficient of variation of two frequeny distribution are 58% and 64% and their SD are 21.2 and 15.2 resp.. Find AM of the distribution.

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235. Prove that $\frac{\sec 8\theta - 1}{\sec 4\theta - 1} = \frac{\tan 8\theta}{\tan 2\theta}$

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236. In $\triangle ABC$,Prove that a cos A + b cos B + c cos C = 2a sin B sin C

Watch Video Solution

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

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238. Solve $x^2 - (7 - i)x + (18 - i) = 0$ and hence prove that the roots are not conjugate.

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239. The Indian cricket eleven is to be selected out of 15 players. 6 of them bowlers and 9 of them batsman. In how many ways the team can be selected so that the team contains at least 3 bowlers.

Watch Video Solution

240. Draw the graph and' find the common region of the system of following inequations : $2x + 5y \leq 40.$ $x + y \leq 1, x \geq 0, y \geq 0.$

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241. 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

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242. In a hyperbola, (a) centre is origin (b) transverse axis along-with x axis (c) length of conjugates axis is 5 unit, (d) distance between two foci is 13 unit. Find the equation of the hyperbola.

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243. find the equation of the ellipse whose eccentricities is 1/2, focus is (-1, 1), directrix is y = x + 3.

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244. 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:

Watch Video Solution

245. 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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246. 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:

Watch Video Solution

247. 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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248. 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:

Watch Video Solution

249. 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:

Watch Video Solution

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

A. a)-2

B. b)1

C. c)2

D. d)no existence.

Answer:

Watch Video Solution

251. 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:

Watch Video Solution

252. 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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253. 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:

Watch Video Solution

254. 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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255. 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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256. Show that $\sin\left(\frac{7\pi}{12}\right) = \frac{1}{4}(\sqrt{6} + \sqrt{2})$

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

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

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

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

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261. 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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262. 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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263. 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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264. Evaluate : $\lim_{x \to \frac{\pi}{2}} \left(\frac{\pi}{2} - x\right) \tan x$

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

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

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267. 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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268. 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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269. $\sin\theta = k\sin(\theta + \phi)$.show that $\tan(\theta + \phi) = \frac{\sin\phi}{\cos\phi - K}$

Watch Video Solution

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

Watch Video Solution

272. 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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273. 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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274. Calcualte the sum of the series :1+3/2+7/4+15/8+31/16+....+t_n

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275. 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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276. 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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277. 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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278. By using section formula, show that the points .(1, 2, 3), (-2, 4, 2) and (7, -2, 5) are colinear

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

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

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

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283. 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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284. Prove that

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

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

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286. 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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287. If the roots of the equation $ax^2 + bx + c = 0$ are α, $\beta$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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288. 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`

Watch Video Solution

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

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

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291. 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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292. 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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293. If B set is the power set of set A, then the correct option is.

A. a)A=B

B. b)$A \in B$

C. c)$A \supset B$

D. d) $B \supset A$

Answer:

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294. Amplitude of the complex number z= 1 is

A. a) $-\pi/2$

B. b) 0

C. c) $\pi/2$

D. d) π

Answer:

Watch Video Solution

295. In the expansion of $\left(C+\frac{1}{C}\right)^{10}$,the term independent of C is

A. a)^10C_4`

B. b)^10C_6`

C. c)^10C_5`

D. d)^10C_7`

Answer:

Watch Video Solution

296. If the arithmetic mean of x and y is $\frac{x^n + y^n}{(x^{n-1} + y^{n-1})}$,then the value of n is

A. a)0

B. b)1

C. c)2

D. d)-1

Answer:

Watch Video Solution

297. The gra'diant of the line perpendicular to the line x/7-y/3+1=0is

A. a)7/3

B. b)3/7

C. c)-3/7

D. d)-7/3

Answer:

Watch Video Solution

298. If the staight line x+ y= c touches the circlc $x^2 + y^2 = 2$, then the value of |c| is

A. a)2

B. b)$\sqrt{2}$

C. c)1

D. d)0

Answer:

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299. If $\lim_{x \to 0} \frac{\tan x - \sin x}{x^3} = \frac{M}{N}$ and M = 3, then the value of N is

A. a)2

B. b)4

C. c)6

D. d)8

Answer:

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300. If $y = \tan^{-1}\left(\frac{1+x}{1-x}\right)$ then dy/dx=

A. a)1

B. b) $\frac{1}{1+x^2}$

C. c) $\frac{2}{1+x^2}$

D. d) $\frac{1-x^2}{1+x^2}$

Answer:

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301. An unbaised coin is tossed two times, the probability of getting 'head' in both case will be.

A. a)1/2

B. b)1

C. c)1/4

D. d)3/4

Answer:

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302. If the coefficent of variation = 40% and variance = 16, the mean will be

A. a)5

B. b)10

C. c)15

D. d)20

Answer:

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303. If n(X) = 4 and n(Y) = 7, then find the maximum and minimum value of $n(X \cup Y)$.

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304. Given R = {(x, y) : x, $y \in N$ and 2x + 3y = 9}.' Find R as sets of ordered pair. '

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305. Find the value of $\tan 20^\circ \tan 40^\circ \tan 80^\circ$.

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306. In $\triangle PQR, \angle P = 60^\circ$, show that $q + r = \frac{q - p}{2}$

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307. If $z = \frac{\sqrt{3} - i}{2}$, then Find the. value of z^{33}

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

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309. If $(1 + x)^n = C_0 + C_1 x + C_2 x^2 + \ldots\ldots + C_n x^n$

.then show that $C_1 + 2C_2 + \ldots$. nC_n=n.2^(n-1)`.

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310. Calculate the sum of the series : $3 - \frac{3}{2} + \frac{3}{2^2} - \frac{3}{2^3} + \ldots.$

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311. Find the length of the intercept of the staight line 3x +4y = 12 with the axes

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312. Find the image of the co-ordinate of a point.(-3, 4, 7) with respect to yz plane.

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313. Find the value of : $\lim_{x \to 0} \frac{\sin 2x + \sin 6x}{\sin 5x - \sin 3x}$

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314. If $4f(x) + 3f(-x) = 7 - 3x$, find the value of f(1).

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315. A box contains 6 white balls and 4 black balls, A ball is drawn at random from the box. What is the probability that the ball is white.

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316. Mean of the getting mathematics number of 70 students is 45. If SD is. 18, then find the co-efficient of variation

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317. A and B are two sets and if n(A) = 4 and n(B) = 7, then find the minimum value of$n(A \cup B)$ and the maximum value $n(A \cap B)$

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318. Show that $\cot 7\left(\frac{1^\circ}{2}\right) = 2 + \sqrt{2} + \sqrt{3} + \sqrt{6}$

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319. If $a^4 + b^4 + c^4 + a^2b^2 = 2c^2\left(a^2 + b^2\right)$„ then show that$\angle C = 60^\circ$ or 120°

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320. By .....in "Principle of Mathematical Induction" prove that for all n $\in$ N

$$1^2 + 2^2 + 3^2 + \ldots\ldots + n^2 = \frac{n(n+1)(2n+1)}{6}$$

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321. If w be a imaginary cube root of uniyt and a+b+c=0 then show that

$$(a+bw+cw^2)^3+(a+bw^2+cw)^3=27abc$$

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322. How many different numbers of 5 digits each (without repetition of digits) can be formed with the digits-5, 6, 7, 8,0 so that the numbers are divisible by 4".

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323. Prove that the middle term in the expansion of $(1+x)^{2n}$ is $\frac{1.3.5.....(2n-1)}{\lfloor n}.2^n.x^n$

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324. Show that the points (-4, 0). (6, 4), (5, 0)and (0, -2) form a trapezium. Find the equations of its two diagonals and also find the angle (acute) between the two diagonals.

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325. If p and q are the lengths of perpendiculars from the origin to the lines $x\cos\theta - y\sin\theta = k\cos 2\theta$ and $x\sec\theta + y\cos ec\theta = k$, respectively, prove that $p^2 + 4q^2 = k^2$.

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326. Find the equation to the circle described on the common chord of the given circles $x^2 + y^2 = 4x + 5$ and $x^2 + y^2 + 8x + 7 = 0$ as diameter.

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327. Find the ratio in which the ZX plane divides the line segment joining the .points (2, 4, 5) and (3, -6, 8).

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328. Evaluate : $\lim_{x \to 0} \frac{x - \sin x}{x^3}$

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329. If $y = \sin x^{\circ}$ .find dy/dx from defination.

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330. Prove that $\sqrt{2}$ irrational, (use the method of contradiction).

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

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332. The probability of' the solving a problems in mathematics of three students are 1/3,1/5,1/6 . If they try to solve the problem together, find the probability that the problem is solved by at least one student.

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333. Scores of a batsman of 5 consecutive inings are 39, 51, 59, 62 and 74. Find the mean diviation of the samples .with respect to AM and median.

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334. If $\alpha \neq \beta$ and $a\tan\alpha + b\tan\beta = (a+b)\tan\left(\frac{\alpha+\beta}{2}\right)$, then show that $\frac{\cos\alpha}{\cos\beta} = \frac{a}{b}$

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335. Show that $\tan\alpha\tan\beta = \tan^2\gamma$ when $\frac{\tan(\alpha-\beta)}{\tan\alpha} + \frac{\sin^2\gamma}{\sin^2\alpha} = 1$

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336. Sum of the square of three different terms, which are in GP is s^2. If the sum of the three terms is αs, show that $1/3<\alpha^2<3$.

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337. Draw the graph and find the common solution region of the . following system of inequations : $2x + y \geq 6$, $3x + 4y \geq 2$.

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338. Solve.$\sqrt{3}x^2 - \sqrt{2}x + 3\sqrt{3} = 0$

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339. If the roots of the quadratics $x^2 - qx + p = 0$ and $x^2 - px + q = 0 (p \neq q)$ differ by a constant, show.that p

+ q + 4 = 0.

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340. Find the equation of a hyperbola whose eccentricity is 5/4 and the. coordinate of foci are (2, -3)and (2, 5).

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341. The co-ordinates of focus and its nearest vertex of an ellipse are (3, -5) and (4, -5) respectively and eccnetricity is 2/3 . Find the co ordinate of its centre and the co-ordinate of the point of contact of. the directrix and Major axis nearest to focus.

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342. If l and l' be the lengths of the segment $\overline{PS}$ and $\overline{P'S}$ of a focal chord $\overline{PP'}$ of the parabola $y^2 = 4ax$.then show that1/l+1/l'=1/a when s is the focus of the parabola

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