MATHS

BOOKS - UNITED BOOK HOUSE

ANNUAL EXAMINATION QUESTION PAPERS 2014

Exercise

1. A function $f: A \to B$, where $A = \{x: -1 \leq x \leq 1\}$ and $B = \{y/1 \leq y \leq 2\}$

is defined by the rule $y = f(x) = 1 + x^2$.

Which of the following statements is then true?

A. a){2}

B. b){3}

C. c)3

D. d)ϕ

Answer:

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2. If the nth term of an A.P is 2n-4,then which of the follwong is the common differnce?

A. a)-2

B. b)-1/2

C. c)1/2

D. d)2

Answer:

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3. Value of $i^n + i^{n+1} + i^{n+2} + i^{n+3}$(where $i = \sqrt{-1}$)

A. a)1

B. b)-1

C. c)0

D. d)none of these

Answer:

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4. If in G.P .,$t_5 : t_3 = 7 : 9$ then $t_9 : t_5$is

A. a)7:9

B. b)9:7

C. c)81:49

D. d)49:81

Answer:

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5. The equation of the circle having centre at (3,7)and radius 5 units is

A. a)$x^2 + y^2 - 6x - 14y + 33 = 0$

B. b)$x^2 + y^2 - 6x - 14y = 33$

C. c)$x^2 + y^2 + 6x + 14y = 33$

D. d)$x^2 + y^2 + 6x + 14y + 33 = 0$

Answer:

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6. The distance between z-axis and (3,4,6)is

A. a)5 units

B. b)6 units

C. c)7 units

D. d)none of these

Answer:

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7. If $y = \sin^2\left(\frac{x}{2}\right)$,then dy/dx is

A. a)sinx

B. b)1/2 sinx

C. c)cosx

D. d)1/2 cosx

Answer:

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8. If $\lim_{x \to 3} \frac{x^n 3^n}{x - 3} = 27n$,then the value of n is

A. a)3

B. b)2

C. c)4

D. d)5

Answer:

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9. 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)17/24

B. b)2/9

C. c)7/24

D. d)13/24

Answer:

10. The range of 62,72,44,25,54,9,56,71,27,-13,-3 is

A. a)82

B. b)75

C. c)85

D. d)81

Answer:

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11. If $A = \{x : x = 3n, n \in z)$ and $B = \{x : x = 6n, n \in z\}$.then find $A \cap B$ and $A \cup B$

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12. A =(1, 2, 3, 5) and B= {4, 6, 9). Define a relation R from A to B by R= {(x, y): the difference between x and y is odd, $x \in A, y \in B\}$. Write R in roster form.

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13. Prove that $\tan 54^\circ = \frac{\cos 9^\circ + \sin 9^\circ}{\cos 9^\circ - \sin 9^\circ}$

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14. If $\tan 15^\circ = x$.then show that $x^2 + 2\sqrt{3}x - 1 = 0$

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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. If number of triangles joining angular points of a n-sided polygon be 12n.find n

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17. Find the term independent of x in the expansion of $\left(x-\frac{2}{x^2}\right)^{15}$

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18. Find the sum, if it exists ,of the following infinite G.P:1/3-2/9+4/27-8/81+...

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19. Find the area of the triangle formed by the staright line 2x-3y=6 with coordinate axes,

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20. Find the coordinates of the point which divides the line segment joining (2,-3,8)and (1,-1,0)internally in the ratio 2:1

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21. Find the derivative of the function $f(x) = 2x^2 + 3x - 5$ at $x = -1$. Also prove that $f'(0) + 3f'(-1) = 0$.

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22. if $\lim_{x \to a} f(x) = \lim_{x \to a} g(x)$,then whether f(x)=g(x) is always true?Justify your answer by an example

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23. If P(A)=2/3,P(B)=1/2,$P(A \cap B) = \frac{1}{6}$,then find the value of $P(A \cap B')$and $P(A \cup B)$

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24. Find the mean deviation about the mean for the following data:39,51,59,62,74.

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25. For any two sets A and B, A-(A-B) equals

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26. If $\alpha$and $\beta$are positive acute angles and $\cos 2\alpha = \frac{3\cos 2\beta - 1}{3 - \cos 2\beta}$,then prove that

$\tan\alpha = \sqrt{2}\tan\beta$

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27. Solve for $x : \cos^3 x \sin 3x + \sin^3 x \cos 3x = \frac{3}{4}$

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

$1 + 2 + 3 + \ldots . + n < \frac{1}{8}(2n+1)^2$

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29. If z=x+iy and |2z+1|=|z-2i|,then prove that $3\left(x^2+y^2\right)+4(x+y)=3$

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30. Out of 14 articles,10 are of same type and each of the remaining is of different types..Find the number of combinations ,if 10 articles are taken at a time.

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31. In the expansion of $\left(\sqrt[3]{2}+\frac{1}{\sqrt[3]{3}}\right)^{n}$ the rationof the 7th term from the beginnign to 7th term from the end is 1:6 .Find n

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32. If the sum of sirst n terms of a G.P is p.sum of its first 2n terms is 3p,Prove that the sum of its first 3n terms is 7p.

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33. 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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34. If the straight line $x/a+y/b=1$is parallel to the line $4x+3y=6$ and passes through the point of intersection of the lines $2x-y-1=0$and $3x-4y+6=0$,find the values of a and b.

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35. Find the equations of the circles which pass through the origin and cut off equal chords of length $\sqrt{2}$ units on the straight lines y=x and y=-x.

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

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37. Find from the first principle,the derivative of tan 2x at $x = \frac{\pi}{8}$

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38. Show that the following statement is true by the method of contrapositive:If x Is an integer and $x^2$is even,then x is also even"

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

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40. What is the probability that a year,selected at random,in between 2001 and 2010 both inclusive will contain 53 mondays?

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41. For a group of 200 students the mean and S.D of marks obtained by them were found to be 40 and 15 respectively.Later on,it was found that the score 23 was misread as 32.Find the correct mean and correct S.D

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

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

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44. Draw the structure of the following: SF_4

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45. state the fundamental theorm of algebra and solve the equation $3x^2 - 5ix + 3 = 0$ $(i = \sqrt{-1})$

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46. How many numbers lying between 100 and 1000 can be formed with the digits 0,3,4,6,8,9?

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47. If $S_1, S_2 \ldots S_m$ denote the sums of n terms of m numbers of A.P is whose first terms are 1,2,...m and common differences are 1,3,..(2m-1)respectively,Show that $S_1 + S_2 + \ldots + S_m = \frac{mn}{2}(mn + 1)$

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

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49. Find the equation of a hyperbola having coodinates of its vertices $(\pm 4, 0)$and coordinates of its foci is $(\pm 6, 0)$

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50. Find the equation of an ellipse whose eccentricity is 1/2,coordinates of one of its foci is (2,0) and equations of its corresponding directrix is x-8=0,Also find out the distance of this focus from its nearest vertex.

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