Topper Secret Questions

Quadratic Equations

1. Which of the following is a **quadratic equation?**

(A) $x^2 + 2x + 1 = (4 - x)^2 + 3$ **(B)** $-2x^2 = (5 - x)(2x - \frac{2}{5})$

(C) $(k + 1)x^2 + \frac{3}{2}x = 7$, where $k = -1$ **(D)** $x^3 - x^2 = (x - 1)^3$

2. Which of the following is not a **quadratic equation?**

(A) $2(x - 1)^2 = 4x^2 - 2x + 1$ **(B)** $2x - x^2 = x^2 + 5$

(C) $(\sqrt{2}x + \sqrt{3})^2 + x^2 = 3x^2 - 5x$ **(D)** $(x^2 + 2x)^2 = x^4 + 3 + 4x^3$

3. Which of the following **equations has 2** as a root?

(A) $x^2 - 4x + 5 = 0$ **(B)** $x^2 + 3x - 12 = 0$

(C) $2x^2 - 7x + 6 = 0$ **(D)** $3x^2 - 6x - 2 = 0$

4. If $\frac{1}{2}$ is a root of the equation $x^2 + kx - \frac{5}{4} = 0$, then the value of k **is**

(A) 2 **(B)** -2 **(C)** $\frac{1}{4}$ **(D)** $\frac{1}{2}$

5. If -5 is a root of the quadratic equation $2x^2 + px - 15 = 0$ and the quadratic equation $p(x^2 + x) + k = 0$ has equal roots find the value of k.

6. Solve for x: $\frac{2x}{x-3} + \frac{1}{2x+3} + \frac{3x+9}{(x-3)(2x+3)} = 0, x \neq 3, \frac{-3}{2}$

7. Solve for x: $4x^2 + 4bx - (a^2 - b^2) = 0$

8. Solve for x: $4x^2 - 2(a^2 + b^2)x + a^2b^2 = 0$

9. Solve by using quadratic formula

$abx^2 + (b^2 - ac)x - bc = 0$.

10. Solve $9x^2 - 6a^2x + a^4 - b^4 = 0$ using quadratic formula.

11. A train travels at a **certain average** speed for a **distance of 63 km** and then travels a distance of 72 km at an average speed of 6 km/h more than its original speed. If it takes 3 hours **to complete the total** journey, what is its original average speed?

12. Find a natural number whose square diminished by 84 is equal to thrice of 8 more than the given number.

13. A natural number, when increased by 12, equals 160 times its reciprocal. Find the number.

14. A train, travelling at a uniform speed for 360 km, would have taken 48 minutes less to travel the same distance if its speed were 5 km/h more. Find the original speed of the train.

15. If Zeba were younger by 5 years than what she really is, then the square of her age (in years) would have been 11 more than five times her actual age. What is her age now?

16. Find two consecutive positive integers, sum of whose squares is 365.

17. At t minutes past 2 pm, the time needed by the minute's hand of a clock to show 3 pm was found to be 3 minutes less than $\frac{t^2}{4}$ minutes. Find t.

18. A cottage industry produces a certain number of pottery articles in a day. It was observed on a particular day that the cost of production of each article (in rupees) was 3 more than twice the number of articles produced on that day. If the total cost of production on that day was rs.90, find the number of articles produced and the cost of each article.

19. Two water taps together can fill a tank in 6 hours. The tap of larger diameter takes 9 hours less than the smaller one to fill the tank separately. Find the time in which each tap can separately fill the tank.

20. Rohan's mother is 26 years older than him. The product of their ages (in years) 3 years from now will be 360. We would like to find Rohan's present age.

21. If the price of a book is reduced by rs.5, a person can buy 5 more books for rs. 300. Find the original list price of the book.

22. In a flight of 600 km, an aircraft was slowed down due to bad weather. Its average speed was reduced by 200 km/hr and the time of flight increased by 30 minutes. Find the duration of flight.

23. The speed of a boat in still water is 15 km/hr. It can go 30 km upstream and return downstream to the original point in 4 hrs 30 minutes. Find the speed of the stream.

24. Sum of areas of **two squares is 400 cm^2**. If the difference of their perimeter is 16 cm. Find the side of each square.

25. If the roots of the quadratic equation

$(b - c)x^2 + (c - a)x + (a - b) = 0$ **are equal, prove** $2b = a + c$.

26. If the equation $(1 + m^2)n^2x^2 + 2mncx + (c^2 - a^2) = 0$ has equal roots, prove that $c^2 = a^2(1 + m^2)$.

27. A rectangular park is to be designed whose breadth is 3 m less than its length. Its area is to be **4 square metres more** than the area of a park that has already been made in the shape of an isosceles triangle with its base as the breadth of the rectangular park and **of altitude 12** m. find the length and **breadth of the park.**

28. An aeroplane left **30 minutes later than** its scheduled time and in order to reach its destination 1500 km away in time, it had to increase **its speed by 250 km/hr** from its usual speed. **Determine its usual speed**.

29. The **hypotenuse of a right-angled** triangle is **6 cm more than** twice the shortest side. If the third **side is 2 cm less** than the hypotenuse, find the sides of the triangle.

30. The difference of two natural **numbers is 3 and** the difference of their reciprocals is $\frac{3}{28}$ **Find the numbers.**

ANSWER'S

Q1. D

Q2. C

Q3. C

Q4. A

Q5. $\frac{7}{4}$

Q6. $x = -1, x \neq \frac{-3}{2}$

Q7. $x = -\frac{(a+b)}{2}, x = \frac{a-b}{2}$

Q8. $x = \frac{b^2}{a}, \frac{a^2}{b}$

Q9. $x = -\frac{b}{a}, \frac{c}{b}$

Q10. $\frac{a^2+b^2}{3}$

Q11. 42 km/h

Q12. 12

Q13. 8

Q14. 45 km/h

Q15. 14 Years

Q16. 13 & 14

Q17. 14 min.

Q18. 6 articles, Rs. 15

Q19. 9hrs.

Q20. 7 Years

Q21. Rs. 20

Q22. 1 hour

Q23. 5 km/hr

Q24. 16 & 12 cm

Q27. L=7m, B=4 m

Q28. 750 km/h

Q29. 10, 26, 24

Q30. 7& 4