Chapter 2

5 marks

Equations

TOPIC :

- Simple Equation
- Simultaneous Linear Equations
- Quadratic Equation
- Cubic Equation

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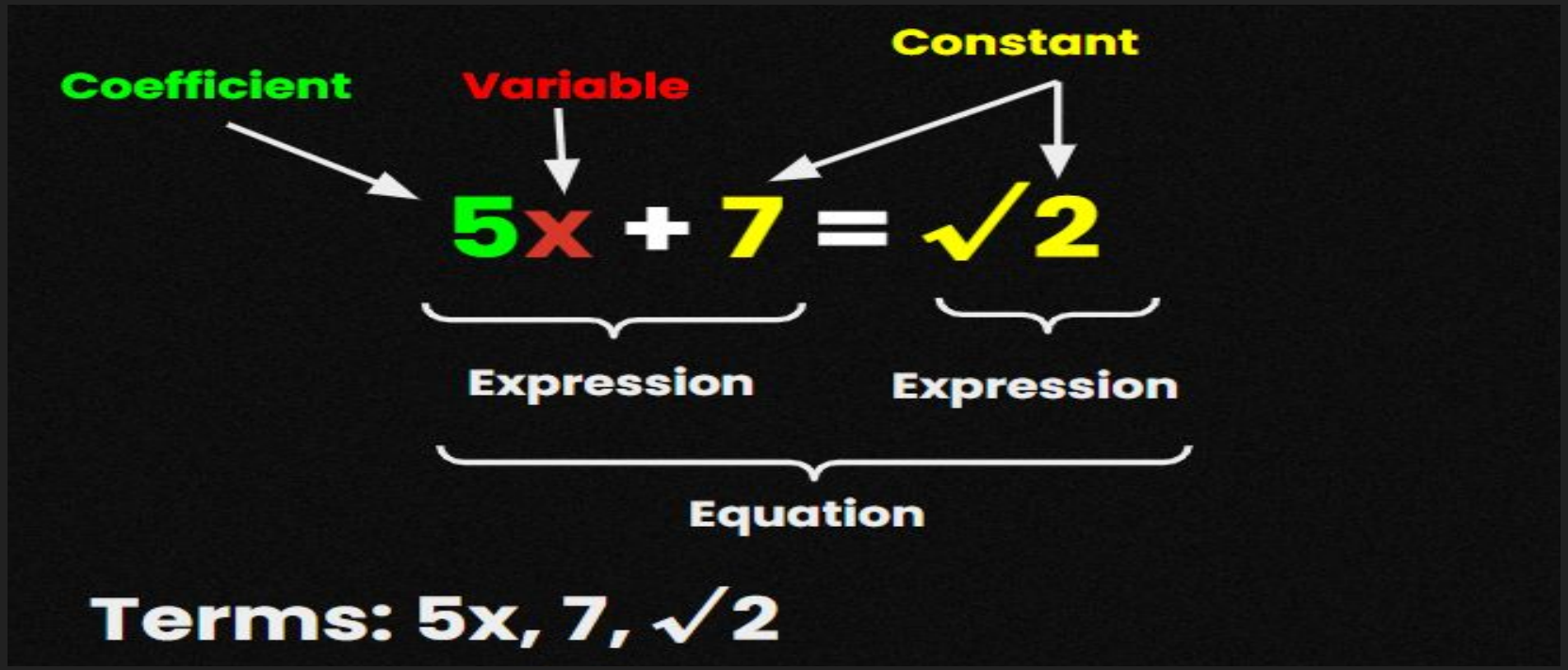
QUANTITATIVE APTITUDE ROMANOVA

- 7 years of experience in teaching Mathematics
- Gold Medalist in M.Sc. and B.Sc. Maths
- Was #1 Maths Faculty in Magnet Brains
- Teaches Maths in CA foundation and K-12
- Taught 30000+ students with highest score as 100


Coefficient
Variable
Constant
5x + 7 = √2
Expression
Expression
Equation
Terms: 5x, 7, √2

EQUATION

- Equation is defined to be a mathematical statement of equality.

Example:

- 5x = 25
- 2x - 3 = 9
- $2y + \frac{5}{2} = \frac{37}{2}$
- 6z + 10 = -2

SOLUTION / ROOT OF The EQUATION

- The value of the variable which satisfies an equation is called the “solution “ of the equation , or the “root “of the equation.

DEGREE

- The highest power of variable in a given equation is called degree.

- $8x + 17 (x-3) = 4 (4x-9) + 12$ — Linear equation.
- $3x^2 + 5x + 6 = 0$ — Quadratic equation.
- $3x^3 + 5x^2 + 6x + 1 = 0$ — Cubic equation.

SIMPLE EQUATION

- Equation of one degree and having one unknown variable is simple equation.
- Simple equation has only one root.
- General form

$$ax + b = 0$$

where ,

a is coefficient of x , $a \neq 0$

b is constant

How to write Negative of a number on Calculator

To Write – 5 on Calculator

Step 1 : Press 5

Step 2 : Press +/− one time

USE OF M± AND M⊟

$$(4 \times 2) + (2 \times 5) + (3 \times 6)$$

4 X 2 M± 2 X 5 M± 3 X 6 M± M⊟

USE OF M= AND M⊟

(3X7)+(2X6)-(3X8)

3X7 M± 2X6 M± 3X8 M= M⊟

EXERCISE (A)

Que.1 The equation $-7x + 1 = 5 - 3x$ will be satisfied for x equal to:

a. 2

b. -1

c. 1

d. None of these

EXERCISE (A)

Que.2 The root of the equation $\frac{x+4}{4} + \frac{x-5}{3} = 11$ is

a. 20

b. 10

c. 2

d. None of these

EXERCISE (A)

Que.3 Pick up the correct value of x for $\frac{x}{30} = \frac{2}{45}$

a. $x = 5$

b. $x = 7$

c. $x = 1\frac{1}{3}$

d. None of these

EXERCISE (A)

Que.4 The solution of the equation $\frac{x+24}{5} = 4 + \frac{x}{4}$

a. 6

b. 10

c. 16

d. None of these

EXERCISE (A)

Que.5 8 is the solution of the equation

a. $\frac{x+4}{4}+\frac{x-5}{3}=11$

b. $\frac{x+4}{2}+\frac{x+10}{9}=8$

c. $\frac{x+24}{5}=4+\frac{x}{4}$

d. $\frac{x-15}{10}+\frac{x+5}{5}=4$

EXERCISE (A)

Que.6 The value of y that satisfies the equation $\frac{y+11}{6} - \frac{y+1}{9} = \frac{y+7}{4}$ is

a. -1

b. 7

c. 1

d. -1/7

EXERCISE (A)

Que.7 The solution of the equation $(p+2)(p-3)+(p+3)(p-4)=p(2p-5)$ is

a. 6

b. 7

c. 5

d. None of these

EXERCISE (A)

Que.8 The equation $\frac{12x+1}{4}=\frac{15x-1}{5}+\frac{2x-5}{3x-1}$ is true for

a. x = 1

b. x = 2

c. x = 5

d. x = 7

EXERCISE (A)

Que.9 Pick up the correct value x for which $\frac{x}{0.5}-\frac{1}{0.05}+\frac{x}{0.005}-\frac{1}{0.0005}=0$

a. x = 0

b. x = 1

c. x = 10

d. None of these

EXERCISE (B)

Que.1 The sum of two numbers is 52 and their difference is 2. The numbers are

a. 17 and 15

b. 12 and 10

c. 27 and 25

d. None of these

EXERCISE (B)

Que.2 The diagonal of a rectangle is 5 cm and one of at sides is 4 cm. Its area is

a. 20 sq. cm

b. 12 sq. cm

c. 10 sq. cm

d. None of these

EXERCISE (B)

Que.3 Divide 56 into two parts such that three times the first part exceeds one third of the second by 48. The parts are.

a. (20, 36)

b. (25, 31)

c. (24, 32)

d. None of these

EXERCISE (B)

Que.4 The sum of the digits of a two digit number is 10. If 18 be subtracted from it the digits in the resulting number will be equal. The number is

a. 37

b. 73

c. 75

d. None of these

EXERCISE (B)

Que.5 The fourth part of a number exceeds the sixth part by 4. The number is

a. 84

b. 44

c. 48

d. None of these

EXERCISE (B)

Que.6 Ten years ago the age of a father was four times of his son. Ten years hence the age of the father will be twice that of his son. The present ages of the father and the son are.

a. (50, 20)

b. (60, 20)

c. (55, 25)

d. None of these

EXERCISE (B)

Que.7 The product of two numbers is 3200 and the quotient when the larger number is divided by the smaller is 2.The numbers are

a. (16, 200)

b. (160, 20)

c. (60, 30)

d. (80, 40)

EXERCISE (B)

Que.8 The denominator of a fraction exceeds the numerator by 2. If 5 be added to the numerator the fraction increases by unity. The fraction is.

a. 5/7

b. 1/3

c. 7/9

d. 3/5

EXERCISE (B)

Que.9 Three persons Mr. Roy, Mr. Paul and Mr. Singh together have ₹ 51. Mr. Paul has ₹ 4 less than Mr. Roy and Mr. Singh has got ₹ 5 less than Mr. Roy. They have the money as.

a. (₹ 20, ₹ 16, ₹ 15)

b. (₹ 15, ₹ 20, ₹ 16)

c. (₹ 25, ₹ 11, ₹ 15)

d. None of these

EXERCISE (B)

Que.10 A number consists of two digits. The digits in the ten's place is 3 times the digit in the unit's place. If 54 is subtracted from the number the digits are reversed. The number is

a. 39

b. 92

c. 93

d. 94

EXERCISE (B)

Que.11 One student is asked to divide a half of a number by 6 and other half by 4 and then to add the two quantities. Instead of doing so the student divides the given number by 5. If the answer is 4 short of the correct answer then the number was

a. 320

b. 400

c. 480

d. None of these

EXERCISE (B)

Que.12 If a number of which the half is greater than 1/5th of the number by 15 then the number is

a. 50

b. 40

c. 80

d. None of these

SIMULTANEOUS LINEAR EQUATIONS *(TWO UNKNOWNS)*

$$a_1x + b_1y + c_1 = 0$$

$$a_2x + b_2y + c_2 = 0$$

- **A value for each unknown which satisfies simultaneously both the equations will give the roots of the equations.**

SIMULTANEOUS LINEAR EQUATIONS *(TWO UNKNOWNS)*

METHODS OF SOLVING

- **CROSS MULTIPLICATION METHOD**
- **SUBSTITUTION METHOD**
- **ELIMINATION METHOD**
- **OPTION METHOD**

ELIMINATION METHOD

Solve

$2x + 5y = 9$ and $3x - y = 5$

IMPORTANT POINTS

$a_1x + b_1y + c_1 = 0$

$a_2x + b_2y + c_2 = 0$

Compare the ratios	Algebraic interpretation
$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$	Exactly one solution (unique)
$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$	Infinitely many solutions
$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$	No solution

EXERCISE (C)

Que.1) The solution of the set of equations $3x + 4y = 7$, $4x - y = 3$ is

a. $(1, -1)$

b. $(1, 1)$

c. $(2, 1)$

d. $(1, -2)$

EXERCISE (C)

Que.2 The values of x and y satisfying the equations $\frac{x}{2}+\frac{y}{3}=2$, x + 2y = 8 are given by the pair.

a. (3, 2)

b. (−2, −3)

c. (2, 3)

d. None of these

EXERCISE (C)

Que.3 $\frac{x}{p}+\frac{y}{q}=2$, $x + y = p + q$ are satisfied by the values given by the pair.

a. $(x = p, y = q)$

b. $(x = q, y = p)$

c. $(x = 1, y = 1)$

d. None of these

EXERCISE (C)

Que.4 The solution for the pair of equations $\frac{1}{16x}+\frac{1}{15y}=\frac{9}{20}, \frac{1}{20x}-\frac{1}{27y}=\frac{4}{45}$ is given by

a. (1/4, 1/3)

b. (1/3, 1/4)

c. (3, 4)

d. (4, 3)

EXERCISE (C)

Que.5 Solve for x and y: $\frac{4}{x} - \frac{5}{y} = \frac{x+y}{xy} + \frac{3}{10}$ and $3xy = 10(y - x)$

a. (5, 2)

b. (−2, −5)

c. (2, −5)

d. (2, 5)

EXERCISE (C)

Que.6 The pair satisfying the equations: x+5y = 36, $\frac{x+y}{x-y}=\frac{5}{3}$ is given by

a. (16, 4)

b. (4, 16)

c. (4, 8)

d. None of these

EXERCISE (C)

Que.7 Solve for x and y : $x-3y= 0$, $x+2y= 20$.

a. $x = 4, y = 12$

b. $x = 12, y = 4$

c. $x = 5, y = 4$

d. None of these

EXERCISE (C)

Que.8 The simultaneous equations $7x-3y = 31$, $9x-5y = 41$ have solutions given by

a. $(-4, -1)$

b. $(-1, 4)$

c. $(4, -1)$

d. $(3, 7)$

EXERCISE (C)

Que.9 1.5x + 2.4 y = 1.8, 2.5(x+1)= 7y have solutions as

a. (0.5, 0.4)

b. (0.4, 0.5)

c. (1/2, 2/5)

d. (2, 5)

EXERCISE (C)

Que.10 The values of x and y satisfying the equations $\frac{3}{x+y}+\frac{2}{x-y}=3$, $\frac{2}{x+y}+\frac{3}{x-y}=3\frac{2}{3}$ are given by

a. (1, 2)

b. (−1, −2)

c. (1, 1/2)

d. (2, 1)

EXERCISE (D)

Que.1) $1.5x + 3.6y = 2.1,\ 2.5(x+1) = 6y$

a. (0.2, 0.5)

b. (0.5, 0.2)

c. (2, 5)

d. (−2, −5)

EXERCISE (D)

Que.2 $\frac{x}{5}+\frac{y}{6}+1=\frac{x}{6}+\frac{y}{5}=28$

a. (6, 9)

b. (9, 6)

c. (60, 90)

d. (90, 60)

EXERCISE (D)

Que.3 $\frac{x}{4} = \frac{y}{3} = \frac{z}{2}$; $7x + 8y + 5z = 62$

a. (4, 3, 2)

b. (2, 3, 4)

c. (3, 4, 2)

d. (4, 2, 3)

EXERCISE (D)

Que.4 $\frac{xy}{x+y}=20$, $\frac{yz}{y+z}=40$, $\frac{zx}{z+x}=24$

a. (120, 60, 30)

b. (60, 30, 120)

c. (30, 120, 60)

d. (30, 60, 120)

EXERCISE (D)

Que.5 $2x + 3y + 4z = 0,\ x + 2y - 5z = 0,\ 10x + 16y - 6z = 0$

a. $(0, 0, 0)$

b. $(1, -1, 1)$

c. $(3, 2, -1)$

d. $(1, 0, 2)$

EXERCISE (D)

Que.6) $\frac{1}{3}(x+y) + 2z = 21,\ 3x - \frac{1}{2}(y+z) = 65,\ x + \frac{1}{2}(x+y-z) = 38$

a. (4, 9, 5)

b. (2, 9, 5)

c. (24, 9, 5)

d. (5, 24, 9)

EXERCISE (D)

Que.7) $\frac{4}{x} - \frac{5}{y} = \frac{x+y}{xy} + \frac{3}{10}$ $3xy = 10(y-x)$

a. (2, 5)

b. (5, 2)

c. (2, 7)

d. (3, 4)

EXERCISE (D)

Que.8) $\frac{x}{0.01}+\frac{y+0.03}{0.05}=\frac{y}{0.02}+\frac{x+0.03}{0.04}=2$

a. (1, 2)

b. (0.1, 0.2)

c. (0.01, 0.02)

d. (0.02, 0.01)

EXERCISE (D)

Que.9) $\frac{xy}{y-x}=110,\ \frac{yz}{z-y}=132,\ \frac{zx}{z+x}=\frac{60}{11}$

a. (12, 11, 10)

b. (10, 11, 12)

c. (11, 10, 12)

d. (12, 10, 11)

EXERCISE (D)

Que.10) $3x-4y+70z = 0,\ 2x+3y-10z = 0,\ x+2y+3z = 13$

a. (1, 3, 7)

b. (1, 7, 3)

c. (2, 4, 3)

d. (−10, 10, 1)

EXERCISE (E)

Choose the most appropriate option (a), (b), (c) or (d).

Que.1) Monthly incomes of two persons are in the ratio 4 : 5 and their monthly expenses are in the ratio 7 : 9. If each saves ₹50 per month find their monthly incomes.

a. (500, 400)

b. (400, 500)

c. (300, 600)

d. (350, 550)

EXERCISE (E)

Choose the most appropriate option (a), (b), (c) or (d).

Que.2) Find the fraction which is equal to 1/2 when both its numerator and denominator are increased by 2. It is equal to 3/4 when both are increased by 12.

a. 3/8

b. 5/8

c. 2/8

d. 2/3

EXERCISE (E)

Choose the most appropriate option (a), (b), (c) or (d).

Que.3) The age of a person is twice the sum of the ages of his two sons and five years ago his age was thrice the sum of their ages. Find his present age.

a. 60 years

b. 52 years

c. 51 years

d. 50 years

EXERCISE (E)

Choose the most appropriate option (a), (b), (c) or (d).

Que.4) A number between 10 and 100 is five times the sum of its digits. If 9 be added to it the digits are reversed find the number.

a. 54

b. 53

c. 45

d. 55

EXERCISE (E)

Choose the most appropriate option (a), (b), (c) or (d).

Que.5) The wages of 8 men and 6 boys amount to 33. If 4 men earn ₹ 4.50 more than 5 boys determine the wages of each man and boy.

a. (₹ 1.50, ₹ 3)

b. (₹ 3, ₹ 1.50)

c. (₹ 2.50, ₹ 2)

d. (₹ 2, ₹ 2.50)

EXERCISE (E)

Choose the most appropriate option (a), (b), (c) or (d).

Que.6) A number consisting of two digits is four times the sum of its digits and if 27 be added to it the digits are reversed. The number is:

a. 63

b. 35

c. 36

d. 60

EXERCISE (E)

Choose the most appropriate option (a), (b), (c) or (d).

Que.7) Of two numbers, $1/5^{th}$ of the greater is equal to $1/3^{rd}$ of the smaller and their sum is 16. The numbers are:

a. (6, 10)

b. (9,7)

c. (12, 4)

d. (11, 5)

EXERCISE (E)

Choose the most appropriate option (a), (b), (c) or (d).

Que.8) y is older than x by 7 years 15 years back x's age was 3/4 of y's age. Their present ages are:

a. (x = 36, y = 43)

b. (x = 50, y = 43)

c. (x = 43, y = 50)

d. (x = 40, y = 47)

EXERCISE (E)

Choose the most appropriate option (a), (b), (c) or (d).

Que.9) The sum of the digits in a three digit number is 12. If the digits are reversed the number is increased by 495 but reversing only of the ten's and unit digits increases the number by 36. The number is

a. 327

b. 372

c. 237

d. 273

EXERCISE (E)

Choose the most appropriate option (a), (b), (c) or (d).

Que.10) Two numbers are such that twice the greater number exceeds twice the smaller one by 18 and $1/3^{rd}$ of the smaller and $1/5^{th}$ of the greater number are together 21. The numbers are:

a. (36, 45)

b. (45, 36)

c. (50, 41)

d. (55, 46)

EXERCISE (E)

Choose the most appropriate option (a), (b), (c) or (d).

Que.11) The demand and supply equations for a certain commodity are $4q + 7p = 17$ and $p = \frac{q}{3} + \frac{7}{4}$. respectively where p is the market price and q is the quantity then the equilibrium price and quantity are:

a. 2, 3/4

b. 3, ½

c. 5, ¾

d. None of these

Dec 2022

The solution of the equations $2x - 5y + 4 = 0$ and $2x + y - 8 = 0$ will be

(a) $(2, -3)$

(b) $(1, -3)$

(c) $(3, 2)$

(d) $(-2, 2)$

Ans : c

June 2016, May 2018

If $2^{x+y} = 2^{2x-y} = \sqrt{8}$, then the respective values of x and y .....

(a) 1 , ½

(b) ½ , 1

(c) ½ , ½

(d) None

Ans : a

Dec 2021

In MCQ paper consisting 100 questions of 1 mark each , a candidate gets 60% marks . If the candidate attempted all questions and there was a penalty of 0.25 marks for wrong answer , the difference between number of right answers and wrong answers is

(a) 32

(b) 36

(c) 40

(d) 38

Ans : b

July 2021

The cost of 2 oranges and 3 apples is ₹ 28 . If the cost of an apple is doubled then the cost of 3 oranges and 5 apples is ₹ 75 . The original cost of 7 oranges and 4 apples is

(a) 59

(b) 47

(c) 71

(d) 63

Ans : a

June 2023

The age of a man is four times the sum of the ages of his two sons and after 10 years , his age will be double the sum of their ages . The present age of the man must be

(a) 56

(b) 45

(c) 60

(d) 64

Ans : c

QUADRATIC EQUATIONS

An equation of the form

$$ax^2 + b\,x + c = 0$$

Where,

a is coefficient of x^2

b is coefficient of x

c is constant

$a \neq 0$

is called a quadratic equation or equation of the second degree.

QUADRATIC EQUATIONS

- **Examples:**

  i) $2x^2 + 3x + 5 = 0$

  ii) $x^2 - x = 0$

  iii) $5x^2 - 6x - 3 = 0$

How to find out the roots of a Quadratic Equation:

- The value of the variable say x is called the root of the equation.
- A quadratic equation has got two roots (usually denoted by α , β)

FACTORISATION METHOD

QUADRATIC FORMULA

FACTORISATION METHOD

SOLVE

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

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

QUADRATIC FORMULA

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

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

Let one root be α and the other root be β

$$\alpha = \frac{-b + \sqrt{b^2 - 4ac}}{2a}$$

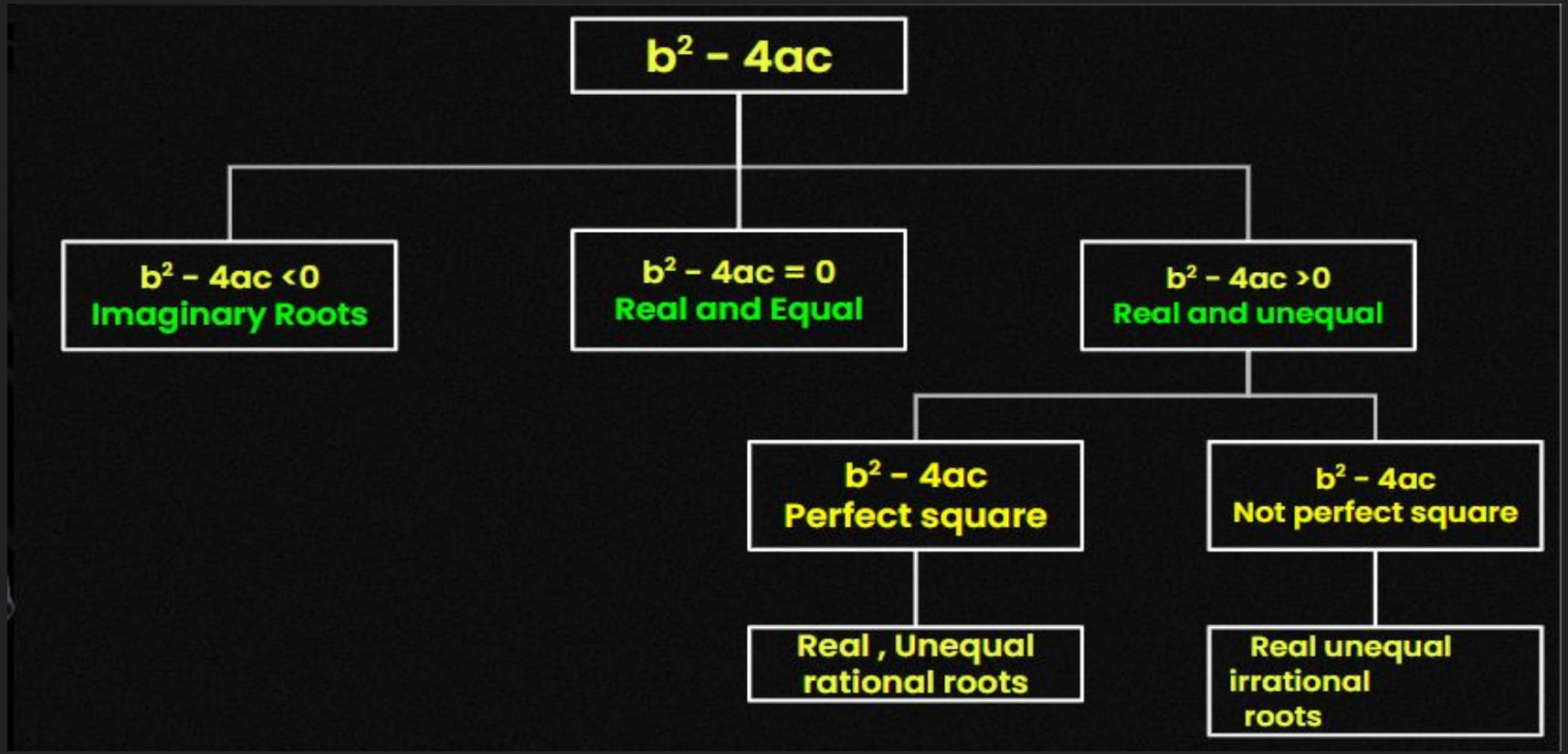
$$\beta = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

QUADRATIC FORMULA

SOLVE

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

NATURE OF ROOTS



NOTE

- If one of the root of the equation is $m + \sqrt{n}$ then the other root will be $m - \sqrt{n}$
- This pair of irrational roots are called Conjugate pairs

IDENTITIES

- $(a+b)^2 = a^2 + b^2 + 2ab$
- $(a-b)^2 = a^2 + b^2 - 2ab$
- $(a+b)^2 = (a-b)^2 + 4ab$

IDENTITIES

- $(a+b)^3 = a^3 + b^3 + 3ab(a+b)$
- $(a-b)^3 = a^3 - b^3 - 3ab(a-b)$

Sum and Product of the Roots:

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

sum of roots = $-\frac{b}{a} = -\frac{\text{coefficient of } x}{\text{coeffient of } x^2}$

product of the roots = $\frac{c}{a} = \frac{\text{constant term}}{\text{coefficient of } x^2}$

How To Construct A Quadratic Equation

Let one root be α and the other root be β

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

$x^2 - (\alpha+\beta)\ x + \alpha\beta = 0$

EXERCISE (F)

Choose the most appropriate option (a), (b), (c) or (d).

Que.1) If the roots of the equation $2x^2 + 8x - m^3 = 0$ are equal then value of m is

a. -3

b. -1

c. 1

d. -2

EXERCISE (F)

Choose the most appropriate option (a), (b), (c) or (d).

Que.2) If $2^{2x+3} - 3^2.2^x + 1 = 0$ then values of x are

a. 0, 1

b. 1, 2

c. 0, 3

d. 0, −3

EXERCISE (F)

Choose the most appropriate option (a), (b), (c) or (d).

Que.3) The values of $4+\cfrac{1}{4+\cfrac{1}{4+\cfrac{1}{4+.....\infty}}}$

a. $1 \pm \sqrt{2}$

b. $2 + \sqrt{5}$

c. $2 \pm \sqrt{5}$

d. None of these

EXERCISE (F)

Choose the most appropriate option (a), (b), (c) or (d).

Que.4) If α, β be the roots of the equation $2x^2 - 4x - 3 = 0$ the value of $\alpha^2 + \beta^2$ is

a. 5

b. 7

c. 3

d. -4

EXERCISE (F)

Choose the most appropriate option (a), (b), (c) or (d).

Que.5) If the sum of the roots of the quadratic equation $ax^2 + bx + c = 0$ is equal to the sum of the squares of their reciprocals then $\frac{b^2}{ac} + \frac{bc}{a^2}$ is equal to

a. 2

b. −2

c. 1

d. −1

EXERCISE (F)

Choose the most appropriate option (a), (b), (c) or (d).

Que.6) The equation $x^2 - (p+4)x + 2p + 5 = 0$ has equal roots the values of p will be.

a. ± 1

b. 2

c. ± 2

d. -2

EXERCISE (F)

Choose the most appropriate option (a), (b), (c) or (d).

Que.7) The roots of the equation $x^2 + (2p-1)x + p^2 = 0$ are real if.

a. $p \geq 1$

b. $p \leq 4$

c. $p \geq 1/4$

d. $p \leq 1/4$

EXERCISE (F)

Choose the most appropriate option (a), (b), (c) or (d).

Que.8) If $x = m$ is one of the solutions of the equation $2x^2 + 5x - m = 0$ the possible values of m are

a. (0, 2)

b. (0, −2)

c. (0, 1)

d. (1, −1)

EXERCISE (F)

Choose the most appropriate option (a), (b), (c) or (d).

Que.9) If p and q are the roots of $x^2 + 2x + 1 = 0$ then the values of $p^3 + q^3$ becomes

a. 2

b. −2

c. 4

d. − 4

EXERCISE (F)

Choose the most appropriate option (a), (b), (c) or (d).

Que.10) If $L + M + N = 0$ and L, M, N are rationals the roots of the equation $(M + N - L)x^2 + (N + L - M)x + (L + M - N) = 0$ are

a. Real and irrational

b. Real and rational

c. Imaginary and equal

d. Real and equal

EXERCISE (F)

Choose the most appropriate option (a), (b), (c) or (d).

Que.11) If α and β are the roots of $x^2 = x + 1$ then value of $\frac{\alpha^2}{\beta} - \frac{\beta^2}{\alpha}$ is

a. $2\sqrt{5}$

b. $\sqrt{5}$

c. $3\sqrt{5}$

d. $-2\sqrt{5}$

EXERCISE (F)

Choose the most appropriate option (a), (b), (c) or (d).

Que.12) If $p \neq q$ and $p^2 = 5p - 3$ and $q^2 = 5q - 3$ the equation having roots as $\frac{p}{q}$ and $\frac{q}{p}$ is

a. $x^2 - 19x + 3 = 0$

b. $3x^2 - 19x - 3 = 0$

c. $3x^2 - 19x + 3 = 0$

d. $3x^2 + 19x + 3 = 0$

EXERCISE (F)

Choose the most appropriate option (a), (b), (c) or (d).

Que.13) If one root of $5x^2 + 13x + p = 0$ be reciprocal of the other then the value of p is

a. −5

b. 5

c. 1/5

d. -1/5

EXERCISE (G)

Choose the most appropriate option (a), (b), (c) or (d).

Que1. A solution of the quadratic equation $(a + b - 2c)x^2 + (2a - b - c)x + (c + a - 2b) = 0$

a. $x = 1$

b. $x = -1$

c. $x = 2$

d. $x = -2$

EXERCISE (G)

Choose the most appropriate option (a), (b), (c) or (d).

Que 2. If the root of the equation $x^2 - 8x + m = 0$ exceeds the other by 4 then the value of m is

a. $m = 10$

b. $m = 11$

c. $m = 12$

d. $m = 9$

EXERCISE (G)

Choose the most appropriate option (a), (b), (c) or (d).

Que 3. The values of x in the equation $7(x + 2p)^2 + 5p^2 = 35xp + 117p^2$ are

a. (4p, −3p)

b. (4p, 3p)

c. (−4p, 3p)

d. (−4p, −3p)

EXERCISE (G)

Choose the most appropriate option (a), (b), (c) or (d).

Que 4. The solutions of the equation $\frac{6x}{x+1}+\frac{6(x+1)}{x}=13$ are

a. (2, 3)

b. (3,−2)

c. (−2, −3)

d. (2,−3)

EXERCISE (G)

Choose the most appropriate option (a), (b), (c) or (d).

Que 5. The satisfying of x for the equation $\frac{1}{x+p+q}=\frac{1}{x}+\frac{1}{p}+\frac{1}{q}$ are

a. (p, q)

b. (-p, -q)

c. (p, -p)

d. (-p, q)

EXERCISE (G)

Choose the most appropriate option (a), (b), (c) or (d).

Que 6. The values of x for the equation $x^2 + 9x + 18 = 6 - 4x$ are

a. (1, 12)

b. (−1, −12)

c. (1, −12)

d. (−1, 12)

EXERCISE (G)

Choose the most appropriate option (a), (b), (c) or (d).

Que 7 The values of x satisfying the equation

$$\sqrt{(2x^2+5x-2)}-\sqrt{(2x^2+5x-9)} = 1 \text{ are}$$

a. (2, −9/2)

b. (4, −9)

c. (2, 9/2)

d. (−2, 9/2)

EXERCISE (G)

Choose the most appropriate option (a), (b), (c) or (d).

Que 8. The solution of the equation $3x^2 - 17x + 24 = 0$ are

a. (2, 3)

b. $(2, 3\frac{2}{3})$

c. $(3, 2\frac{2}{3})$

d. $(3, \frac{2}{3})$

EXERCISE (G)

Choose the most appropriate option (a), (b), (c) or (d).

Que.9 The equation $\frac{3(3x^2+15)}{6} + 2x^2 + 9 = \frac{2x^2+96}{7} + 6$ has got the solution as

a. (1, 1)

b. (1/2, −1)

c. (1, −1)

d. (2, −1)

EXERCISE (G)

Choose the most appropriate option (a), (b), (c) or (d).

Que 10. The equation $\left(\frac{l-m}{2}\right)x^2-\left(\frac{l+m}{2}\right)x+m=C$ has got two values of x to satisfy the equation given as

a. $\left(1,\frac{2m}{l-m}\right)$

b. $\left(1,\frac{m}{l-m}\right)$

c. $\left(1,\frac{2l}{l-m}\right)$

d. $\left(1,\frac{1}{l-m}\right)$

EXERCISE (H)

Choose the most appropriate option (a), (b), (c) or (d).

Que 1. The sum of two numbers is 8 and the sum of their squares is 34. Taking one number as x form an equation in x and hence find the numbers. The numbers are

a. (7, 10)

b. (4, 4)

c. (3, 5)

d. (2, 6)

EXERCISE (H)

Choose the most appropriate option (a), (b), (c) or (d).

Que.2 The difference of two positive integers is 3 and the sum of their squares is 89. Taking the smaller integer as x form a quadratic equation and solve it to find the integers. The integers are:

a. (7, 4)

b. (5, 8)

c. (3, 6)

d. (2, 5)

EXERCISE (H)

Choose the most appropriate option (a), (b), (c) or (d).

Que 3. Five times of a positive whole number is 3 less than twice the square of the number. The number is

a. 3

b. 4

c. −3

d. 2

EXERCISE (H)

Choose the most appropriate option (a), (b), (c) or (d).

Que 4. The area of a rectangular field is 2000 sq.m and its perimeter is 180m. Form a quadratic equation by taking the length of the field as x and solve it to find the length and breadth of the field. The length and breadth are

a. (205m, 80m)

b. (50m, 40m)

c. (60m, 50m)

d. None

EXERCISE (H)

Choose the most appropriate option (a), (b), (c) or (d).

Que 5. Two squares have sides p cm and (p + 5) cms. The sum of their squares is 625 sq. cm. The sides of the squares are

a. (10 cm, 30 cm)

b. (12 cm, 25 cm)

c. (15 cm, 20 cm)

d. None of these

EXERCISE (H)

Choose the most appropriate option (a), (b), (c) or (d).

Que 6. Divide 50 into two parts such that the sum of their reciprocals is 1/12. The numbers are

a. (24,26)

b. (28,22)

c. (27, 23)

d. (20, 30)

EXERCISE (H)

Choose the most appropriate option (a), (b), (c) or (d).

Que 7. There are two consecutive numbers such that the difference of their reciprocals is 1/240. The numbers are

a. (15, 16)

b. (17, 18)

c. (13, 14)

d. (12, 13)

EXERCISE (H)

Choose the most appropriate option (a), (b), (c) or (d).

Que 8. The hypotenuse of a right-angled triangle is 20 cm. The difference between its other two sides be 4cm. The sides are

a. (11cm, 15cm)

b. (12cm, 16cm)

c. (20cm, 24cm)

d. None of these

EXERCISE (H)

Choose the most appropriate option (a), (b), (c) or (d).

Que 9. The sum of two numbers is 45 and the mean proportional between them is 18. The numbers are

a. (15, 30)

b. (32, 13)

c. (36, 9)

d. (25, 20)

EXERCISE (H)

Choose the most appropriate option (a), (b), (c) or (d).

Que 10. The sides of an equilateral triangle are shortened by 12 units 13 units and 14 units respectively and a right angle triangle is formed. The side of the equilateral triangle is

a. 17 units

b. 16 units

c. 15 units

d. 18 units

EXERCISE (H)

Choose the most appropriate option (a), (b), (c) or (d).

Que 11. A distributor of apple Juice has 5000 bottle in the store that it wishes to distribute in a month. From experience it is known that demand D (in number of bottles) is given by $D = -2000p^2 + 2000p + 17000$. The price per bottle that will result zero inventory is

a. ₹ 3

b. ₹ 5

c. ₹ 2

d. None of these

EXERCISE (H)

Choose the most appropriate option (a), (b), (c) or (d).

Que12. The sum of two irrational numbers multiplied by the larger one is 70 and their difference is multiplied by the smaller one is 12; the two numbers are

a. $3\sqrt{2}, 2\sqrt{3}$

b. $5\sqrt{2}, 3\sqrt{5}$

c. $2\sqrt{2}, 5\sqrt{2}$

d. None of these

Dec 2010

If one root of the equation $x^2 - 3x + k = 0$ is 2, then value of k will be

(a) -10

(b) 0

(c) 2

(d) 10

Ans : c

Jan 2021

If the quadratic equation $x^2 + px + q = 0$ and $x^2 + qx + p = 0$ have a common root then $p + q = ?$

(a) 0

(b) 1

(c) -1

(d) 2

Ans : c

Dec 2022

What will be the value of k, if the roots of the equation

$(k - 4)x^2 - 2kx + (k + 5) = 0$ are equal?

(a) 18

(b) 20

(c) 19

(d) 21

Ans : b

June 2010

Roots of the equation $3x^2 - 14x - k = 0$ will be reciprocal of each other if:

(a) k = −3

(b) k = 0

(c) k = 3

(d) k = 14

Ans : a

June 2015

If α, β are the roots of the quadratic equation $2x^2 - 4x = 1$ then the value of $\alpha^2/\beta + \beta^2/\alpha =$

(a) -11

(b) 22

(c) -22

(d) 11

Ans : c

June 2012

If one of the roots of the equation $x^2 + px + a$ is $\sqrt{3} + 2$, then the value of 'p' and 'a' is

(a) −4, −1

(b) 4, −1

(c) −4, 1

(d) 4, 1

Ans : c

Jan 2021

The value of P for which the difference between the root of equation

$x^2 + px + 8 = 0$ is 2 is

(a) ±2

(b) ±4

(c) ±6

(d) ± 8

Ans : c

Jan 2021

Find the condition that one root is double the of $ax^2 + bx + c = 0$

(a) $2b^2 = 3ac$

(b) $b^2 = 3ac$

(c) $2b^2 = 9.ac$

(d) None

Ans : c

CUBIC EQUATIONS

An equation of the form

$$ax^3 + bx^2 + cx + d = 0$$

Where,

a is coefficient of x^3 , $a \neq 0$

b is coefficient of x^2

c is coefficient of x

d is constant

is called a cubic equation or equation of the degree three .

EXERCISE I

Choose the most appropriate option (a), (b), (c) or (d).

Que 1. The solution of the cubic equation $x^3 - 6x^2 + 11x - 6 = 0$ is given by the triplet :

a. (−1, 1, −2)

b. (1, 2, 3)

c. (−2, 2, 3)

d. (0, 4, −5)

EXERCISE I

Choose the most appropriate option (a), (b), (c) or (d).

Que 2. The cubic equation $x^3 + 2x^2 - x - 2 = 0$ has 3 roots namely.

a. (1, −1, 2)

b. (−1, 1, −2)

c. (−1, 2, −2)

d. (1, 2, 2)

EXERCISE I

Choose the most appropriate option (a), (b), (c) or (d).

Que 3. x, x - 4, x + 5 are the factors of the left-hand side of the equation.

a. $x^3 + 2x^2 - x - 2 = 0$

b. $x^3 + x^2 - 20x = 0$

c. $x^3 - 3x^2 - 4x + 12 = 0$

d. $x^3 - 6x^2 + 11x - 6 = 0$

EXERCISE I

Choose the most appropriate option (a), (b), (c) or (d).

Que 4 The equation $3x^3 + 5x^2 = 3x + 5$ has got 3 roots and hence the factors of the left-hand side of the equation $3x^3 + 5x^2 - 3x - 5 = 0$ are

a. $x - 1, x - 2, x - 5/3$

b. $x - 1, x + 1, 3x + 5$

c. $x + 1, x - 1, 3x - 5$

d. $x - 1, x + 1, x - 2$

EXERCISE I

Choose the most appropriate option (a), (b), (c) or (d).

Que 5. The roots of the equation $x^3 + 7x^2 - 21x - 27 = 0$ are

a. (−3, −9,− 1)

b. (3, −9, −1)

c. (3, 9, 1)

d. (−3, 1, 9)

EXERCISE I

Choose the most appropriate option (a), (b), (c) or (d).

Que 6. The roots of $x^3 + x^2 - x - 1 = 0$ are

a. $(-1, -1, 1)$

b. $(1, 1, -1)$

c. $(-1,-1,-1)$

d. $(1, 1, 1)$

EXERCISE I

Choose the most appropriate option (a), (b), (c) or (d).

Que 7. The satisfying value of $x^3 + x^2 - 20x = 0$ are

a. (1, 4, 5)

b. (2, 4, −5)

c. (0, − 4, 5)

d. (0, 4, −5)

EXERCISE I

Choose the most appropriate option (a), (b), (c) or (d).

Que 8 The roots of the cubic equation $x^3 - 6x^2 + 9x - 4 = 0$ are

a. (4, 1, -1)

b. (-4, -1, -1)

c. (-4, -1, 1)

d. (1, 1, 4)

EXERCISE I

Choose the most appropriate option (a), (b), (c) or (d).

Que 9 If $4x^3 + 8x^2 - x - 2 = 0$ then value of $(2x+3)$ is given by

a. 4, −1, 2

b. −4, 2, 1

c. 2, −4, −1

d. None of these.

Dec 2020

The rational root of the equation $0 = 2p^3 - p^2 - 4p + 2$ is

(a) -2

(b) 2

(c) 1/ 2

(d) -1/2

Ans : c