

Previous Year Boards Questions

Chapter 4 – Quadratic Equations

1 Mark:

1. If one root of the quadratic equation $6x^2 - x - k = 0$ is $\frac{2}{3}$, then find the value of k . **CBSE 2017, Foreign (30/2/1)**
2. Find the value of k , for which one root of the quadratic equation $kx^2 - 14x + 8 = 0$ is six times the other. **CBSE Sample Paper 2016**
3. If $x = -\frac{1}{2}$ is a solution of the quadratic equation $3x^2 + 2kx - 3 = 0$, find the value of k . **CBSE 2015, Delhi (30/1/1)**
4. If the quadratic equation $px^2 - 2\sqrt{5}px + 15 = 0$ has two equal roots, then find the value of p . **CBSE 2015, Outside Delhi (30/1)**
5. If 1 is a root of the equations $ay^2 + ay + 3 = 0$ and $y^2 + y + b = 0$, then ab equals:
A) 3
B) $-\frac{7}{2}$
C) 6
D) -3 **CBSE 2012, Delhi (30/1/1)**
6. If the quadratic equation $mx^2 + 2x + m = 0$ has two equal roots, then the values of m are
A) ± 1
B) 0, 2
C) 0, 1
D) -1, 0 **CBSE 2012, Foreign (30/2/1)**
7. The roots of the quadratic equation $2x^2 - x - 6 = 0$ are
A) -2, 3/2
B) 2, -3/2
C) -2, -3/2
D) 2, 3/2 **CBSE 2012, Outside Delhi (30/1)**
8. The roots of the equation $x^2 + x - p(p + 1) = 0$, where p is a constant, are
A) $p, p + 1$
B) $-p, p + 1$
C) $p, -(p + 1)$
D) $-p, -(p + 1)$ **CBSE 2011, Delhi (30/1/1)**
9. The roots of the quadratic equation $x^2 + 5x - (\alpha + 1)(\alpha + 6) = 0$, where α is a constant, are
A) $\alpha + 1, \alpha + 6$
B) $(\alpha + 1), -(\alpha + 6)$
C) $-(\alpha + 1), (\alpha + 6)$
D) $-(\alpha + 1), -(\alpha + 6)$ **CBSE 2011, Foreign (30/2/1)**
10. The roots of the equation $x^2 - 3x - m(m + 3) = 0$, where m is a constant, are
A) $m, m + 3$
B) $-m, m + 3$
C) $m, -(m + 3)$
D) $-m, -(m + 3)$ **CBSE 2011, Outside Delhi (30/1)**
11. Find the discriminant of the quadratic equation $3\sqrt{3}x^2 + 10x + \sqrt{3} = 0$. **CBSE 2009, Outside Delhi (30/1)**
12. Write the nature of roots of quadratic equation $4x^2 + 4\sqrt{3}x + 3 = 0$. **CBSE 2009, Foreign (30/2/1)**
13. For what value of k the quadratic equation $x^2 - kx + 4 = 0$ has equal roots? **CBSE Sample Paper I 2008**
14. What is the nature of roots of the quadratic equation $4x^2 - 12x - 9 = 0$? **CBSE Sample Paper II 2008**

2 Marks:

- Find the value of p , for which one root of the quadratic equation $px^2 - 14x + 8 = 0$ is 6 times the other.
CBSE 2017, Outside Delhi (30/1)
- Find the roots of the quadratic equation $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$.
CBSE 2017, Delhi (30/1/1)
- Find the value of k for which the equation $x^2 + k(2x + k - 1) + 2 = 0$ has real and equal roots.
CBSE 2017, Delhi (30/1/1)
- Solve for x :
 $\sqrt{3}x^2 + 10x - 8\sqrt{3} = 0$.
CBSE 2017, Foreign (30/2/1)
- 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 .
CBSE 2016, Outside Delhi (30/1)
- If $x = \frac{2}{3}$ and $x = -3$ are roots of the quadratic equation $ax^2 + 7x + b = 0$, find the values of a and b .
CBSE 2016, Delhi (30/1/1)
- A two digit number is four times the sum of the digits. It is also equal to 3 times the product of digits. Find the number.
CBSE 2016, Foreign (30/2/1)
- If 2 is a root of the equation $x^2 + kx + 12 = 0$ and the equation $x^2 + kx + q = 0$ has equal roots, find the value of q .
CBSE Sample Paper 2016
- Solve the following quadratic equation for x :
 $4x^2 - 4a^2x + (a^4 - b^4) = 0$
CBSE 2015, Delhi (30/1/1)
- Solve for x :
 $x^2 - (\sqrt{3} + 1)x + \sqrt{3} = 0$
CBSE 2015, Foreign (30/2/1)
- Solve the following quadratic equation for x :
 $4x^2 + 4bx - (a^2 - b^2) = 0$
CBSE 2015, Outside (30/1)
- Find the roots of the quadratic equation $3x^2 - 2\sqrt{6}x + 2 = 0$.
CBSE Sample Paper 2015
- Find the values of p for which the quadratic equation $4x^2 + px + 3 = 0$ has equal roots.
CBSE 2014, (30/1), (30/3)
- Find the values of k for which the quadratic equation $9x^2 - 3kx + k = 0$ has equal roots.
CBSE 2014 (30/2), (30/3)
- Solve the following quadratic equation for x :
 $4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0$
CBSE 2013, Delhi (30/1/1)
- Find the value(s) of k so that the quadratic equation $x^2 - 4kx + k = 0$ has equal roots.
CBSE 2012, Delhi (30/1/1)
- Find the value of k for which the roots of the quadratic equation $(k - 4)x^2 + 2(k - 4)x + 2 = 0$ are equal.
CBSE 2012, Foreign (30/2/1)
- Find the value of p for which the roots of the equation $px(x - 2) + 6 = 0$, are equal.
CBSE 2012, Outside Delhi (30/1)
- Find the value of p so that the quadratic equation $px(x - 3) + 9 = 0$ has two equal roots.
CBSE 2011, Delhi (30/1/1)
- For what value of k does the quadratic equation $(k - 5)x^2 + 2(k - 5)x + 2 = 0$ have equal roots?
CBSE 2011, Foreign (30/2/1)
- Find the roots of the following quadratic equation:
 $\sqrt{3}x^2 - 2\sqrt{2}x - 2\sqrt{3} = 0$
CBSE 2011, Foreign (30/2/1)
- Find the value of m so that the quadratic equation $mx(x - 7) + 49 = 0$ has two equal roots.
CBSE 2011, Outside Delhi (30/1)

3 Marks:

- If $ad \neq bc$, then prove that the equation $(a^2 + b^2)x^2 + 2(ac + bd)x + (c^2 + d^2) = 0$ has no real roots. **CBSE 2017, Outside Delhi (30/1)**
- If the equation $(1 + m^2)x^2 + 2mcx + c^2 - a^2 = 0$ has equal roots then show that $c^2 = a^2(1 + m^2)$. **CBSE 2017, Delhi (30/1/1)**
- If the roots of the quadratic equation $(a - b)x^2 + (b - c)x + (c - a) = 0$ are equal, prove that **CBSE 2017, Foreign (30/2/1)**
- Solve for $x = \frac{1}{(x-1)(x-2)} + \frac{1}{(x-2)(x-3)} = \frac{2}{3}, x \neq 1, 2, 3$ **CBSE 2016, Outside Delhi (30/1)**
- Solve for x :
 $\frac{2x}{x-3} + \frac{1}{2x+3} + \frac{3x+9}{(x-3)(2x+3)} = 0, x \neq 3, -3/2$ **CBSE 2016, Delhi (30/1/1)**
- Solve the given quadratic equation for $x : 9x^2 - 9(a + b)x + (2a^2 + 5ab + 2b^2) = 0$. **CBSE 2016, Foreign (30/2/1)**
- Solve $\frac{1}{(a+b+x)} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}, a + b \neq 0$. **CBSE Sample Paper 2016**
- Find that non-zero value of k , for which the quadratic equation $kx^2 + 1 - 2(k - 1)x + x^2 = 0$ has equal roots. Hence find the roots of the equation. **CBSE 2015, Delhi (30/1/1)**
- Solve for x :
 $x^2 + 5x - (a^2 + a - 6) = 0$ **CBSE 2015, Foreign (30/2/1)**
- Solve for x :
 $\sqrt{3}x^2 - 2\sqrt{2}x - 2\sqrt{3} = 0$ **CBSE 2015, Outside Delhi (30/1)**
- Solve the following quadratic equation for x
 $x^2 - 4ax - b^2 + 4a^2 = 0$ **CBSE 2012, Outside Delhi (30/1)**
- If the sum of two natural numbers is 8 and their product is 15, find the numbers. **CBSE 2012, Outside Delhi (30/1)**
- If a student had walked 1 km/hr faster, he would have taken 15 minutes less to walk 3 km . Find the rate at which he was walking. **CBSE Sample Paper III 2008**
- Find the value of k so that the following quadratic equation has equal roots:
 $2x^2 - (k - 2)x + 1 = 0$ **CBSE Sample Paper III 2008**
- Solve the following equation for z .
 $\frac{4}{z-1} - \frac{5}{z+2} = \frac{3}{z}, z \neq 1, 0, -2$ **CBSE 2015, Sample Paper 2015**
- Solve for x :
 $\frac{16}{x} - 1 = \frac{15}{x+1}; x \neq 0, -1$ **CBSE 2014 (30/1), (30/2), (30/3)**
- For what value of k , are the roots of the quadratic equation $kx(x - 2) + 6 = 0$ equal? **CBSE 2013, Delhi (30/1/1)**
- Solve for $x : 4x^2 - 4ax + (a^2 - b^2) = 0$ **CBSE 2012, Delhi (30/1/1)**
- Solve for $x : 3x^2 - 2\sqrt{6}x + 2 = 0$ **CBSE 2012, Delhi (30/1/1)**
- Solve for x :
 $4\sqrt{3}x^2 + 5x - 2\sqrt{3} = 0$ **CBSE 2012, Foreign (30/2/1)**
- Solve the following quadratic equation for x
 $x^2 - 4ax - b^2 + 4a^2 = 0$ **CBSE 2012, Outside Delhi (30/1)**
- If the sum of two natural numbers is 8 and their product is 15, find the numbers. **CBSE 2012, Outside Delhi (30/1)**

23. Find the roots of the following quadratic equation :

$$2\sqrt{3}x^2 - 5x + \sqrt{3} = 0$$

CBSE 2011, Delhi (30/1/1)

24. Find the roots of the following quadratic equation:

$$x^2 - 3\sqrt{5}x + 10 = 0$$

CBSE 2011, Outside Delhi (30/1)

4 Marks:

1. Speed of a boat in still water is 15 km/h . It goes 30 km upstream and returns back at the same point in 4 hours 30 minutes. Find the speed of the stream. CBSE 2017, Delhi (30/1/1)

2. Solve for x :

$$\frac{1}{x+1} + \frac{3}{5x+1} = \frac{5}{x+4}, x \neq -1, -\frac{1}{5}, -4$$

CBSE 2017, Outside Delhi (30/1)

3. A motor boat whose speed is 24 km/h in still water takes 1 hours more to go 32 km upstream than to return downstream to the same spot. Find the speed of the stream. CBSE 2016, Outside Delhi (30/1)

4. A pole has to be erected at a point on the boundary of a circular park of diameter 17 m in such a way that the differences of its distances from two diametrically opposite fixed gates A and B on the boundary is 7 metres. Find the distances from the two gates where the pole is to be erected. CBSE 2016, Foreign (30/2/1)

5. Find the positive value(s) of k for which quadratic equations $x^2 + kx + 64 = 0$ and $x^2 - 8x + k = 0$ both will have real roots. CBSE 2016, Foreign (30/2/1)

6. Three eighth of the students of a class opted for visiting an old age home. Sixteen students opted for having a nature walk. Square root of total number of students in the class opted for tree plantation in the school. The number of students who visited an old age home is same as the number of students who went for a nature walk and did tree plantation. Find the total number of student. What values are inculcated in students through such activities? CBSE Sample Paper 2016

7. A passenger, while boarding the plane, slipped from the stairs and got hurt. The pilot took the passenger in the emergency clinic at the airport for treatment. Due to this, the plane got delayed by half an hour. To reach the destination 1500 km away in time, so that the passengers could catch the connecting flight, the speed of the plane was increased by 250 km/hour than the usual speed. Find the usual speed of the plane. What value is depicted in this question? CBSE 2016, Delhi (30/1/1)

8. Find x in terms of a, b and c :

$$\frac{a}{x-a} + \frac{b}{x-b} = \frac{2c}{x-c}, x \neq a, b, c$$

CBSE 2016, Delhi (30/1/1)

9. The numerator of a fraction is 3 less than its denominator. If 2 is added to both the numerator and the denominator, then the sum of the new fraction and original fraction is $\frac{29}{20}$. Find the original fraction. CBSE 2015, Delhi (30/1/1)

10. Solve for x :

$$\frac{2}{x+1} + \frac{3}{2(x-2)} = \frac{23}{5x}, x \neq 0, -1, 2$$

CBSE 2015, Delhi (30/1/1)

11. If $x = -2$ is a root of the equation $3x^2 + 7x + p = 0$, find the values of k so that the roots of the equation $x^2 + k(4x + k - 1) + p = 0$ are equal. CBSE 2015, Foreign (30/2/1)

12. The total cost of a certain length of a piece of cloth is ₹ 200. If the piece was 5 m longer and each metre of cloths costs ₹ 2 less, the cost of the piece would have remained unchanged. How long is the piece and what is its original rate per metre? CBSE 2015, Foreign (30/2/1)

13. A train travels at a certain average speed for a distance of 54 km and then travels a distance of 63 km at an average speed of 6 km/h more than the first speed. If it takes 3 hours to complete the total journey, what is its first speed? CBSE 2015, Outside Delhi (30/1)

14. Anil takes 6 days less than the time taken by Varun to finish a piece of work. If both Anil and Varun together can finish that work in 4 days, find the time taken by Varun to finish the work independently. CBSE Sample Paper 2015

15. 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. **CBSE Sample Paper 2015**
16. Solve for x :
 $\frac{x-2}{x-3} + \frac{x-4}{x-5} = \frac{10}{3}; x \neq 3, 5$ **CBSE 2014, Outside Delhi (30/1)**
17. A motorboat whose speed in still water is 18 km/h, takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream. **CBSE 2014, (30/1), (30/2), (30/3)**
18. Solve for x :
 $\frac{x-3}{x-4} + \frac{x-5}{x-6} = \frac{10}{3}; x \neq 4, 6$ **CBSE 2014, Foreign (30/2/1)**
19. Solve the following for x :
 $\frac{1}{2a+b+2x} = \frac{1}{2a} + \frac{1}{b} + \frac{1}{2x}$ **CBSE 2013, Delhi (30/1/1)**
20. Sum of the areas of two squares is 400 cm². If the difference of their perimeters is 16 cm, find the sides of the two squares. **CBSE 2013, Delhi (30/1/1)**
21. A shopkeeper buys some books for ₹ 80. If he had bought 4 more books for the same amount, each book would have cost ₹ 1 less. Find the number of books he bought. **CBSE 2012, Delhi (30/1/1)**
22. The sum of two numbers is 9 and the sum of their reciprocals is $\frac{1}{2}$. Find the numbers. **CBSE 2012, Delhi (30/1/1)**
23. A two-digit number is such that the product of its digits is 14. When 45 is added to the number, the digits interchange their places. Find the number. **CBSE 2012, Foreign (30/2/1)**
24. Find the consecutive natural numbers, the sum of whose squares is 145. **CBSE 2012, Foreign (30/2/1)**
25. The numerator of a fraction is 3 less than its denominator. If 1 is added to the denominator, the fraction is decreased by $\frac{1}{15}$. Find the fraction. **CBSE 2012, Outside Delhi (30/1)**
26. In a flight of 2800 km, an aircraft was slowed down due to bad weather. Its average speed is reduced by 100 km/h and time increased by 30 minutes. Find the original duration of the flight. **CBSE 2012, Outside Delhi (30/1)**
27. A motor boat whose speed is 20 km/h in still water, takes 1 hour more to go 48 km upstream than to return downstream to the same spot. Find the speed of the stream. **CBSE 2011, Delhi (30/1/1)**
28. Find the roots of the equation $\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}, x \neq -4, 7$ **CBSE 2011, Delhi (30/1/1)**
29. 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. **CBSE 2011, Foreign (30/2/1)**
30. Solve the following equation for x :
 $\frac{1}{x+1} + \frac{2}{x+2} = \frac{5}{x+4}, x \neq -1, -2, -4$ **CBSE 2011, Foreign (30/2/1)**
31. A train travels 180 km at a uniform speed. If the speed had been 9 km/hour more, it would have taken 1 hour less for same journey. Find the speed of the train. **CBSE 2011, Outside Delhi (30/1)**
32. Find the roots of the equation $\frac{1}{2x-3} + \frac{1}{x-5} = 1, x \neq \frac{3}{2}, 5$. **CBSE 2011, Outside Delhi (30/1)**

6 Marks:

1. Some students planned a picnic. The total budget for food was Rs. 2,000. But 5 students failed to attend the picnic and thus the cost of food for each member increased by Rs. 50. How many students attended the picnic and how much did each student pay for the food? **CBSE 2010, Foreign (30/2/1)**
2. Solve the following equation for x :
$$\frac{3x-4}{7} + \frac{7}{3x-4} = \frac{5}{2}, x \neq \frac{4}{3}$$
 CBSE 2010, Foreign (30/2/1)
3. Three consecutive positive integers are such that the sum of the square of the first and the product of the other two is 46, find the integers. **CBSE 2010, Delhi (30/1/1)**
4. The difference of squares of two numbers is 88. If the larger number is 5 less than twice the smaller number, then find the two numbers. **CBSE 2010, Delhi. (30/1/1)**
5. The sum of squares of two consecutive odd numbers is 394. Find the numbers. **CBSE 2009, Delhi (30/1/1)**
6. Places A and B are 100 km apart on a highway. One car starts from A and another from B at the same time. If the cars travel in the same direction at different speeds, they meet in 5 hours. If they travel towards each other, they meet in 1 hour. What are the speeds of the two cars? **CBSE 2009, Delhi (30/1/1)**
7. Solve the following equation for x :
$$9x^2 - 9(a+b)x + (2a^2 + 5ab + 2b^2) = 0$$
 CBSE 2009, Outside Delhi (30/1)
8. 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, then find the values of p and k . **CBSE 2009, Outside Delhi (30/1)**
9. A trader bought a number of articles for Rs. 900. Five articles were found damaged. He sold each of the remaining articles at Rs. 2 more than what he paid for it. He got a profit of Rs. 80 on the whole transaction. Find the number of articles he bought. **CBSE 2009, Foreign (30/2/1)**
10. Two years ago a man's age was three times the square of his son's age. Three years hence his age will be four times his son's age. Find their present ages. **CBSE 2009, Foreign (30/2/1)**
11. A peacock is sitting on the top of a pillar, which is 9 m high. From a point 27 m away from the bottom of the pillar, a snake is coming to its hole at the base of the pillar. Seeing the snake the peacock pounces on it. If their speeds are equal, at what distance from the hole is the snake caught? **CBSE 2008 (30/2/1), (30/2/2), (30/2/3)**
12. The difference of two numbers is 4. If the difference of their reciprocals is $\frac{4}{21}$, find the two numbers. **CBSE 2008 (30/2/1), (30/2/2), (30/2/3)**
13. Some students arranged a picnic. The budget for food was Rs. 240. Because four students of the group failed to go, the cost of food to each student got increased by Rs. 5. How many students went for the picnic? **CBSE Sample Paper I 2008**
14. A plane left 30 minutes late than its scheduled time and in order to reach the destination 1500 km away in time, it had to increase the speed by 250 km/h from the usual speed. Find its usual speed. **CBSE Sample Paper I 2008**