



Freedom Valley School, Bardoli

Class:10th

WORKSHEET

Chapter no: 4

Teacher's sign:

Sub: MATHS

Principal sign:

Key points of the chapter	
1	The quadratic equation is of the form $ax^2+bx+c=0$, where a,b and c are constants.
2	b^2-4ac is called the discriminant.
3	The solutions (roots) of a quadratic equation $ax^2+bx+c=0$, can be found using the quadratic formula: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
4	Nature of the roots: A quadratic equation $ax^2 + bx + c = 0$ has (i) two distinct real roots, if $b^2 - 4ac > 0$, (ii) two equal real roots, if $b^2 - 4ac = 0$, (iii) no real roots, if $b^2 - 4ac < 0$.

1 Mark (MCQs)

- If one root of the equation $ax^2 + bx + c = 0$ is 7 times the other, then
(a) $b^2 = 16ac$ (b) $b^2 = 3ac$ (c) $7b^2 = 64ac$ (d) $64b^2 = 7ac$
- The number of real roots of the equation $(x+1)^2 + (x-2)^2 + (x+3)^2 = 0$ are
(a) 1 (b) 2 (c) 0 (d) None of these
- If 6 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.
(a) 6 (b) 4 (c) -4 (d) 3
- Find the value of k for which the quadratic equation $3x^2 + 6x + k = 0$ has real and equal roots.
(a) 4 (b) 3 (c) -1 (d) 7
- If the sum and product of the roots of the equation $3x^2 - 8x + 2k = 0$ are equal, Then the value of k is
(a) 4 (b) 3 (c) 6 (d) 8
- The nature of the roots of quadratic equation $\sqrt{5}x^2 - \sqrt{3}x - \frac{1}{\sqrt{5}} = 0$ is
(a) Real and distinct (b) Real and repeated (c) Not Real (d) 8
- If $\sin\alpha$ and $\cos\alpha$ are the roots of the equation $px^2 + qx + r = 0$ then $q^2 =$
(a) $p^2 - 2pr$ (b) $p^2 + 2pr$ (c) $p^2 - pr$ (d) $p^2 + pr$
- A quadratic equation, one root is 4 and the product of the roots is zero is
(a) $x^2 + 4x = 0$ (b) $x^2 - 4x = 0$ (c) $2x^2 + 4x = 0$ (d) $2x^2 + 2x^2 = 0$
- If the equation $x^2 + 6x + k = 0$ has real and distinct roots, then
(a) $k < 9$ (b) $k > 9$ (c) $k \geq 9$ (d) $k \leq 9$
- If one root of the equation $3x^2 + 10x + (\lambda - 5) = 0$ be the reciprocal of the other, then $\lambda =$
(a) 5 (b) 8 (c) 3 (d) -8

(VERY SHORT QUESTIONS 2 Marks)

1. Solve the following quadratic equation by factorization method:

$$\frac{x+3}{x-4} - \frac{6-x}{x} = 3$$

2. A two digits number is such that the product of its digits is 56. If 9 is subtracted from the number, the digits interchange their places. Find the number.
3. Solve: $P + \frac{1}{P} = 26\frac{1}{26}$
4. Find two consecutive odd positive integers, sum of whose square is 202.
5. Three consecutive positive integers are such that the sum of the square of the first and the product of the other two is 92. Find the integers.
6. The length of the sides forming right angle of a right-angled triangle are $2x$ cm and $(x - 1)$ cm. If the area of the triangle is 30cm^2 , find its hypotenuse.
7. A shopkeeper sells a book for ₹ 75 and gains as much percent as the cost price of the book. Find the cost price of the book.
8. Determine the nature of the roots of the following quadratic equation :
- (i) $3a^2 b^2 x^2 - 16abcx + 4c^2 = 0$ (ii) $4p^2q^2 x^2 - 12pqx + 36 = 0$
9. Write all the values of k for which the quadratic equation $x^2 + kx + 64 = 0$ has equal roots. Find the roots of the equation so obtained.
10. If 2 is a root of the quadratic equation $2x^2 + qx - 30 = 0$ and the quadratic equation $q(x^2 + x) + k = 0$ has equal roots, find the value of k .

(SHORT ANSWER TYPE QUESTIONS 3 Marks)

1. Two water taps together can fill a tank in $\frac{15}{4}$ hours. The larger takes 4 hours less than the smaller one to fill the tank separately. Formulate the quadratic equation and find the time in which each tap can separately fill the tank.
2. Solve: $x = \frac{1}{3 - \frac{1}{3 - \frac{1}{3-x}}}$, $x \neq 3$
3. Solve for x : $pqr x^2 - (x^2 + pq)x + r = 0$
4. In a flight of 3000 km, an aircraft was slowed down due to bad weather. Its average speed for the trip was reduced by 200 km/hour and the time of flight increased by 320 minutes. Find the duration of flight.
5. Determine the nature of the roots of the following quadratic equation:
- (i) $2x^2 + 3x - 1 = 0$ (ii) $x^2 - 5x + 4 = 0$ (iii) $7x^2 + 9x - 8 = 0$

ASSERTION AND REASON BASED MCQs

Directions:

- a.) Both Assertion and Reason are true and Reason is the correct explanation for Assertion
b.) Both Assertion and Reason are true and Reason is not the correct explanation for Assertion.
c.) Assertion is true but the reason is false.
d.) Assertion is false but the reason is true.

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Assertion: The roots of the equation $7x^2 + x - 1 = 0$ are real and distinct
Reason : if $b^2 - 4ac > 0$ then roots are real and distinct.

2	Assertion: Every quadratic equation has at most two root Reason: Every quadratic equation has atleast one real root.
3	Assertion: The equation $9x^2+3kx + 4 = 0$ has equal roots for $k = 9$. Reason : If discriminant 'D' of a quadratic equation is equal to zero then the roots of equation are real and equal.
4	Assertion: $(2x - 1)^2 - 4x^2 + 5 = 0$ is not a quadratic equation. Reason: An equation of the form $ax^2 + bx + c = 0$, $a \neq 0$, where $a, b, c \in \mathbb{R}$ is called a quadratic equation.
5	Assertion: $3x^2 - 6x + 3 = 0$ has equal roots. Reason: The quadratic equation $ax^2 + bx + c = 0$ have equal roots if discriminant $D > 0$.
6	Assertion: $4x^2 - 12x + 9 = 0$ has equal roots. Reason : The quadratic equation $ax^2 + bx^2 + c = 0$ has equal roots if discriminant $D > 0$.
7	Assertion: The product of two successive positive integral multiples of 5 is 300, then the two numbers are 15 and 20. Reason: The product of two consecutive integrals is a multiple of 2.
8	Assertion: Sum of ages of two friends is 20 years. Four years ago, the product of their ages in years was 48. Then the difference between their ages is 16. Reason: For a quadratic equation $ax^2+bx+c=0$, $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$
9	Assertion: If discriminant $D = b^2 - 4ac < 0$ then the roots of quadratic equation $ax^2 + bx + c = 0$ are imaginary. Reason: The roots of the quadratic equation $x^2 + 2x + 2 = 0$ are imaginary
10	Assertion: If one root of the quadratic equation $2x^2 + kx - 6 = 0$ is 2, the value of k is -1 Reason: $x = 2$ is a root of the equation $2x^2 + kx - 6 = 0$

CASE BASED QUESTIONS (4 MARKS)

1	<p>Raj and Ajay are very close friends. Both the families decide to go to Ranikhet by their own cars. Raj's car travels at a speed of x km/h while Ajay's car travels 5 km/h faster than Raj's car. Raj took 4 hours more than Ajay to complete the journey of 400 km.</p> <p>i) What will be the distance covered by Ajay's car in two hours?</p> <p>(a) $2(x + 5)$ km (b) $(x - 5)$ km (c) $2(x + 10)$ km (d) $2(x + 5)$ km</p> <p>ii) Which of the following quadratic equation describe the speed of Raj's car?</p> <p>(a) $x^2 - 5x - 500 = 0$ (b) $x^2 - 4x - 400 = 0$ (c) $x^2 + 5x - 500 = 0$ (d) $x^2 - 4x + 400 = 0$</p> <p>iii) What is the speed of Raj's car?</p> <p>(a) 20 km/hour (b) 15 km/hour (c) 25 km/hour (d) 10 km/hour</p> <p>iv) How much time took Ajay to travel 400 km?</p> <p>(a) 20 hour (b) 40 hour (c) 25 hour (d) 16 hour</p>
2	<p>John and Jivanti are playing with marbles. They mixed up their marbles without knowing, how many marbles they had before mixing. But now they have 45 marbles altogether. While playing they lost 10 marbles. Since they are not knowing the number of marbles they had in the beginning, so they agreed that both of them lost 5 marbles each, and the product of the number of marbles they now have is 124. Now they want to know the number of marbles each one brought to play. Help them.</p>

	<p>(i) If John had 'x' marbles then write the expression for number of marbles Jivanti had.</p> <p>(ii) Represent the above information in the form of a quadratic equation.</p> <p>(iii) Find the no. of marbles with John by solving a quadratic equation.</p> <p>(iv) If α and β are the roots of the equation $x^2 - p(x + 1) - c = 0$, then find the value of $(\alpha + 1)(\beta + 1)$.</p>
3	<p>The speed of a motor boat is 20 km/hr. For covering the distance of 15 km the boat took 1 hour more for upstream than downstream.</p> <p>i) Let speed of the stream be x km/hr. then speed of the motorboat in upstream will be</p> <p>(a) 20 km/hr (b) $(20 + x)$ km/hr (c) $(20 - x)$ km/hr (d) 2 km/hr</p> <p>ii) Which is the correct quadratic equation for the speed of the current ?</p> <p>(a) $x^2 + 30x - 200 = 0$ (b) $x^2 + 20x - 400 = 0$ (c) $x^2 + 30x - 400 = 0$ (d) $x^2 - 20x - 400 = 0$</p> <p>iii) What is the speed of current ?</p> <p>(a) 20 km/hour (b) 10 km/hour (c) 15 km/hour (d) 25 km/hour</p> <p>iv) How much time boat took in downstream?</p> <p>(a) 90 minute (b) 15 minute (c) 30 minute (d) 45 minute</p>

LONG ANSWERS (5 MARKS)

1	A pole has to be erected at a point on the boundary of a circular park of diameter 13 metres 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. Is it possible to do so? If yes, at what distances from the two gates should the pole be erected?
2	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 ` 90, find the number of articles produced and the cost of each article.
3	A train travels a distance of 480 km at a uniform speed. If the speed had been 8 km/h less, then it would have taken 3 hours more to cover the same distance. Find the speed of the train.

(ANSWERS)