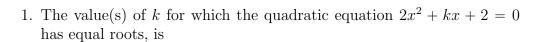
## ALGEBRA

## December 16, 2023



- (A) 4
- (B)  $\pm 4$
- (C) -4
- (D) 0

2. on dividing a polynomial p(x) by  $x^2 - 4$ , quotient and remainder are found to be x and 3 respectively. The polynomial p(x) is

(A) 
$$3x^2 + x - 12$$

(B) 
$$x^3 - 4x + 3$$

(C) 
$$x^2 + 3x - 4$$

(D) 
$$x^3 - 4x - 3$$

3. Simplest form of

$$\frac{1+\tan^2 A}{1+\cot^2 A}\tag{1}$$

is .

4. Write the value of

$$\sin^2 30^\circ + \cos^2 60^\circ \tag{2}$$

.

- 5. From the quadratic polynomial, the sum and product of whose zeroes are (-3) and 2 respectively.
- 6. Can  $(x^2 1)$  be a reminder while dividing  $x^4 3x^2 + 5x 9$  by  $(x^2 + 3)$ ? Justify your answer with reasons.
- 7. If A, B and C are interior angles of  $\triangle ABC$ , then show that

$$\cos\left(\frac{B+C}{2}\right) = \sin\left(\frac{A}{2}\right) \tag{3}$$

8. Prove that:

$$(\sin^4 \theta - \cos^4 \theta + 1)\csc^2 \theta = 2 \tag{4}$$

- 9. Sum of the areas of two squares is  $544m^2$ . If the difference of their perimeters is 32m, find the sides of the two squares.
- 10. A motor boat whose speed is 18km/h in still water takes 1 hour more to go 24km upstream than to return down stream to the same spot. Find the speed of the stream.
- 11. Obtain the zeroes of the polynomial  $p(x) = 2x^4 x^3 11x^2 + 5x + 5$  if two zeroes are  $\sqrt{5}$  and  $-\sqrt{5}$ .
- 12. What minimum is added to  $2x^3 3x^2 + 6x + 7$  so that the resulting polynomial will be divisible by  $x^2 4x + 8$ ?
- 13. If

$$\cos\left(\sin^{-1}\frac{2}{\sqrt{5}} + \cos^{-1}x\right) = 0\tag{5}$$

then x is equal to

- (A)  $\frac{1}{\sqrt{5}}$
- (B)  $-\frac{2}{\sqrt{5}}$
- (C)  $\frac{2}{\sqrt{5}}$
- (D) 1