November 22, 2023

Questions

1. Find the sum and product of zeroes of the polynomial $p(x) = x^2 + 5x + 6$
2. If $2\cos\theta = \sqrt{3}$, then find the value of θ
3. Find the discriminant of the quadratic equation $2x^2 - 5x - 6 = 0$.
4. In $\triangle ABC$, right-angled at A, if $AB = 7cm$ and $AC = 24cm$, then find $\sin B$ and $\tan C$.
5. (a) If $\sin(A + B) = \sqrt{3}/2$, $\sin(A - B) = 1/2$,Where $0° < A + B < 90°; A > B$, then find the values of A and B.
   (b) Simplify :
$$\frac{\sin 30° + \tan 45° - \cos 60°}{\sec 30° + \cos 60° + \cot 45°} \tag{1}$$
6. The greater of two supplementary angles exceeds the smaller by $18°$. Find the two angles.
7. Prove that $7\sqrt{2}$ is an irrational number ,given that $\sqrt{2}$ is an irrational number.
8. (a) Prove that :
$$\sec\theta(1 - \sin\theta)(\sec\theta + \tan\theta) = 1 \tag{2}$$
   (b) Prove that :
$$\frac{1 + \sec A}{\sec A} = \frac{\sin^2 A}{1 - \cos A} \tag{3}$$
9. If α, β are the zeroes of the quadratic polynomial $x^2 + 9x + 20$, from a quadratic polynomial whose zeroes are $(\alpha + 1)$ and $(\beta + 1)$.
10. (a) The diagonal of a rectangular field is 60 meters more than the shorter side, find the sides of the field.

(b) The sum of the ages of a father and his son is 45 years. Five years ago, the product of their ages (in years) was 124. Determine their present ages

11. Write a quadratic polynomial sum of Whose zeroes is -5 and product is 6.

12. If the sum of the zeroes of the polynomial $2x^2 - 3ax + 4$ is 6, then the value of a

    (a) 4
    (b) -4
    (c) 2
    (d) -2

13. The common zero of the polynomials $x^3 + 1, x^2 - 1$ and $x^2 + 2x + 1$ is

    (a) -2
    (b) -1
    (c) 1
    (d) 2

14. If α, β are the zeroes of the polynomial $x^2 - 4x + 6$, then the value of $\alpha\beta$ is

    (a) 4
    (b) -4
    (c) 6
    (d) -6

15. The zeroes of the polynomial $3x^2 - 5x - 2$ are

    (a) $\frac{1}{3}$,2
    (b) $-\frac{1}{3}$,2
    (c) $\frac{1}{3}$,-2
    (d) $-\frac{1}{3}$,-2

16. If is a zero of the polynomial $p(x) = ax^2 - 3(a-1)x - 1$ then the value of a is

    (a) $\frac{1}{3}$,2
    (b) $-\frac{1}{3}$,2
    (c) $\frac{1}{3}$,-2
    (d) $-\frac{1}{3}$,-2

17. If $\tan\theta = 4/3$, find the value $\frac{2\sin\theta - 3\cos\theta}{2\sin\theta + 3\cos\theta}$

18. If x= $a\cos\theta$ and y=$b\sin\theta$, then find the value of $b^2x^2 + a^2y^2$

19. A number consists of two digits whose sum is 9. if 27 is added to the number, the digits are reversed. Find the number

20. Prove that :

$$\frac{\tan\theta - \cot\theta}{\sin\theta\cos\theta} = \tan^2\theta - \cot^2\theta \tag{4}$$

21. Prove that:

$$(\sec\theta - \tan\theta)^2 = \frac{1+\sin\theta}{1-\sin\theta} \tag{5}$$

22. The sum of the squares of three consecutive positive integers is 110. Find the positive integers.

23. Ram can row a boat at the rate of 4 km/hour in still water. If he takes 8 hours in going 12 km upstream and 12 km downstream, find the speed of the stream.