

November 23, 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  $\theta$
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  $0^\circ < A + B < 90^\circ$ ;  $A > B$ , then find the values of  $A$  and  $B$ .  
(b) Simplify :

$$\frac{\sin 30^\circ + \tan 45^\circ - \cos 60^\circ}{\sec 30^\circ + \cos 60^\circ + \cot 45^\circ} \quad (1)$$

6. The greater of two supplementary angles exceeds the smaller by  $18^\circ$ . 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 :

$$\sec \theta (1 - \sin \theta) (\sec \theta + \tan \theta) = 1 \quad (2)$$

- (b) Prove that :

$$\frac{1 + \sec A}{\sec A} = \frac{\sin^2 A}{1 - \cos A} \quad (3)$$

9. If  $\alpha, \beta$  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  $\alpha, \beta$  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  $b^2 x^2 + a^2 y^2$
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 :

$$\frac{\tan \theta - \cot \theta}{\sin \theta \cos \theta} = \tan^2 \theta - \cot^2 \theta \quad (4)$$

21. Prove that:

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

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.