MISCELLANEOUS EXERCISE – 1

Q. 1 Multiple Choice Questions

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

1. 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

2. The solution set of equation $4x^2-16=0$ is
   (a) $\{\pm 4\}$ (b) $\{4\}$
   (c) $\{\pm 2\}$ (d) ± 2

3. The number of methods to solve a quadratic equation is
   (a) 1 (b) 2
   (c) 3 (d) 4

4. An equation of the form $2^{2x}-3.2^x+5=0$ is called a / an ___ equation.
   (a) Exponential (b) Radical
   (c) Reciprocal (d) None of these

5. 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 $(x+8)$

6. 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) $ax^2=0,\ a\neq 0$

7. The solution set of the equation $x^2-9=0$ is
   (a) $\{\pm 3\}$ (b) $\{3\}$
   (c) $\{-3\}$ (d) $\{9\}$

8. The number of terms in a standard quadratic equation $ax^2+bx+c=0$ is ___
   (a) 1 (b) 2
   (c) 3 (d) 4

9. 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) $\left\{\frac{-1}{5},-2\right\}$

10. The solution set of equation $x^2-16=0$ is……..
    (a) $\{\pm 4\}$ (b) $\{+4\}$
    (c) $\{-4\}$ (d) None of these

11. 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) $\frac{b\pm\sqrt{b^2+4ac}}{2a}$

12. 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

13. 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

14. How many linear factors a quadratic equation has?
    (a) 1 (b) 2
    (c) 3 (d) 4

15. 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

16. 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 .....**
(a) Irrational numbers
(b) Rational numbers
(c) Real numbers
(d) Whole numbers

18. **The solution set of $25x^2-1=0$ is**
(a) $\left\{\pm\frac{1}{5}\right\}$ (b) $\left\{-\frac{1}{5}\right\}$
(c) $\left\{+\frac{1}{5}\right\}$ (d) None of these

19. **Cancellation of x on both sides of $5x^2=30x$ means**
(a) the loss of one root
(b) no loss of any root
(c) gain of one root
(d) undefined solution

20. **If $2^x=1$, then x = ...**
(a) 0 (b) 1
(c) 2 (d) $\frac{1}{2}$

21. **What should be done to make the co-efficient of x^2 equal to 1 in $3x^2+7x=0$?**
(a) multiply the equation by $\frac{1}{3}$
(b) divide the equation by $\frac{1}{3}$
(c) add $\frac{1}{3}$ in both sides
(d) subtract $\frac{1}{3}$ from both sides

22. **Sentences involving the Sign..... between two algebraic expressions are called equations**
(a) $<$ (b) $\geq$
(c) $=$ (d) $<$ or $>$

23. **The solution set of equation $x^2-x-2=0$ is.....**
(a) $\{2, 1\}$ (b) $\{-2, 1\}$
(c) $\{2, -1\}$ (d) $\{-2, -1\}$

24. **An equation of type $x^4+x^3+x^2+x+1=0$ is called a/ an .....equation.**
(a) Radical (b) Reciprocal
(c) Exponential (d) None of these

25. **Solve the equation $5^{1+x}+5^{1-x}=26$**
(a) $\{1\}$ (b) $\{\pm1\}$
(c) $\{2\}$ (d) $\{\pm2\}$

26. **The value of variable of an equation not satisfying the equation is called.**
(a) root (b) extraneous root
(c) exponent (d) solution set

27. **The number of roots of a quadratic equation is:**
(a) 1 (b) 2
(c) 3 (d) 4

28. **The solution set of equation $x^2-7x+6=0$ is.....**
(a) $\{1, 6\}$ (b) $\{-1, -6\}$
(c) $\{-1, 6\}$ (d) $\{1, -6\}$

29. **What should be done to make the co-efficient of x^2 equal to 1, in $7x^2+2x-1=0$?**
(a) multiply the equation by 7
(b) divide the equation by 7
(c) add 7 in both sides
(d) subtract 7 from both sides

30. **If b=0 in a quadratic equation $ax^2+bx+c=0$, then it is called.**
(a) Pure quadratic equation
(b) Linear equation
(c) Quadratic equation
(d) Exponential equation

31. **What is the degree of quadratic equation?**
(a) 1 (b) 2
(c) 3 (d) 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.....**
(a) 0 (b) 1
(c) a (d) b

33. **If $y=2^x$ and $8y=1$, then, x =...**
(a) 8 (b) $\frac{1}{8}$

(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

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

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

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

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

$$x=\frac{-2\pm\sqrt{4\times3}}{2}$$

$$x=\frac{-2\pm2\sqrt{3}}{2}$$

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

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

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

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

Solution:

$5x^2 = 15x$

$5x^2 - 15x = 0$

$5x(x - 3) = 0$

$5x(x - 3) = 0$

$5x = 0$ or $x - 3 = 0$

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

$x = 0$ or $x = 3$

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

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

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

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

$$2x=\frac{\pm3+1}{2}$$

$$x=\frac{\pm3+1}{2\times2}$$

$$x=\frac{\pm3+1}{4}$$

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

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

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

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

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

Solution:

$$\sqrt{3x+18}=x \quad \text{.....(i)}$$

Taking square of both sides

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

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

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

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

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

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

$x-6=0$ or $x+3=0$

$x=6$ or $x=-3$

Checking

Put x = 6 in equation (i)

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

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

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

$$\sqrt{36}=6$$

$6=6$ which is true

Put $x=-3$ in given equation

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

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

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

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

$3=-3$ 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 $a, b, c \in R$ 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 $2^{2x}-3.2^x+5=0$ 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. $ax^2 + bx + c = 0, \quad a \neq 0$

ii. Three

iii. Completing square

iv. $x=\dfrac{-b\pm\sqrt{b^2-4ac}}{2a}$

v. $\left\{\pm\dfrac{1}{5}\right\}$

vi. Exponential

vii. $\{\pm 3\}$

viii. Reciprocal

ix. Extraneous

x. Radical Sign