

Time : 1 Hour 30 Minute

STD 10 Maths

Total Marks : 50

Chapter Based Test

Section A

* Choose the right answer from the given options. [1 Marks Each] [7]

- $x^2 - 6x + 6 = 0$ have:
(A) Real and Equal roots (B) Real roots (C) Real and Distinct roots (D) No Real roots
- The roots of the quadratic equation $2x^2 - x - 6 = 0$ are:
(A) $-2, \frac{3}{2}$ (B) $2, \frac{-3}{2}$ (C) $-2, \frac{-3}{2}$ (D) $2, \frac{3}{2}$
- $x^2 - 30x + 225 = 0$ have:
(A) No real roots (B) Real and Distinct roots (C) Real and Equal roots (D) Real roots
- If the equation $x^2 - ax + 1 = 0$ has two distinct roots, then:
(A) $|a| = 2$ (B) $|a| < 2$ (C) $|a| > 2$ (D) None of these.
- If $\sin \alpha$ and $\cos \alpha$ are the roots of the equations $ax^2 + bx + c = 0$, then $b^2 =$
(A) $a^2 - 2ac$ (B) $a^2 + 2ac$ (C) $a^2 - ac$ (D) $a^2 + ac$
- In the equation $ax^2 + bx + c = 0$, it is given that $D = (b^2 - 4ac) > 0$. Then, the roots of the equation are:
a. Real and equal.
b. Real and unequal.
c. Imaginary.
d. None of these.
- The roots of the equation $2x^2 - 6x + 3 = 0$ are:
a. Real, unequal and rational.
b. Real, unequal and irrational.
c. Real and equal.
d. Imaginary.

* A statement of Assertion (A) is followed by a statement of Reason (R). [3]

Choose the correct option.

- Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following:

Assertion : The values of x are $-\frac{a}{2}$, a for a quadratic equation $2x^2 + ax - a^2 = 0$.

Reason : For quadratic equation $ax^2 + bx + c = 0$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

- Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
- Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
- Assertion (A) is true but reason (R) is false.
- Assertion (A) is false but reason (R) is true

9. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following:

Assertion: $4x^2 - 12x + 9 = 0$ has repeated roots.

Reason: The quadratic equation $ax^2 + bx + c = 0$ has repeated roots if discriminant $D > 0$.

- Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
- Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
- Assertion (A) is true but reason (R) is false.
- Assertion (A) is false but reason (R) is true

10. **Directions:** In the following questions, the Assertions (A) and Reason(s) (R) have been put forward. Read both the statements carefully and choose the correct alternative from the following:

Assertion : If roots of the equation $x^2 - bx + c = 0$ are two consecutive integers, then $b^2 - 4c = 1$

Reason : If a, b, c are odd integers then the roots of the equation $4abcx^2 + (b^2 - 4ac)x - b = 0$ are real and distinct.

- If both assertion and reason are true and reason is the correct explanation of assertion.
- If both assertion and reason are true but reason is not the correct explanation of assertion.
- If assertion is true but reason is false.
- If both assertion and reason are false.

* **State whether the following sentences are True or False. [1 Marks Each] [2]**

11. Write whether the following statements are true or false. Justify your answers.
Every quadratic equation has at least one real root.

12. Write whether the following statements are true or false. Justify your answers.
Every quadratic equation has at most two roots.

* **Answer the following questions in one sentence. [1 Marks Each] [2]**

13. Check the equation is quadratic equation or not: $(x - 2)(x + 1) = (x - 1)(x + 3)$

14. Check the equation is quadratic equation or not: $(x - 2)^2 + 1 = 2x - 3$

Section B

* Given section consists of questions of 2 marks each.

[10]

1. If $b = 0, c < 0$, is it true that the roots of $x^2 + bx + c = 0$ are numerically equal and opposite in sign? Justify.
2. Determine the nature of the root of the following quadratic equation:
 $2x^2 - 3x + 5 = 0$
3. The following are quadratic equations in x ?
 $x - \frac{6}{x} = 3$
4. Solve: $\sqrt{3}x^2 - 2\sqrt{2}x - 2\sqrt{3} = 0$
5. Find the nature of the roots of the following quadratic equations:
 $x^2 - x + 2 = 0$

Section C

* Given section consists of questions of 3 marks each.

[12]

1. A car moves a distance of 2592km with uniform speed. The number of hours taken for the journey is one-half the number representing the speed, in km/hour. Find the time taken to cover the distance.
2. Solve the following quadratic equations by factorization:
 $3x^2 = -11x - 10$
3. Find the roots of the following equations, if they exist, by applying the quadratic formula:
 $36x^2 - 12ax + (a^2 - b^2) = 0$
4. Find the values of k for which the quadratic equation $(3k + 1)x^2 + 2(k + 1)x + 1 = 0$ has real and equal roots.

Section D

* Given section consists of questions of 5 marks each.

[10]

1. Out of a group of swans, $\frac{7}{2}$ times the square root of the total number are playing on the shore of a pond. The two remaining ones are swimming in water. Find the total number of swans.
2. A pole has to be erected at a point on the boundary of a circular park of diameter 13 meters in such a way that the difference of its distances from two diametrically opposite fixed gates A and B on the boundary is 7 meters. Is it possible to do so? If yes, at what distances from the two gates should the pole be erected?

Section E

* Case study based questions

[4]

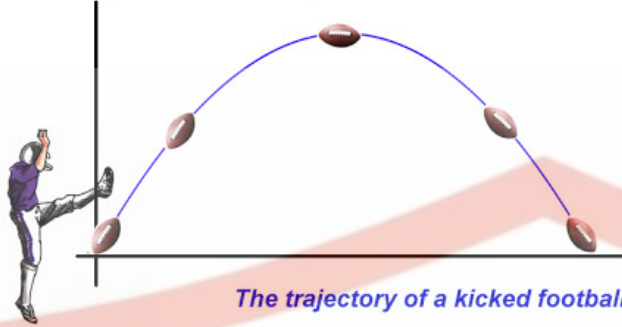
1. **Applications of Parabolas**

Parabola has many applications in our day-to-day life. For example, if an object (projectile) is thrown in space, then the path of the projectile is a parabola. If we know the equation of the path of a projectile by using various properties of parabola, we can

obtain many important results like greatest height attained by the projectile, its horizontal range reached etc.

Parabola: A parabola is the graph that results from $p(x) = ax^2 + bx + c$ they are symmetric about a vertical line known as the axis of symmetry and runs through the maximum or minimum point of the parabola which is called the vertex.

Projectile Motion



- i. Graph of a quadratic polynomial is:
- ii. The number of zeroes that polynomial $p(x) = (x - 2)^2 + 5$ can have is:
- iii. If a parabolic trajectory is represented by $x^2 - 4x + 3$, then its zeroes are:
Or
If one zero of a parabolic trajectory $p(y) = 5y^2 - 14y + k$ is reciprocal of the other, the find the value of k:

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