MATHS

BOOKS - UNITED BOOK HOUSE

JODHPUR PARK BOYS'S SCHOOL

EXERCISE

1. If $A = \{x \in C : x^2 = 1\}$ and $B = \{x \in C : x^4 = 1\}$, then $A \cup B$ is :

A. a){-1,i}

B. b){-1,1}

C. c)$\{\pm 1, \pm 1i\}$

D. d)ϕ

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2. Prove that $\frac{1}{2\sin 10^\circ} - 2\sin 70^\circ = 1.$

A. a)0

B. b)1

C. c)2

D. d)4

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3. IF cosA+cosB=m and sinA+sinB=n,where m,$n \neq 0$then sin(A+B)is equal to ___

A. a) $\frac{mn}{m^2+n^2}$

B. b) $\frac{2mn}{m^2+n^2}$

C. c) $\frac{m^2+n^2}{2mn}$

D. d) $\frac{mn}{m+n}$

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4. If $1, \log_9\left(3^{1-x}+2\right)$ and $\log_3\left(4.3^x-1\right)$ are in A.P., then x is equal to

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A. a) $\log_4 3$

B. b) $\log_3 4$

C. c) $1-\log_3 4$

D. d) $\log_3 0.25$

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5. $(666\ldots n \times)^2$+(888..n times) is equal to ___

A. a) $\frac{4}{9}(10^n - 1)$

B. b) $\frac{4}{9}(10^{2n} - 1)$

C. c) $\frac{4}{9}(10^n - 1)^2$

D. d)none of these

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6. If $\omega$is an imaginary cube root of unit,then the value of the expression

$\left(1+\frac{1}{\omega}\right)\left(1+\frac{1}{\omega^2}\right)+\left(2+\frac{1}{\omega}\right)\left(2+\frac{1}{\omega^2}\right)+\left(3+\frac{1}{\omega}\right)\left(3+\frac{1}{\omega^2}\right)$ +...+ $\left(n+\frac{1}{\omega}\right)\left(n+\frac{1}{\omega^2}\right)$is

A. a) $\frac{n\left(n^2+2\right)}{3}$

B. b) $\frac{n\left(n^2-2\right)}{3}$

C. c) $\frac{n\left(n^2+1\right)}{3}$

D. d)none of these

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7. Solution of |2x-3|<|x+2|is ___

A. a) $\left(-\infty, \frac{1}{3}\right)$

B. b)(1/3,5)

C. c) $(5, \infty)$

D. d) $\left(-\infty, \frac{1}{3}\right) \cup (5, \infty)$

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8. If the foot of perpendicular from the origin to a straight line is at the point (3,-4),then the equation of the line is ___

A. a)3x-4y=25

B. b)3x-4y+25=0

C. c)4x+3y=25

D. d)4x-3y=24

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9. The area boundede by the curves y=|x|-1and y=-|x|+1 is__

A. a)1sq.unit

B. b)2 sqs.units

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

D. d)4 sq.units

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10. A ray of light along $x + \sqrt{3}y = \sqrt{3}$ gets reflected when reaching x-axis,the equation of refelcted ray is

A. a)y=x+1

B. b)$\sqrt{3}y = x - \sqrt{3}$

C. c)$y = \sqrt{3}x - 3$

D. d)none of these

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11. Let $A, B,$ and C be the sets such that $A \cup B = A \cup C$ and $A \cap B = A \cap C$. Show that $B = C$.

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12. Find the domain and range of the relation p defined by p= {(a,b):b=|a-1|,a∈Z and |a| ≤3}.

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13. If x be real show that $\cos\theta$cannot be equal to x+1/x.

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14. If $\cos\theta = \tan^2\left(\frac{\theta}{2}\right)$ show that $\cos\theta = \sqrt{2} - 1$

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

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16. If ωbe an imaginaryb cube root of unity,then prove that, $\frac{1}{1+2\omega} + \frac{1}{2+\omega} - \frac{1}{1+\omega} = 0$

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17. Show that the middle term in the expansion of $\left(x - \frac{1}{x}\right)^{2n}$ is $\frac{1.3.5.7.... (2n-1)}{n!}(-2)^n$

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18. Find the sum of all factors of the number 3645.

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19. For any two positive numbers a and b,prove that $AM \geq GM$

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20. Find the vaue of $9^{\frac{1}{3}} 9^{\frac{1}{9}} 9^{\frac{1}{27}} \ldots \infty$

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21. Prove that the area of a triangle is invariant under the translation of axes.

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22. If $t_1$and t_2 are the roots of the equation $t^2 + \lambda t + 1 = 0$,where $\lambda$is an orbitary constant,then prove that the line joining the point $\left(at_1^2, 2at_1\right)$and $\left(at_2^2, 2at_2\right)$always passes through a fixed point.Also find that point.

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23. Prove that $A \times (B \cup C) = (A \times B) \cup (A \times C)$

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24. Find the distance from the eye at which a coin must be placed so as just to hide the full moon.The diameter of coin being 2 cm and the diamter of the moon makes an angle 31'at the eye of the observer.

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25. If $\cos(\alpha+\beta)=\frac{4}{5}.\sin(\alpha-\beta)=\frac{5}{13}$ and α,β lie between 0 and $\frac{\pi}{4}$ then find the value of $\tan 2\alpha$

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

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27. Solve :$6x^2-(5+3i)x+11i-3=0$ in the complex plane C.

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28. Find the sum of first n terms of the series: $\frac{1}{1+1^2+1^4}+\frac{2}{1+2^2+2^4}+\frac{3}{1+3^2+3^4}....$

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29. Find n, if the ratio of the fifth term from beginning to the fifth term from the end in the expansion of $\left(\sqrt[4]{2}+\frac{1}{\sqrt[4]{3}}\right)^n$ id $\sqrt{6}:1$.

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30. Find the natural number a for which $\sum_{k=1}^{n} f(a+k)=16(2^n-1)$where the function f satisifies f(x+y)=f(x)f(y) for x,$y \in N$and f(1)=2.

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31. The line joing two points A(2,0)and B(3,1)I rotated about A in anti clockwise direction through an angle of 15°.If B goes to C in the new position,what will be the co-ordinates of C?

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32. In what direction should a line be drawn through the pont (1,2) so that its point of intersection with the lne x+y=4 is at a disatnce. $\frac{\sqrt{6}}{3}$ from the given point?

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33. If $\left(\alpha^2, \alpha\right)$ lies inside the triangle bounded by the lines x-5y+6=0,x-3y+2=0and x-2y-3=0 then find the value of α

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34. Find the equations of the circles which passes through the origin and cuts off equal chords of length a from the straight line y-x=0 and y+x=0

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35. Show that :$\tan\left(142\left(\frac{1^\circ}{2}\right)\right) = 2+\sqrt{2}-\sqrt{3}-\sqrt{6}$

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36. If A+B+C=π,prove that :cosA+cosB-cosC=-1+4cosA/2cosB/2sinC/2.

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37. Solve : $\frac{|x+3|+x}{x+2} > 1, x \in R,$

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38. Find principal amplitude of $\left(1+i\tan\left(\frac{3\pi}{5}\right)\right)$

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39. A square is draw by joing the mid points of the sides of a given square.A third square is draw inside the second square in the same way and this process continues indefintely.If the side if the first square is 16 cm.determine the sum of the areas of all the squares.

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40. On the portion of the line $x+3y-3=0$ which is intercepted between the coordinate axes,a square is constructed on the side of line away from the origin .Find co-ordinates of the intersection of its diagonals.Also find the equation of the opposite side of the given side.

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41. Find the locus of the midpoint of the chords of the parabola $y^2 = 4ax$.which subtend a right angle at the vertex.

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