

MISCELLANEOUS EXERCISE - 1

Q. 1 Multiple Choice Questions

Four possible answers are given for the following questions. Tick (✓) the correct answer.

- An equation, which remains unchanged when x is replaced by $\frac{1}{x}$ is called a/an.....
 (a) Exponential equation
 (b) Reciprocal equation
 (c) Radical equation
 (d) None of these
- The solution set of equation $4x^2 - 16 = 0$ is
 (a) $\{\pm 4\}$ (b) $\{4\}$
 (c) $\{\pm 2\}$ (d) ± 2
- The number of methods to solve a quadratic equation is
 (a) 1 (b) 2
 (c) 3 (d) 4
- An equation of the form $2^{2x} - 3 \cdot 2^x + 5 = 0$ is called a / an ____ equation.
 (a) Exponential (b) Radical
 (c) Reciprocal (d) None of these
- Two linear factors of $x^2 - 15x + 56$ are
 (a) $(x - 7)$ and $(x + 8)$
 (b) $(x + 7)$ and $(x - 8)$
 (c) $(x - 7)$ and $(x - 8)$
 (d) $(x + 7)$ and $(x + 8)$
- Standard form of quadratic equation is ____
 (a) $bx + c = 0, b \neq 0$
 (b) $ax^2 + bx + c = 0, a \neq 0$
 (c) $ax^2 = bx, a \neq 0$
 (d) $ax^2 = 0, a \neq 0$
- The solution set of the equation $x^2 - 9 = 0$ is
 (a) $\{\pm 3\}$ (b) $\{3\}$
 (c) $\{-3\}$ (d) $\{9\}$
- The number of terms in a standard quadratic equation $ax^2 + bx + c = 0$ is ____
 (a) 1 (b) 2
 (c) 3 (d) 4

- The solution set of equation $2 + 9x = 5x^2$ is.....
 (a) $\left\{\frac{-1}{5}, 2\right\}$ (b) $\left\{\frac{+1}{5}, 2\right\}$
 (c) $\left\{\frac{1}{5}, -2\right\}$ (d) $\left\{\frac{-1}{5}, -2\right\}$
- The solution set of equation $x^2 - 16 = 0$ is.....
 (a) $\{\pm 4\}$ (b) $\{+4\}$
 (c) $\{-4\}$ (d) None of these
- The quadratic formula is
 (a) $\frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ (b) $\frac{b \pm \sqrt{b^2 - 4ac}}{2a}$
 (c) $\frac{-b \pm \sqrt{b^2 + 4ac}}{2a}$ (d) $\frac{b \pm \sqrt{b^2 + 4ac}}{2a}$
- An equation of the type $3^x + 3^{2-x} + 6 = 0$ is a/an.....
 (a) Exponential equation
 (b) Reciprocal equation
 (c) Radical equation
 (d) None of these
- If $a = 0$, in $ax^2 + bx + c = 0$, then it reduces to.....
 (a) pure quadratic equation
 (b) linear equation
 (c) quadratic equations
 (d) exponential equation
- How many linear factors a quadratic equation has?
 (a) 1 (b) 2
 (c) 3 (d) 4
- An equation of the form $2x^4 - 3x^3 + 7x^2 - 3x + 2 = 0$ is called a/an
 (a) Reciprocal equation
 (b) Radical equation
 (c) Exponential equation
 (d) None of these
- The solution set of equation $5x^2 = 30x$ is.....
 (a) $\{5, 30\}$ (b) $\{0, 6\}$
 (c) $\{0, -6\}$ (d) $\{5, 0\}$

17. The standard form of the quadratic equation is $ax^2+bx+c=0$ where a, b, c are
- Irrational numbers
 - Rational numbers
 - Real numbers
 - Whole numbers
18. The solution set of $25x^2 - 1 = 0$ is
- $\left\{\pm\frac{1}{5}\right\}$
 - $\left\{-\frac{1}{5}\right\}$
 - $\left\{+\frac{1}{5}\right\}$
 - None of these
19. Cancellation of x on both sides of $5x^2=30x$ means
- the loss of one root
 - no loss of any root
 - gain of one root
 - undefined solution
20. If $2^x=1$, then x =
- 0
 - 1
 - 2
 - $\frac{1}{2}$
21. What should be done to make the co-efficient of x^2 equal to 1 in $3x^2 + 7x = 0$?
- multiply the equation by $\frac{1}{3}$
 - divide the equation by $\frac{1}{3}$
 - add $\frac{1}{3}$ in both sides
 - subtract $\frac{1}{3}$ from both sides
22. Sentences involving the Sign..... between two algebraic expressions are called equations
- <
 - $\geq$
 - =
 - < or >
23. The solution set of equation $x^2-x-2=0$ is.....
- {2, 1}
 - {-2, 1}
 - {2, -1}
 - {-2, -1}
24. An equation of type $x^2+x^2+x^2+x^2+1=0$ is called a/ anequation.
- Radical
 - Reciprocal
 - Exponential
 - None of these
25. Solve the equation $5^{1+x} + 5^{1-x} = 26$
- {1}
 - { ± 1 }
 - {2}
 - { ± 2 }
26. The value of variable of an equation not satisfying the equation is called.
- root
 - extraneous root
 - exponent
 - solution set
27. The number of roots of a quadratic equation is:
- 1
 - 2
 - 3
 - 4
28. The solution set of equation $x^2-7x+6=0$ is.....
- {1, 6}
 - {-1, -6}
 - {-1, 6}
 - {1, -6}
29. What should be done to make the co-efficient of x^2 equal to 1, in $7x^2+2x-1=0$?
- multiply the equation by 7
 - divide the equation by 7
 - add 7 in both sides
 - subtract 7 from both sides
30. If $b=0$ in a quadratic equation $ax^2+bx+c=0$, then it is called.
- Pure quadratic equation
 - Linear equation
 - Quadratic equation
 - Exponential equation
31. What is the degree of quadratic equation?
- 1
 - 2
 - 3
 - 4
32. The cancellation of x on both sides of the equation of the type $ax^2=bx$ means the loss of one root. That root is always equal to.....
- 0
 - 1
 - a
 - b
33. If $y=2^x$ and $8y=1$, then, x =...
- 8
 - $\frac{1}{8}$

(c) 3 (d) -3

34. The solution set of equation $3x^2 + 4x = 5$ is.....

(a) $\left\{ \frac{-2 \pm \sqrt{19}}{3} \right\}$ (b) $\left\{ \frac{2 \pm \sqrt{19}}{3} \right\}$
 (c) $\left\{ \frac{4 \pm \sqrt{19}}{3} \right\}$ (d) None of these

35. If $y = x^{-1}$ and $3y = 5$, the value of x is

(a) $\frac{5}{3}$ (b) $-\frac{5}{3}$
 (c) $-\frac{3}{5}$ (d) $\frac{3}{5}$

ANSWER KEY

1.	b	2.	c	3.	c	4.	a	5.	c
6.	b	7.	a	8.	c	9.	a	10.	a
11.	a	12.	a	13.	b	14.	b	15.	a
16.	b	17.	c	18.	a	19.	a	20.	a
21.	a	22.	c	23.	c	24.	b	25.	b
26.	b	27.	b	28.	a	29.	b	30.	a
31.	b	32.	a	33.	d	34.	a	35.	d

Q.2. Write short answers of the following questions.

(i) Solve $x^2 + 2x - 2 = 0$

Solution: $x^2 + 2x - 2 = 0$

$$ax^2 + bx + c = 0$$

$$\Rightarrow a = 1, b = 2, c = -2$$

We know that

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

$$x = \frac{-2 \pm \sqrt{(2)^2 - 4(1)(-2)}}{2(1)}$$

$$x = \frac{-2 \pm \sqrt{4+8}}{2}$$

$$x = \frac{-2 \pm \sqrt{12}}{2}$$

$$x = \frac{-2 \pm \sqrt{4 \times 3}}{2}$$

$$x = \frac{-2 \pm 2\sqrt{3}}{2}$$

$$x = \frac{2(-1 \pm \sqrt{3})}{2}$$

$$x = -1 \pm \sqrt{3}$$

$$S.S = \{-1 \pm \sqrt{3}\}$$

(ii) Solve by factorization $5x^2 = 15x$

Solution:

$$5x^2 = 15x$$

$$5x^2 - 15x = 0$$

$$5x(x - 3) = 0$$

$$5x(x - 3) = 0$$

$$5x = 0 \quad \text{or} \quad x - 3 = 0$$

$$x = \frac{0}{5} \quad \text{or} \quad x = 3$$

$$x = 0 \quad \text{or} \quad x = 3$$

Solution set is $\{0, 3\}$

(iii) Write in standard form $\frac{1}{x+4} + \frac{1}{x-4} = 3$

Solution: $\frac{1}{x+4} + \frac{1}{x-4} = 3$

$$\frac{(x-4) + (x+4)}{(x+4)(x-4)} = 3$$

$$\frac{x - \cancel{4} + x + \cancel{4}}{(x)^2 - (4)^2} = 3$$

$$\frac{2x}{x^2 - 16} = 3$$

$$2x = 3(x^2 - 16)$$

$$2x = 3x^2 - 48$$

$$0 = 3x^2 - 2x - 48$$

$$3x^2 - 2x - 48 = 0$$

(iv) Write the name of methods for solving a quadratic equation.

Ans. Following three methods are used for solving the quadratic equation.

(i) Factorization method

(ii) Completing square method

(iii) Quadratic formula method

(v) Solve $\left(2x - \frac{1}{2}\right)^2 = \frac{9}{4}$

Solution:

$$\left(2x - \frac{1}{2}\right)^2 = \frac{9}{4}$$

Taking square root

$$\sqrt{\left(2x - \frac{1}{2}\right)^2} = \pm \sqrt{\frac{9}{4}}$$

$$2x - \frac{1}{2} = \pm \frac{3}{2}$$

$$2x = \pm \frac{3}{2} + \frac{1}{2}$$

$$2x = \frac{\pm 3 + 1}{2}$$

$$x = \frac{\pm 3 + 1}{2 \times 2}$$

$$x = \frac{\pm 3 + 1}{4}$$

$$\Rightarrow x = \frac{3+1}{4} \quad \text{or} \quad x = \frac{-3+1}{4}$$

$$x = \frac{4}{4} \quad \text{or} \quad x = \frac{-2}{4}$$

$$x = 1 \quad \text{or} \quad x = \frac{-1}{2}$$

The Solution set is $\left\{1, \frac{-1}{2}\right\}$

(vi) Solve $\sqrt{3x+18} = x$

Solution:

$$\sqrt{3x+18} = x \dots\dots\dots(i)$$

Taking square of both sides

$$(\sqrt{3x+18})^2 = (x)^2$$

$$3x + 18 = x^2$$

$$\Rightarrow x^2 - 3x - 18 = 0$$

$$x^2 - 6x + 3x - 18 = 0$$

$$x(x-6) + 3(x-6) = 0$$

$$(x-6)(x+3) = 0$$

$$x-6 = 0 \quad \text{or} \quad x+3 = 0$$

$$x = 6 \quad \text{or} \quad x = -3$$

Checking

Put $x = 6$ in equation (i)

$$\sqrt{3x+18} = x$$

$$\sqrt{3(6)+18} = 6$$

$$\sqrt{18+18} = 6$$

$$\sqrt{36} = 6$$

$$6 = 6 \quad \text{which is true}$$

Put $x = -3$ in given equation

$$\sqrt{3x+18} = x$$

$$\sqrt{3(-3)+18} = -3$$

$$\sqrt{-9+18} = -3$$

$$\sqrt{9} = -3$$

$$3 = -3 \quad \text{which is not true}$$

As -3 is an extraneous root

So, the solution set is $\{6\}$

(vii) Define quadratic equation

Quadratic Equation

An equation which contains the square of the unknown (variable) quantity, but no higher power, is called a quadratic equation. Standard form of quadratic equation in one variable is $ax^2 + bx + c = 0$, where $a, b, c \in \mathbb{R}$ and $a \neq 0$.

(viii) Define reciprocal equation

Reciprocal Equation

An equation is said to be a reciprocal equation, if it remains unchanged, when x is replaced by $\frac{1}{x}$.

Example

(i) $ax^4 + bx^3 + cx^2 + bx + a = 0$ OR

(ii) $a\left(x^2 + \frac{1}{x^2}\right) + b\left(x + \frac{1}{x}\right) + c = 0$

(ix) Define exponential equation:

Exponential Equation:

An equation in which variable occurs in exponent is called exponential equation.

Example: $2^x - 8 = 0$

(x) Define radical equation

Radical Equation

An equation involving expression of variable under the radical sign is called radical equation.

Examples: (i) $\sqrt{x+3} = 1$
(ii) $\sqrt{x-1} = \sqrt{x-2}$

Q.3 Fill in the blanks:

- i. The standard form of the quadratic equation is_____.
- ii. The number of methods to solve a quadratic equation are.....
- iii. The name of the method to derive a quadratic formula is
- iv. The solution of the equation $ax^2+bx+c=0$, $a \neq 0$ _____.
- v. The solution set of $25x^2-1=0$ is_____.
- vi. An equation of the form $2^{2x}-3 \cdot 2^x+5=0$ is called a/an _____equation.
- vii. The solution set of the equation $x^2-9=0$ is_____.
- viii. An equation of the type $x^4+x^3+x^2+x+1=0$ is called an_____ equation.
- ix. A root of an equation, which do not satisfy the equation is called _____root.
- x. An equation involving expression of the variable under_____ is called radical equation.

Answers:

- i. $ax^2 + bx + c = 0$, $a \neq 0$
- ii. Three
- iii. Completing square
- iv. $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
- v. $\left\{ \pm \frac{1}{5} \right\}$
- vi. Exponential
- vii. $\{ \pm 3 \}$
- viii. Reciprocal
- ix. Extraneous
- x. Radical Sign