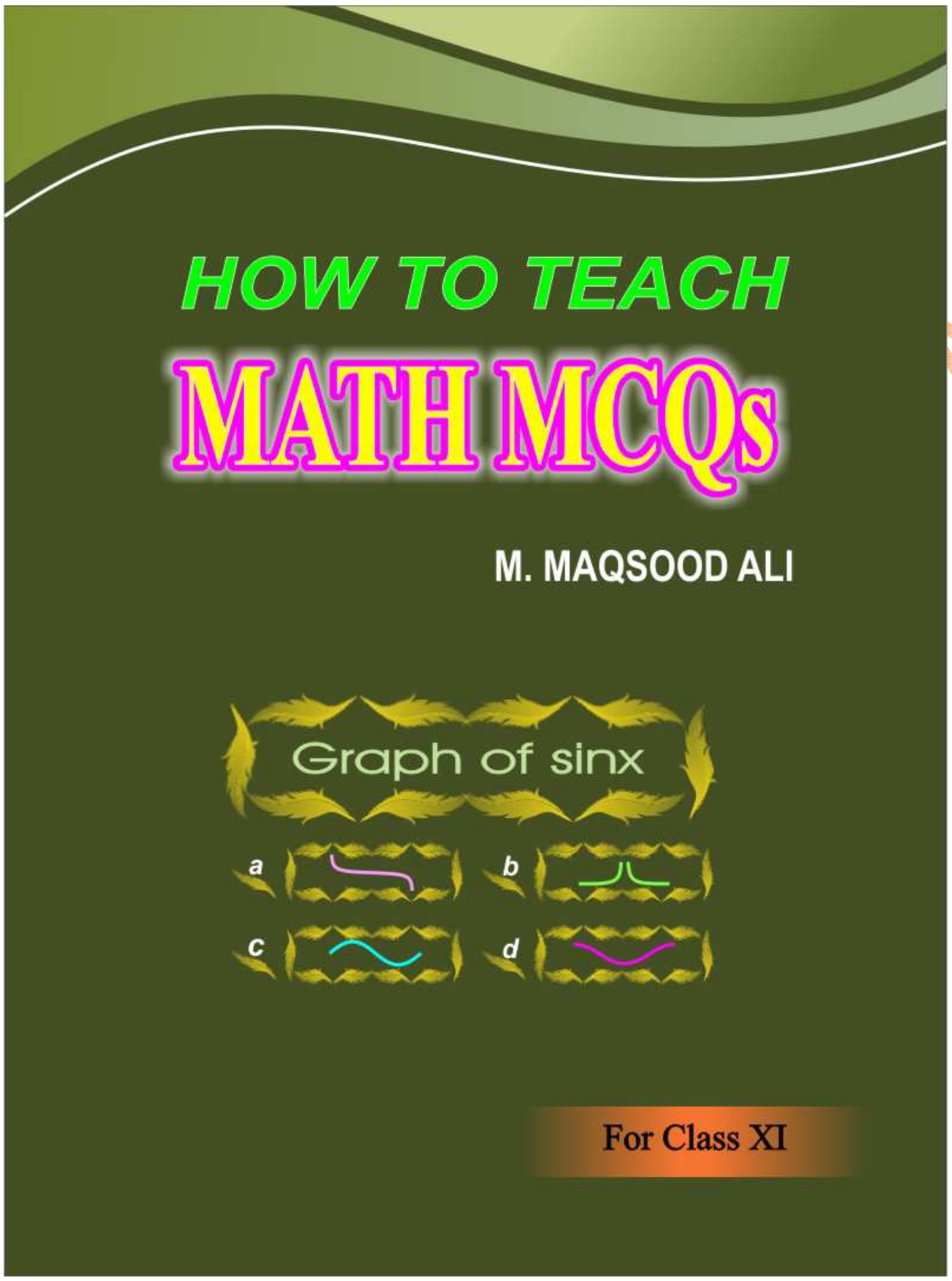
HOW TO TEACH
MATH MCQs
M. MAQSOOD ALI
Graph of sinx
a
b
c
d
For Class XI

Chapter 3

QUADRATIC AND CUBIC EQUATIONS

ROOTS OF A QUADRATIC EQUATION

The value of x in a quadratic equation $ax^2 + bx + c = 0$ is called the roots of the equation.

Case-1: Coefficient of x^2 is 1:

MCQ- 1:

What are the roots of the equation $x^2 + 5x - 14 = 0$?

(a) $5, -1$ (b) $14, -1$ (c) $-7, 2$ (d) $2, -7$

Solution:

Long Method:

$$x^2 + 5x - 14 = 0$$
$$x^2 + 7x - 2x - 14 = 0$$
$$x(x + 7) - 2(x + 7) = 0$$
$$(x - 2)(x + 7) = 0$$

Either, $x - 2 = 0$ *or* $x + 7 = 0$

$x = 2$, $x = -7$

The answer is (d).

Shortcut:

$$x^2 + 5x - 14 = 0$$

Break middle term $5x$

$$7, -2$$

Change the signs and get the roots

$$x = -7, 2$$

The answer is (d).

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Case-2: Coefficient of x^2 is not equal to1:

MCQ-2:

What are the roots of the equation $4x^2 - 13x + 10 = 0$?

(a) $5\,,\,{}^{3}/_{2}$ (b) $2\,,\,{}^{5}/_{4}$ (c) $2\,,-4$ (d) ${}^{1}/_{2}\,,{}^{7}/_{4}$

Solution:

Long Method:

$$4x^2 - 13x + 10 = 0$$
$$4x^2 - 8x - 5x + 10 = 0$$
$$4x(x - 2) - 5(x - 2) = 0$$
$$(x - 2)(4x - 5) = 0$$

Either $x - 2 = 0$ *or* $4x - 5 = 0$

$$x = 2 \quad , \quad x = {}^{5}/_{4}$$

The answer is (b).

Shortcut:

$$4x^2 - 13x + 10 = 0$$

Break middle term $-13x$

$$-8\,,-5$$

Change the sign and dividing by the coefficient of x^2 (i.e. 4) to get the roots

$$x = 8/4 \quad , \quad x = 5/4$$
$$x = 2 \quad , \quad x = 5/4$$

The answer is (b).

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FACTOR OF A QUADRATIC EXPRESSION

MCQ-3:

What are the factors of the expression $x^2 + 5x - 14$?

(a) $(x-2)(x+7)$ (b) $(x-3)(x+6)$

(c) $(x-6)(x+8)$ (d) $(x-1)(x+6)$

Solution:

$$x^2 + 5x - 14 = 0$$

Break middle term $5x$

$7\ , -2$

Change the signs and get the roots

$x = -7, 2$

Subtract both the roots from x and multiply them

$(x-2)(x-(-7)$

$(x-2)(x+7)$

are the factors.

The answer is (a).

MCQ-3:

What are the factors of the expression $4x^2 - 13x + 10 = 0$?

(a) $(x-2)\,(4x-5)$ (b) $(x-1)\,(2x-4)$

(c) $(4x-3)\,(x-6)$ (d) $(x-2)\,(4x-5)$

Solution:

The roots of the equation $4x^2 - 13x + 10 = 0$ are

$x = 2$ and $x = 5/4$ (see example 2)

2 , 5/4

Subtract both roots from x and multiply them

$(x-2)(x-5/4)$

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Multiply second factor by 4

$$(x - 2)(4x - 5)$$

The answer is (a).

COMPLETING THE SQUARE

Formulae:

(i) $a^2 + 2ab + b^2 = (a + b)^2$

(ii) $a^2 - 2ab + b^2 = (a - b)^2$

Lecture:

Fill in the blanks.

$$b^2 + 2ab + \_\_\_\_\_ = (b + a)^2$$

$$b^2 + 2ab + \left(\frac{2a}{2}\right)^2 = (b + a)^2$$

$$b^2 + 2ab + a^2 = (b + a)^2$$

Example: Fill in the blanks $x^2 + 10x + \_\_\_\_\_ = (\_\_\_ + \_\_\_\_)^2$?

Solution:

$$x^2 + 10x + \_\_\_\_\_ = (\_\_\_\_ + \_\_\_\_)^2$$

$$x^2 + 10x + \left(\frac{10}{2}\right)^2 = (x + \tfrac{10}{2})^2$$

$$x^2 + 10x + 5^2 = (x + 5)^2$$

EXERCISE-3.1

(1) What are the roots of the equation $x^2 - 8x - 20 = 0$?

(a) $4, -5$ (b) $4, 5$ (c) $-2, 10$ (d) $-2, -6$

(2) What are the roots of the equation $3x^2 - 10x + 8 = 0$?

(a) $-1, 1/3$ (b) $12, 2$ (c) $-2, -2/3$ (d) $2,\ 4/3$

(3) What are the factors of the equation $2x^2 + 5x - 18 = 0$?

(a) $(x - 3)(2x + 9)$ (b) $(x - 2)(2x + 9)$

(c) $(x - 2)(2x + 1)$ (d) $(2x + 1)(x - 9)$

(4) $x^2 - 6x + 9 = (x - \underline{\ ?\ })^2$

(a) 3 (b) 2 (c) 6 (d) 9

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(5) $x^2 + 16x - 12 = (x + \underline{\ ?\ })^2 - 76$

(a) 12 (b) 64 (c) 16 (d) 8

(6) $x^2 - 8x - 16 = (x - 4)^2 - \underline{\ ?\ }$

(a) 0 (b) 32 (c) 20 (d) 12

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SOLUTIONS OF EQUATION

MCQ-4:

$x =?$, if $\sqrt{x+1} - \sqrt{x+13} = -2$

(a) 0 (b) 1 (c) 2 (d) 3

Solution:

Do not solve the equation.

Put the value of x, from given four options one by one.

Option (d): For $x = 3$

$$\sqrt{3+1} - \sqrt{3+13}$$
$$= \sqrt{4} - \sqrt{16}$$
$$= 2 - 4$$
$$= -2$$

The answer is (d).

MCQ-5:

$x =?$, if $64^{2x} = 2$

(a) $1/6$ (b) $1/12$ (c) $1/2$ (d) 6

Solution:

$$64^{2x} = 2$$

On R.H.S: base= 2

On L.H.S: base= 64

Convert 64 into base 2.

$64 = 2^6$

$$(2^6)^{2x} = 2$$
$$2^{12x} = 2^1$$
$$12x = 1$$

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$$x = {}^{1}/_{12}$$

The answer is (b).

EXERCISE-3.2

(1) $x =?$, if $2^{2x+1} + 4^x = 48$.

(a) 0 (b) 1 (c) 2 (d) 3

(2) $x =?$, if $\sqrt{2x+14} + \sqrt{x+24} = 9$.

(a) 0 (b) 1 (c) 2 (d) 3

(3) $5^{2x+1} = 1, then\ x =?$

(a) $5^{-\frac{1}{2}}$ (b) $-\frac{1}{2}$ (c) $-\frac{1}{2}$ (d) 0

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NATURE OF THE ROOTS

Lecture:

The nature of roots of a quadratic equation

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

depend on discriminant

$$D = b^2 - 4ac$$

which is a part of quadratic formula

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

The nature of the roots

(i) $D = 0$, the roots are real and equal.

(ii) $D > 0$, the roots are real and distinct (unequal).

(iii) $D < 0$, the roots are complex and distinct (unequal).

(iv) D is perfect square , the roots are rational and distinct,
otherwise irrational and distinct.

Roots are equal if D = 0:

MCQ-6:

What is the nature of the roots of $3x^2 - 6x + 3 = 0$?

(a) real and equal (b) real and unequal

(c) complex and unequal (d) irrational and unequal

Solution:

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

$$a = 3 \quad b = -6 \quad c = 3$$

$$D = b^2 - 4ac$$

$$D = (-6)^2 - 4(3)(3)$$

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$$D = 36 - 36$$
$$= 0$$

The answer is (a).

MCQ-7:

What is the value of m if the roots of the equation $5x^2 - 2mx + 6 = 0$ are equal?

(a) $m < \pm\sqrt{30}$ (b) $m > \pm\sqrt{30}$ (c) $m = \pm\sqrt{30}$ (d) None

Solution:

$$5x^2 - 2mx + 6 = 0$$

$$a = 5 \ , \ b = -2m \ , \ c = 6$$

$$b^2 - 4ac = 0$$

$$(-2m)^2 - 4.5.6 = 0$$
$$4m^2 - 120 = 0$$
$$m^2 = 30$$
$$m = \pm\sqrt{30}$$

The answer is (c).

Roots are real and Distinct if D > 0:

MCQ-8:

What is the nature of the roots of $5x^2 - 7x + 1 = 0$?

(a) real and equal (b) rational and unequal

(c) complex and unequal (d) irrational

Solution:

$$5x^2 - 7x + 1 = 0$$

$$a = 5 \quad b = -7 \quad c = 1$$

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MCQ-9:

What is the value of m if the roots of the equation $4x^2 - 6x + 3m = 0$ are real and unequal?

(a) $m > 2/3$ (b) $m < 1/4$ (c) $m < 2/3$ (d) $m < {}^{3}/_{4}$

Solution:

$$4x^2 - 6x + 3m = 0$$

$$a = 4 \quad , \quad b = -6 \quad , \quad c = 3m$$

$$D > 0$$
$$b^2 - 4ac > 0$$
$$(-6)^2 - 4\,(4)\,(3m) > 0$$
$$36 - 48m > 0$$
$$3 - 4m > 0$$
$$-4m > -3$$
$$4m < 3$$
$$m < {}^{3}/_{4}$$

The answer is (d).

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Roots are complex and unequal if D<0:

MCQ-10:

What is the nature of the roots of the equation $5x^2 - 8x + 4 = 0$?

(a) real and equal (b) rational and unequal

(c) irrational and unequal (d) complex and unequal

Solution:

$$5x^2 - 8x + 4 = 0$$

$$a = 5,\ b = -8,\quad c = 4$$

$$D = b^2 - 4ac$$

$$\begin{aligned} D &= (-8)^2 - 4(5)(4) \\ &= 64 - 80 \\ &= -16 < 0 \end{aligned}$$

The answer is (d).

MCQ-11: What is the value of m if the nature of the roots of the equation $4x^2 - 2mx + 9 = 0$ are complex and distinct?

(a) $m < -6, m > 6$ (b) $m > 6$

(c) $m < \pm 6$ (d) $-6 < m < 6$

Solution:

$$4x^2 - 2mx + 9 = 0$$

$$a = 4,\ b = -2m,\ c = 4$$

$$b^2 - 4ac < 0$$

$$\begin{aligned} (-2m)^2 - 4(4)(9) &< 0 \\ 4m^2 - 144 &< 0 \\ m^2 - 36 &< 0 \end{aligned}$$

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$$m^2 < 36$$

$$-6 < m < 6 \quad \{ \because m^2 = 36 \Rightarrow m = \pm 6$$

The answer is (d).

Roots are rational and distinct if d is perfect square:

MCQ-12:

What is the nature of the roots of the equation $3x^2 - 8x + 4 = 0$?

(a) real and equal (b) rational and unequal

(c) irrational and unequal (d) complex and unequal

Solution:

$$3x^2 - 8x + 4 = 0$$

$$a = 3, \quad b = -8, \quad c = 4$$

$$D = b^2 - 4ac$$

$$= (8)^2 - 4(3)(4) = 64 - 48 = 16 = 4^2$$

16 is a perfect square of 4.

The answer is (b).

Lecture:

If D > 0 , the roots are rational or irrational:

If D > 0 , the roots are real and distinct (unequal).

Since

$\mathbb{R} = \mathbb{Q} \cup \mathbb{Q}'$

$\mathbb{Q}$: set of rational numbers

$\mathbb{Q}'$: set of irrational numbers

so that if D >0

There are two cases.

Case-1: D is perfect square , the roots are rational and distinct.

Case-2: D is not perfect square, the roots are irrational and distinct.

EXERCISE-3.3

(1) What is the nature of the roots of the equation $x^2 - 5x + 6 = 0$?

(a) irrational (b) real equal (c) not real (d) rational

(2) Let D be the discriminant of the quadratic equation

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

The roots of the equation are real if

(a) D = 0 (b) D≥ 0 (c) $D < 0$ (d) None

(3) The roots of a quadratic equation are not real if

(a) D = 0 (b) D < 0 (c) D ≥ 0 (d) $D > 0$

(4) The roots of a quadratic equation are real and distinct if

(a) D > 0 (b) D < 0 (c) D = 0 (d) None

(5) What are the nature of the roots of the equation $4x^2 - 12x + 9 = 0$?

(a) equal (b) real distinct (c) complex (d) rational

(6) What are the nature of the roots of the equation $x^2 + 2x - 3 = 0$?

(a) equal (b) real distinct (c) complex (d) rational

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SUM AND PRODUCT OF THE ROOTS

$$\text{Sum of the roots} = -\,{}^{b}/_{a}$$

$$\text{Product of the roots} = \frac{c}{a}$$

MCQ-13:

What are the sum and product of the roots of the equation $5x^2 - 8x + 9 = 0$?

(a) $\frac{5}{8}, \frac{9}{8}$ (b) $\frac{8}{5}, \frac{9}{5}$ (c) $\frac{5}{9}, \frac{8}{9}$ (d) $\frac{-5}{8}, \frac{1}{8}$

Solution:

$$5x^2 - 8x + 9 = 0$$

$$a = 5 \ , \ b = -8 \ , \ c = 9$$

$$sum\ of\ the\ roots = -\,{}^{b}/_{a}$$

$$\text{sum of the roots} = -\frac{(-8)}{5}$$

$$= \frac{8}{5}$$

$$\text{Product of the roots} = \frac{c}{a}$$

$$= \frac{9}{5}$$

The answer is (b).

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Lecture:

Explanations:

Sum of the roots and product of the roots without using formulae:

Firstly, find the roots of the equation

$$x^2 - 5x + 6 = 0$$

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

$$x(x-2) - 3(x-2) = 0$$

$$(x-2)(x-3) = 0$$

Either $x - 2 = 0$ *or* $x - 3 = 0$

$x = 2$, $x = 3$

2, 3 are the roots.

Now,

Sum of the roots $= 2 + 3 = 5$

Products of the roots $= 2 \times 3 = 6$

Using formula:

$$x^2 - 5x + 6 = 0$$

$a = 1, \quad b = -5, \quad c = 6$

Sum of the roots $= \frac{-b}{a} = \frac{-(-5)}{1} = 5$

product of the roots $= \frac{c}{a} = \frac{6}{1} = 6$

MCQ-14:

What is the value of m if the sum of the roots of the equation $5x^2 - (m+6)x + 9 = 0$ is 8?

(a) 34 (b) 28 (c) 14 (d) 6

Solution:

$$5x^2 - (m+6)x + 9 = 0$$

$a = 5, \quad b = -(m+6), \quad c = 9$

sum of the roots $= 8$

$$\frac{-b}{a} = 8$$

$$\frac{-\{-(m+6)\}}{5} = 8$$

$$m + 6 = 40$$

$$m = 34$$

The answer is (a).

MCQ-15:

$kx^2 - 5x + 6 = 0$, what is the value of k if the product of the roots is 18?

(a) 3 (b) $^1/_3$ (c) -3 (d) $^{-1}/_3$

Solution:

$$kx^2 - 5x + 6 = 0$$

$a = k$, $b = -5$, $c = 6$

Product of the roots $= 18$

$$\frac{c}{a} = 18$$

$$\frac{6}{k} = 18$$

$$k = 6/18$$

$$k = 1/3$$

The answer is (b).

MCQ-16:

What is the equation whose roots are additive inverse of the roots 5 and 8 of an equation?

(a) $x^2 + 8x + 5 = 0$ (b) $x^2 + 3x + 13 = 0$

(c) $x^2 + 2x + 8 = 0$ (d) $x^2 + 13x + 40 = 0$

Solution:

Additive inverse of 5 and 8 are -5 and -8

Sum of the roots $= (-5) + (-8)$

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$$= -5 - 8$$
$$= -13$$

Product of the roots $= (-5)(-8)$

$$= (-5)(-8)$$
$$= 40$$

Required Equation:

$x^2 -$ (sum of the roots) $x +$ (product of the roots) $= 0$

$$x^2 - (-13)\,x + 40 = 0$$
$$x^2 + 13x + 40 = 0$$

The answer is (d).

EXERCISE-3.4

(1) What is the sum of two roots of the equation $5x^2 - 8x - 4 = 0$?

(a) $^1/_2$ (b) 5/8 (c) 8/5 (d) 4/5

(2) The product of the roots of the equation $2x^2 - 5kx + k = 2$ *is* 8. What is the value of k?

(a) 12 (b) 18 (c) 16 (d) 20

(3) The square of the sum of the roots of the equation $3x^2 - 6kx + 10 = 0$ *is* 36. What is the value of k?

(a) -3 (b) 9 (c) $\sqrt{18}$ (d) -6

(4) The sum of the roots of the equation $x^2 - 2kx + 12 = 0$ is equal to 4 times the product of the roots. What is the value of k?

(a) 12 (b) 24 (c) 48 (d) 6

(5) The product of the roots of the equation $2x^2 + 6x + k = 1$ is equal to the square of the sum of the roots. What is k?

(a) -6 (b) 7 (c) 19 (d) 18

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(6) The product of the roots of the equation $3x^2 - 12x + p = 6$ is equal to the square root of sum of the roots. What is the value of p?

(a) 12 (b) 6 (c) 18 (d) 54

(7) α and β are roots of the equation $5x^2 + 3kx + 20 = 5x$. What is the value of k if $(\alpha + \beta)^2 = \alpha\beta$?

(a) 15 (b) -5 (c) -25 (d) None

(8) What is the equation whose root are $3i$ and $5i$?

(a) $x^2 - 8x - 15 = 0$ (b) $x^2 + 8ix - 15 = 0$

(c) $x^2 - 15x + 8 = 0$ (d) $None$

(9) What is the equation whose roots are three times the roots of the equation $(x - 2)(x - 5) = 0$

(a) $x^2 - 21x + 30 = 0$ (b) $x^2 - 7x + 10 = 0$

(c) $x^2 - 21x + 90 = 0$ (d) $x^2 - 81 = 0$

(10) Sum and product of the roots of the equation $x^2 + bx + c = 0$ are 18 and -115 respectively. What are the values of b and c?

(a) $18, 115$ (b) $115, -18$ (c) $18, -115$ (d) $-18, -115$

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CUBIC EQUATIONS

ω is a cube root of 1 (unity).

All cube roots of 1 are

1, ω and ω^2.

where $\omega = \frac{-1+\sqrt{3}\,i}{2}$ and $\omega^2 = \frac{-1-\sqrt{3}i}{2}$

PROPERTIES OF ω

1) $\omega^3 = 1$

2) $1 + \omega + \omega^2 = 0$

i) $1 + \omega = -\omega^2$

ii) $1 + \omega^2 = -\omega$

iii) $\omega + \omega^2 = -1$

VALUE OF ω^n

i) n is exactly divisible by 3:

$$\omega^n = 1$$

ii) The remainder is 1, when n is divided by 3:

$$\omega^n = \omega$$

iii) The remainder is 2, when n is divided by 3:

$$\omega^n = \omega^2$$

MCQ-17:

$\omega^4 = ?$

(a) 1 (b) ω (c) ω^2 (d) 0

Solution:

Remainder is 1, when 4 is divided by 3

$$\omega^4 = \omega$$

Note: $\omega^4 = \omega^3.\omega = 1.\omega = \omega$

The answer is (b).

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MCQ-18:

$$\omega^{38} = ?$$

(a) 1 (b) ω (c) ω^2 (d) 0

Solution:

Remainder is 2, when 38 is divided by 3

$$\omega^{38} = \omega^2$$

Note: $\omega^{38} = \omega^{36}.\omega^2 = (\omega^3)^{12}.\omega^2 = (1)^{12}.\omega^2 = \omega^2$

The answer is (c).

MCQ-19:

$$\omega^{19} = ?$$

(a) 1 (b) ω (c) ω^2 (d) 0

Solution:

Reminder is 1, when 19 is divided by 3

$$\omega^{19} = \omega$$

Note: $\omega^{19} = \omega^{18}.\omega = (\omega^3)^6.\omega = (1)^6.\omega = \omega$

The answer is (b).

MCQ-20:

$\omega^5 + \omega^{18} + \omega^{25} = ?$

(a) 1 (b) ω (c) ω^2 (d) 0

Solution:

Reminder is 2 when 5 is divided by 3 ⇒ $\omega^5 = \omega^2$

18 is exactly divisible by 3 ⇒ $\omega^{18} = 1$

Reminder is 1when 25 is divided by 3 ⇒ $\omega^{25} = \omega$

$$\omega^5 + \omega^{18} + \omega^{25}$$

$$= \omega^2 + 1 + \omega$$

$$= 1 + \omega + \omega^2$$

$$= 0$$

The answer is (d).

EXERCISE-3.5

(1) $\omega^{50} = ?$

(a) 0 (b) 1 (c) ω (d) ω^2

(2) $\omega^{37} = ?$

(a) 0 (b) 1 (c) ω (d) ω^2

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(8) $(\omega^{10} + \omega^6)^8 = ?$

(a) 1 (b) ω (c) ω^2 (d) 2ω

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CUBIC EQUATIONS

Lecture:

Real cube root of $x^3 - a^3 = 0$:

$$x = \sqrt[3]{a^3} = a$$

Example-1:

Find real cube root of $x^3 - 27 = 0$

$$x^3 = 27$$

$$x = \sqrt[3]{27} = \sqrt[3]{3^3} = 3$$

All cube roots of a^3:

$$x^3 = a^3$$

$$x^3 - a^3 = 0$$

$$(x-a)(x^2 + ax + a^2) = 0$$

Either $x - a = 0 \Rightarrow x = a$

or $x^2 + ax + a^2 = 0$

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

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

$$x = \left(\frac{-1 \pm \sqrt{3}i}{2}\right) a$$

All cube roots are

$$a,\ \left(\frac{-1+\sqrt{3}i}{2}\right) a\ ,\ \left(\frac{-1-\sqrt{3}i}{2}\right) a$$

or

$$a\ ,\quad a\omega\ ,\quad a\omega^2$$

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All cube roots of $-a^3$:

$$x^3 = -a^3$$
$$x^3 - (-a)^3 = 0$$

All cube roots are

$$(-a)\,,\ (-a)\omega\,,\ (-a)\omega^2$$

or

$$-a\,,\ -a\omega\,,\ -a\omega^2$$

where ω is cube root of 1.

Result:

(i) One cube root is real and other two are complex of the equation

$x^3 - a^3 = 0$ or $x^3 + a^3 = 0$.

(ii) The cube roots of a^3 are $a\ , a\omega\ , a\omega^2$

and the cube roots of $-a^3$ are $-a\ , -a\omega\ , -a\omega^2$

where $\omega = \frac{-1+\sqrt{3}i}{2}$ and $\omega^2 = \frac{-1-\sqrt{3}i}{2}$ are complex numbers.

This shows that one cube root of a real number is real and other two roots are complex. This result helps us to find all the cube roots of a real number.

MCQ-21:

What are all cube roots of 1 (unity) .

(a) $1,\ \omega, \omega^2$ (b) 1 (c) $1\ , -1$ (d) $1, -1,\ \omega$

Solution:

$$x^3 = 1$$
$$x^3 = 1^3$$
$$\Rightarrow a = 1$$

All cube roots of 1 (unity) are

$$a\ ,\ a\omega\ ,\ a\omega^2$$

$$\Rightarrow 1,\ \omega, \omega^2$$

The answer is (a).

MCQ-22:

What are the cube roots of 64?

(a) 8 (b) $4, -4, 4\omega$

(c) $8, -8, 8\omega$ (d) $4, 4\omega, 4\omega^2$

Solution:

$$64 = 4^3$$
$$\Rightarrow a = 4$$

All cube roots of 64 are

$$a, a\omega, a\omega^2$$

$$\Rightarrow 4, 4\omega, 4\omega^2$$

The answer is (d).

MCQ-23:

What are the cube roots of -27?

(a) 9 (b) $3, 3\omega, 3\omega^2$

(c) $-3, -3\omega, -3\omega^2$ (d) $-3, -3\omega, -3$

Solution:

$$-27 = (-3)^3$$
$$\Rightarrow a = -3$$

All cube roots of -27 are

$$a, a\omega, a\omega^2$$

$$\Rightarrow -3, -3\omega, -3\omega^2$$

The answer is (c).

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MCQ-24:

What are the cube roots of 1728?

(a) $-12\ ,12\ ,\ 12\ \omega$ (b) $-6\ ,6\ ,\ 6\omega^2$

(c) $-8\ ,\ 8\ ,\ 4\ \ (-1\ +\sqrt{3}\ i)$ (d) $-12\ \ ,-6\ +6\sqrt{3}i\ \ ,-6\ -6\ \sqrt{3}\ i$

Solution:

Do not find cube roots of 1728.
Read the given options carefully.

i) There are two real and one complex roots in first three option (a), (b), (c).

ii) Option (d) has one real and two complex roots.

The answer is (d).

EXERCISE-3.6

(1) What is a cube root of 64?

(a) -8 (b) $-4\omega^2$ (c) $8\omega^2$ (d) 4ω

(2) What is a cube root of -27?

(a) $3\sqrt{3}\ i$ (b) $-3\omega^2$ (c) 3ω (d) $3\omega^2$

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