



Mathematics-9
Miscellaneous Exercise-1

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Q.1 Multiple Choice Questions

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

- (i) Standard form of quadratic equation is; **(K.B)**
(GRW 2014, 16, MTN 2017, SGD 2015, 17, FSD 2018, RWP 2015)
- (a) $bx + c = 0, b \neq 0$ (b) $ax^2 + bx + c = 0, a \neq 0$
(c) $ax^2 = bx, a \neq 0$ (d) $ax^2 = 0, a \neq 0$
- (ii) The number of terms in a standard quadratic equation $ax^2 + bx + c = 0$ is; **(K.B)**
(LHR 2015, BWP 2015, MTN 2015)
- (a) 1 (b) 2
(c) 3 (d) 4
- (iii) The number of methods to solve a quadratic equation is; **(K.B)**
(GRW 2017, FSD 2014, 17, SWL 2015, 16, RWP 2016, 17, D.G.K 2014, 15, 17)
- (a) 1 (b) 2
(c) 3 (d) 4
- (iv) The quadratic formula is; (FSD 2015, D.G.K 2014, SWL 2014, 17) **(A.B)**
- (a) $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ (b) $x = \frac{b \pm \sqrt{b^2 - 4ac}}{2a}$
(c) $x = \frac{-b \pm \sqrt{b^2 + 4ac}}{2a}$ (d) $x = \frac{b \pm \sqrt{b^2 + 4ac}}{2a}$
- (v) Two linear factors of $x^2 - 15x + 56$ are; **(A.B + U.B)**
(LHR 2014, FSD 2016, RWP 2017, D.G.K 2016)
- (a) $(x - 7)$ and $(x + 8)$ (b) $(x + 7)$ and $(x - 8)$
(c) $(x - 7)$ and $(x - 8)$ (d) $(x + 7)$ and $(x + 8)$
- (vi) An equation, which remains unchanged when x is replaced by $\frac{1}{x}$ is called a/an; **(K.B)**
- (a) Exponential equation (b) Reciprocal equation
(c) Radical equation (d) None of these
- (vii) An equation of the type $3^x + 3^{2-x} + 6 = 0$ is a/an; **(K.B)**
(GRW 2016, SGD 2014, 16, D.G.K 2015, 17)
- (a) Exponential equation (b) Radical equation
(c) Reciprocal equation (d) None of these
- (viii) The solution set of equation $4x^2 - 16 = 0$ is; **(K.B + U.B + A.P)**
- (a) $\{\pm 4\}$ (b) $\{4\}$
(c) $\{\pm 2\}$ (d) ± 2
- (ix) The equation of the form $2x^4 - 3x^3 + 7x^2 - 3x + 2 = 0$ is called a/an; **(A.B+K.B+U.B)**
- (a) Reciprocal equation (b) Radical equation
(c) Exponential equation (d) None of these

ANSWER KEY

i.	ii.	iii.	iv.	v.	vi.	vii.	viii.	ix.
b	c	c	a	c	b	a	c	a



Unit-1

Quadratic Equations

Q.2 Write short answers of the following questions. (A.B)

- (i) Solve $x^2 + 2x - 2 = 0$
(LHR 2017, SWL 2017, SGD 2014, 17, RWP 2015)

Solution:

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

$$x^2 + 2x = 2$$

Adding $(1)^2$ on both sides

$$x^2 + 2x + (1)^2 = 2 + (1)^2$$

$$(x+1)^2 = 2+1$$

$$(x+1)^2 = 3$$

Taking sq. root on both sides

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

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

$$\therefore \text{Solution Set} = \{-1 \pm \sqrt{3}\}$$

- (ii) Solve by factorization $5x^2 = 15x$
(LHR 2015, 16, GRW 2014, 16, 17, SWL 2016, 17, BWP 2014, 16, D.G.K 2017)

(A.B)

Solution:

$$5x^2 = 15x$$

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

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

Either

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

$$x = 0 \quad \quad x = 3$$

$$\therefore \text{Solution Set} = \{0, 3\}$$

- (iii) Write in standard form

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

(FSD 2017, SWL 2016, SGD 2015, BWP 2015, MTN 2014, D.G.K 2014) **(A.B)**

Solution:

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

Multiply both sides by

$$(x+4)(x-4),$$

we get

$$x-4 + x+4 = 3(x+4)(x-4)$$

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

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

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

Which is in standard form of quadratic equation.

- (iv) Write the name of the methods for solving a quadratic equation. **(A.B)**

Solution:

Following are the three methods:

- Factorization
- Completing square
- Quadratic Formula

- (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 on both sides

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

Unit-1

Quadratic Equations

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

Either

$$2x - \frac{1}{2} = \frac{3}{2} \quad \text{or} \quad 2x - \frac{1}{2} = -\frac{3}{2}$$

$$2x = \frac{3}{2} + \frac{1}{2}, \quad 2x = -\frac{3}{2} + \frac{1}{2}$$

$$2x = \frac{3+1}{2}, \quad 2x = \frac{-3+1}{2}$$

$$2x = \frac{4}{2}, \quad 2x = \frac{-2}{2}$$

$$2x = 2, \quad 2x = -1$$

$$x = \frac{2}{2}, \quad x = -\frac{1}{2}$$

$$x = 1$$

$$\therefore \text{Solution Set} = \left\{ -\frac{1}{2}, 1 \right\}$$

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

Solution:

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

Squaring both sides

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

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

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

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

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

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

Either

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

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

Verification

When $x=6$

When $x=-3$

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

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

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

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

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

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

$$\sqrt{36} = 6$$

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

$$6 = 6 \text{ (True)}$$

$$3 = -3 \text{ (False)}$$

$$\therefore \text{Solution Set} = \{6\}$$

Extraneous root = -3

(vii) Define quadratic equation.

Answer: "A polynomial equation, which contains the square of the unknown (variable) quantity, but no higher power, is called a quadratic equation, or an equation of degree two is called quadratic equation".

i.e., $ax^2 + bx + c = 0$

(viii) Define reciprocal equation.

Answer: An equation, which remains unchanged when 'x' is replaced by $\frac{1}{x}$ is

called reciprocal equation

$$ax^4 + bx^3 + cx^2 + bx + a = 0$$

Unit-1

Quadratic Equations

(ix) Define exponential equation. **(U.B)**

Answer: An equation, in which a variable or an algebraic expression occurs in exponent, is called exponential equation.

e.g. $2^x + 64 \cdot 2^{-x} - 20 = 0$

(x) Define radical equation. **(U.B)**

Answer: An equation in which a variable or an algebraic expression occurs under radical sign is called radical equation.

e.g. $\sqrt{ax+b} = cx+d$, $2\sqrt{x} - 3 = 0$



Unit-1

Quadratic Equations

Q.3 Fill in the blanks

- (i) The standard form of the quadratic equation is _____. **(K.B)**
- (ii) The number of methods to solve a quadratic equation are _____. **(K.B)**
- (iii) The name of the method to derive a quadratic formula is _____. **(K.B)**
- (iv) The solution of the equation $ax^2 + bx + c = 0$, $a \neq 0$ is _____. **(K.B + A.B)**
- (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. **(U.B)**
(GRW 2014, 17, SGD 2016, 14, BWP 2016)
- (vii) The solution set of the equation $x^2 - 9 = 0$ is _____. **(U.B)**
- (viii) An equation of the type $x^4 + x^3 + x^2 + x + 1 = 0$ called a/ an _____ equation. **(U.B)**
- (ix) A root of an equation, which do not satisfy the equation is called _____ root. **(U.B)**
- (x) An equation involving impression of the variable under _____ is called radical equation. **(U.B)**

ANSWER KEY

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