MATHS

BOOKS - UNITED BOOK HOUSE

TIRTHAPATI INSTITUTION

Exercise

1. Which is nullest of the following sets

   A. a){0}

   B. b){phi}

C. c) $\left\{ x : x \, is \, a \int e \geq r \text{ and } 1' < x < '2 \right\}$

D. d){x:x is areal number and 1'ltxlt'2}`

Answer:

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2. Express $(\cos 20° - \cos 40°)$ in sine form

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3. If $i = \sqrt{-1}$ then which of the follwoings is the value of $(1 + i + i^2 + i^3 + i^4)$

A. a)0

B. b)1

C. c)i

D. d)2

Answer:

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4. Find the value of discrimimant of the quadratic equation $x^2 + 2x + 2 = 0$

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5. If tan A=3,then which of the followings is the value of tan2A?

A. a)-3/4

B. b)-4/3

C. c)3/4

D. d)4/3

Answer:

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6. If $A = \{x : x \in R, -32 \le x \le 10\}$, $B = \{x : x \in R, 0 \le x \le 12\}$ then find A-B.

7. If $A = \{x : x \in R, \ -32 \leq x \leq 10\},$

$B = \{x : x \in R, 0 \leq x \leq 12\}$ then find A-B.

8. Determine the modulus-amplitude form of the comples number $\left(\sqrt{3} + i\right)$

9. If the sum of the two roots of the quadratic equation $x^2 - px + q = 0$ be the thrice of their difference then prove that $2p^2 = 9q$

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10. State the principle of mathematical induction.

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11. If $A \subseteq B$ and $B \subseteq C$ then show that $A \subseteq C$.

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12. Show that $\dfrac{\cos 2^\circ - \sin 2^\circ}{\cos 2^\circ + \sin 2^\circ} = \tan 43^\circ$

13. If $x \cos \theta + y \sin \theta = x \cos \phi + y \sin \phi$ then show that $y = x \tan \left(\dfrac{\theta + \phi}{2} \right)$

14. IF $2 \cos \theta = x + \dfrac{1}{x}$ then show that $2 \cos 3\theta = x^3 + \dfrac{1}{x^3}$

15. Find the value of $\sin(221/2^\circ)$ with the help of the value of $\cos 45^\circ$

16. $\tan 25^\circ = a$ prove that

$$\frac{\tan 155^\circ - \tan 115^\circ}{1 + \tan 155^\circ \cdot \tan 115^\circ} = \frac{1 - a^2}{2a}$$

17. Prove that, $\cos\left(\dfrac{\pi}{5}\right) - \cos\left(\dfrac{2\pi}{5}\right) = \dfrac{1}{2}$

18. By the principle of mathematical induction prove that $(5^{2n} - 1)$ is always divisible by 24 for all positive integral values of n.

19. IF $x = a + bw + cw^2, y = a + bw^2 + cw$ then show that

$$x^3 + y^3 = (2a - b - c)(2b - c - a)(2c - a - b)$$

20. If the roots of the quadratic equation $a(b-c)x^2 + b(c-a) + c(a-b) = 0$ be equal then prove that a,b,c are in Harmonic progression .

21. Prove that $(A \cup B)^c = A^c \cap B^c$ [without venn-diagram]

22. If sinx-siny=a and cosx+cosy=b,prove that $\tan\left(\dfrac{x+y}{2}\right) = \pm\sqrt{\dfrac{4 - a^2 - b^2}{a^2 + b^2}}$

23. Mathematically find the value of $\sin 18°$

24. Show that

$$\cos\left(\frac{\pi}{11}\right)\cos\left(\frac{2\pi}{11}\right)\cos\left(\frac{3\pi}{11}\right)\cos\left(\frac{4\pi}{11}\right)\cos\left(\frac{5\pi}{11}\right) = \frac{1}{32}$$

25. If $\cos x + \cos y + \cos z = 0$ and $\sin x + \sin y + \sin z = 0$ then show that

$$\cos(x - y) + \cos(y - z) + \cos(z - x) = -\frac{3}{2}$$

26. If z=x+iy and |2z-1| =|z-2|then prove that

$$x^2 + y^2 = 1$$

27. If the two roots of the quadratic equation

$$ax^2 + bx + c = 0 \text{and} \quad \alpha \text{and} \quad \beta, \text{find} \quad \text{the} \quad \text{value} \quad \text{of}$$

$$\left(\frac{a\alpha^2}{b\alpha + c} - \frac{a\beta^2}{b\beta + c} \right)$$

28. For any three sets A,B,C prove by the formulae of set algebra that

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

29. By the principle of mathematical induction prove that 1+2+3+4+...n=$\dfrac{n(n+1)}{2}$

30. Prove that

$$\tan 1° \tan 2° \tan 3° ... \tan 88° \tan 89° = 1$$

31. Show that $\tan 50° = \tan 40° + 2\tan 10°$

32. Show that $\dfrac{\sqrt{3}}{\sin 20°} - \dfrac{1}{\cos 20°} = 4$