

Chapter 2 - Equations

Linear Equation in one variable and two variable

Past Year Questions

PYQ May 18

- (1) If $2^{x+y} = 2^{2x-y} = \sqrt{8}$, then the respective values of x and y are ____
- a. $1, \frac{1}{2}$ b. $\frac{1}{2}, 1$
 c. $\frac{1}{2}, \frac{1}{2}$ d. None of these

PYQ May 18

- (2) If $\frac{3}{x+y} + \frac{2}{x-y} = -1$ and $\frac{1}{x+y} - \frac{1}{x-y} = \frac{4}{3}$ then (x, y) is:
- a. (2,1) b. (1,2)
 c. (-1,2) d. (-2,1)

PYQ Nov. 19

- (3) $\frac{2x+5}{10} + \frac{3x+10}{15} = 5$, find x
- a. 10.58 b. 9.58
 c. 9.5 d. None of these

PYQ Nov. 19

- (4) Find value of $x^2 - 10x + 1$ if $x = \frac{1}{5 - 2\sqrt{6}}$
- a. 25 b. 1
 c. 0 d. 49

Note: Que to be shifted to Quadratic Equation Topic

PYQ July 21

- (5) 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 (in ₹) is:
- a. 59 b. 47
 c. 71 d. 63

PYQ Dec. 21

- (6) In a multiple choice question paper consisting of 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 answers is:
- a. 32 b. 36
 c. 40 d. 38

PYQ June 22

- (7) The values of x and y satisfying the equations $\frac{3}{x+y} + \frac{2}{x-y} = 3$, $\frac{2}{x+y} + \frac{3}{x-y} = 3\frac{2}{3}$ given by
- a. (1,2) b. (-1,-2)
 c. (1, $\frac{1}{2}$) d. (2, 1)

PYQ June 22

- (8) A plumber can be paid either ₹ 600 and ₹ 50 per hour or ₹ 170 per hour. If the job takes 'n' hour, for what value of 'n' the second method earns better wages for the plumber?
- a. 5 b. 6
 c. 4 d. 7

PYQ Dec 22

- (9) The solution of the following system of linear eqs. $2x - 5y + 4 = 0$ and $2x + y - 8 = 0$ will be:
- a. (2, -3) b. (1, -3)
 c. (3, 2) d. (-2, 2)

PYQ Dec 22

- (10) The solution of the linear simultaneous equations $2x - y = 4$ and $3x + 4y = 17$ is
- a. $x=3; y=2$ b. $x=2; y=3$
 c. $x=-3; y=-2$ d. $x=-2; y=-3$

PYQ Sep 24

- (11) A person purchased 2 apples and 5 bananas at the cost of ₹ 90. Later he visited to another shop where shopkeeper told him that if you give me ₹ 50 and one banana, I can give you 3 apples. He agreed to the deal. What is the cost of one apple and one banana?
- a. (10, 15) b. (15, 10)
 c. (10, 20) d. (20, 10)

Answer Key

1 a	2 b	3 b
4 c	5 a	6 a
7 d	8 a	9 c
10 a	11 d	

Linear Equation in one variable and two variable

Mock Test Paper Questions

MTP May 18

(1)	x	5	6	7	8
	y	11	13	15	17

In the above table corresponding values of two variable x and y have been given. Which of the following equations establishes the relationship between the two variables?

- a. $y = 3x + 2$ b. $y = 2x - 1$
 c. $y = 2x + 1$ d. $y = 3x + 1$

MTP Nov 20

- (2) If $2x - 3y = 1$ and $5x + 2y = 50$, then what is the value of $(x - 2y)$?

- a. -2 b. 6
 c. 7 d. 10

MTP Nov 21

- (3) If $xy + yz + zx = -1$, then the value of

★ $\left(\frac{x+y}{1+xy} + \frac{z+y}{1+zy} + \frac{x+z}{1+zx} \right)$ is

- a. xyz b. $-1/yz$
 c. $\frac{1}{xyz}$ d. $\frac{1}{x+y+z}$

MTP Nov 21

- (4) The value of 'k' for system of equations $kx + 2y = 5$ and $3x + y = 1$ has no solution is:

- a. 5 b. $2/3$
 c. 6 d. $3/2$

MTP Nov 21

- (5) The cab bill is partly fixed and partly varies on the distance covered. For 456 km the bill is ₹8252, for 484 km the bill is Rs. 8728. What will the bill be for 500km?

- a. ₹ 8876 b. ₹ 9156
 c. ₹ 9472 d. ₹ 9000

MTP Oct 21

- (6) The point of intersection between the lines $3x + 4y = 7$ and $4x - y = 3$ lie in the

- a. 1st quadrant. b. 2nd quadrant.
 c. 3rd quadrant d. 4th quadrant.

MTP Oct 21

- (7) If $\sqrt{1 + \frac{25}{144}} = 1 + \frac{x}{12}$, then x is

- a. 1 b. 2
 c. 3 d. 0

MTP June 22

- (8) If $2^{x+y} = 2^{2x-y} = \sqrt{8}$ then the respective values of x and y are _____

- a. 1, $\frac{1}{2}$ b. $\frac{1}{2}$, 1
 c. $\frac{1}{2}$, $\frac{1}{2}$ d. none of these

MTP Dec 22 Series II

- (9) $\frac{2x+5}{10} + \frac{3x+10}{15} = 5$, then the value of x

- a. 10.58 b. 9.58
 c. 9.5 d. None of these

MTP June 2023 Series II

- (10) Solve for x , y and z .

$$\frac{xy}{y-x} = 210, \frac{xz}{z-x} = 140, \frac{yz}{y+z} = 140$$

- a. 105;210;420 b. 100;205;400
 c. 95;215;395 d. None of these

MTP Dec 2023 Series I

- (11) If $\frac{\sqrt{x+5} + \sqrt{x-16}}{\sqrt{x+5} - \sqrt{x-16}} = \frac{7}{3}$ then x equals

- a. 10 b. 20
 c. 30 d. 40

MTP June 24 Series III

(12)	x	5	6	7	8
	y	11	13	15	17

In the above table corresponding values of two variable x and y have been given. Which of the following equations establishes the relationship between the two variables?

- a. $y = 3x + 2$ b. $y = 2x - 1$
 c. $y = 2x + 1$ d. $y = 3x + 1$

MTP Sep 24 Series I

- (13) $2^{x+y} = 2^{x-y} = \sqrt{8}$, then the value of x and y is

- a. 1, $\frac{1}{2}$ b. $\frac{1}{2}$, 1
 c. $\frac{1}{2}$, $\frac{1}{2}$ d. None of these

Answer Key

1	c	2	a	3	c
4	c	5	d	6	a
7	a	8	a	9	b
10	a	11	b	12	C
13	a				

Word Problems on Equations

Past Year Questions

PYQ May 18

- (1) If the sides of an equilateral triangle are shortened by 3 units, 4 units and 5 units respectively and a right triangle is formed then the side of an equilateral triangle is:
- a. 6 units b. 7 units
c. 8 units d. 10 units

PYQ June 19

- (2) A number consist of two digits such that the digit in one's place is thrice the digit in ten's place. If 36 be added then the digits are reversed. Find the number _____.
- a. 62 b. 26
c. 39 d. None of these

PYQ June 22

- (3) If a person has cloth of total 91 cm. If he divides it into 3 parts then longest part is twice the shortest one and another part is 3 cm more than shortest one. What is the shortest one?
- ★
- a. 25 b. 44
c. 22 d. 46

PYQ Dec 22

- (4) If the cost of 3 bags and 4 pens is ₹257 whereas the cost of 4 bags and 3 pens is ₹ 324, then the cost of one bag is:
- a. 8 b. 24
c. 32 d. 75

PYQ Jun 23

- (5) The largest side of a triangle is 3 times the shortest side and third side is 4 cm shorter then largest side. If the perimeter of the triangle is at least 59 cm, what is the length of shortest side?
- a. Less than 7 cm
b. Greater than or equal to 7 cm
c. Less than 9 cm
d. Greater than or equal to 9 cm

PYQ Jun 23

- (6) 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 years b. 45 years
c. 60 years d. 64 years

PYQ Dec 23

- (7) Divide 27 into two parts, so that 5 times the first and 11 times the second together equal to 195, then the ratio of first and second part is:
- a. 17 : 10 b. 15 : 12
c. 14 : 13 d. 16 : 11

PYQ Sep 24

- (8) A number consist 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, then the digits are reversed. The number is:
- a. 62 b. 39
c. 93 d. 31

Answer Key

1 c	2 b	3 c
4 d	5 d	6 c
7 a	8 c	

Word Problems on Equations

Mock Test Paper Questions

MTP May 18

- (1) A number consists of two digits. The digits in tens place is 3 times the digit in the unit's place. If 54 is subtracted from the digits are reversed. The number is
- a. 39 b. 92
c. 93 d. 94

MTP Nov 18

- (2) A number consist of three digit of which the middle one is zero and the sum of other digits is 9. The number formed by interchanging the first and third digits is more than the original number by 297 find the number?
- a. 306 b. 309
c. 603 d. 307

MTP Nov 18

- (3) The age of a person is twice the sum of the ages of his two sons and 5 years ago his age was thrice the sum of their ages. Find present age.
- a. 60 years b. 52 years
c. 51 years d. 50 years

MTP May 19

- (4) Ten years ago the age of a father was four times his son. Ten years hence the age of the father will be twice that of his son. The present age of the father and the son are

- a. (50, 20) b. (60, 20)
c. (55, 25) d. none of these

MTP Nov 19

- (5) 5 chairs and 3 tables cost of ₹ 350. and 3 Chairs and 5 tables cost ₹ 370. What is the cost of the table and two chairs?

- a. ₹ 130 b. ₹ 120
c. ₹ 150 d. ₹ 140

MTP Nov 19

- (6) If thrice of A's age 6 years ago be subtracted from twice his present age, the result would be equal to his present age. Find A's Age

- a. 9 b. 8
c. 10 d. 12

MTP May 20

- (7) The sum of two numbers is 62 and their product is 960. The sum of their reciprocals is

- a. $\frac{31}{480}$ b. $\frac{29}{480}$
c. $\frac{61}{960}$ d. $\frac{41}{960}$

MTP May 20, ICAI SM

- (8) 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

MTP May 20, ICAI SM

- (9) 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)

MTP Nov 20

- (10) The cost of 5 mangoes is equal to the cost of 20 oranges. If the total cost 2 mangoes and 10 oranges is ₹ 22.50, find the cost of two oranges.

- a. ₹ 1.25 b. ₹ 2.50
c. ₹ 3 d. ₹ 3.50

MTP Nov 20

- (11) A man sells 6 radios and 4 televisions for ₹ 18,480. If 14 radios and 2 televisions are sold for the same. What is the price of radio?

- a. ₹ 1848 b. ₹ 543.52
c. ₹ 1680 d. ₹ 3360

MTP Apr 21

- (12) On the average an experienced person does 7 units of work while a fresh one work 5 units of work daily but the employer has to maintain an output of atleast 35 units of work per day.

The situation can be expressed as:

- a. $7x + 5y < 35$
b. $7x + 5y \leq 35$
c. $7x + 5y > 35$
d. $7x + 5y \geq 35$

Note: From Chapter 3

MTP Nov 21

- (13) X and Y have their present ages in the ratio 6:7. 14 years ago, the ratio of the ages of the two was 4:5. What will be the ratio of their ages 21 years from now?

- a. 7:11 b. 9:10
c. 8:11 d. 11:13

MTP Dec 22 – Series I

- (14) A man wants to cut three lengths from a single piece of board of length 91 cm. The Second length is to be 3 cm longer than the shortest and third length is to be twice as the shortest. What is the possible length for the shortest piece?

- a. 22 b. 20
c. 15 d. 18

MTP Jun 23 – Series I

- (15) If thrice of A's age 6 years ago be subtracted from twice his present age, the result would be equal to his present age. Find A's present age.

- a. 7 b. 8
c. 9 d. 6

MTP Jun 23 – Series I

- (16) The cost prices of 3 pens and 4 bags is ₹ 324, and 4 pens and 3 bags is ₹ 257, then cost price of 1 pen is equal to

- a. ₹ 16 b. ₹ 18
c. ₹ 50 d. ₹ 75

MTP Jun 23 – Series I

- (17) In a hostel ration stocked for 400 students upto 31 days. After 28 days 280 students were vacated the hostel. Find the number of days for which the remaining ration will be sufficient for the remaining students.
- a. 5 b. 4
c. 7 d. 10

MTP Jun 23 – Series I

- (18) The sum of the two numbers is 8 and the sum of their squares is 34. Taking one number as x from an equation in x and hence find the numbers. The numbers are
- a. (7, 10) b. (4, 4)
c. (3, 5) d. (2, 6)

MTP Jun 23 – Series II

- (19) The value of y of fraction x/y exceeds with x by 5 and if 3 be added to both the fraction becomes $\frac{3}{4}$. Find the fraction,
- a. $12/17$ b. $13/17$
c. $\frac{1}{3}$ d. None of these

MTP Jun 23 – Series II

- (20) If difference between a number and its positive square root is 12; the numbers are
- a. 9 b. 16
c. 25 d. None of these

MTP June 24 Series I

- (21) 4 tables and 3 chairs together cost ₹ 2,250 and 3 tables and 4 chairs cost ₹ 1950. Find the cost of 2 chairs and 1 table.
- a. ₹ 550 b. ₹ 1005
c. ₹ 750 d. None of these

MTP June 24 Series I

- (22) The ages of two persons are in the ratio 5:7. Eighteen years ago their ages were in the ratio of 8:13, their present ages (in years) are :
- a. 50,70 b. 70,50
c. 40,56 d. None of these

MTP June 24 Series I

- (23) A box contains ₹ 56 in the form of coins of one rupee, 50 paise and 25 paise. The number of 50 paise coin is double the number of 25 paise coins and four times the numbers of one rupee coins. The numbers of 50 paise coins in the box is
- a. 64 b. 32
c. 16 d. 14

MTP June 24 Series I

- (24) Find the positive value of k for which the equations: $x^2 + kx + 64 = 0$ & $x^2 + 8x + k = 0$ will have real roots:
- a. 12 b. 16
c. 18 d. 22

MTP June 24 Series II

- (25) The sum of two numbers is 75 and their difference is 20. Find the difference of their squares.
- a. 1500 b. 1600
c. 1550 d. None of these

MTP June 24 Series III

- (26) A number consists of two digits. The digits in tens place is 3 times the digit in the unit's place. If 54 is subtracted from the digits are reversed. The number is
- a. 39 b. 92
c. 93 d. 94

MTP Sep 24 Series II

- (27) 4 tables and 3 chairs, together, cost ₹ 2,250 and 3 tables and 4 chairs cost ₹ 1950. Find the cost of 2 chairs and 1 table.
- a. ₹ 550 b. ₹ 1005
c. ₹ 750 d. None of these

MTP Sep 24 Series II

- (28) Aman walks a certain distance with certain speed. If he walks $1/2$ km an hour faster, he takes 1 hour less. But, if he walks 1 km an hour slower, he takes 3 more hours. Find the distance covered by the man and his original rate of walking.
- a. 36 km, 4 km/hr
b. 40 km, 10 km/hr
c. 50 km, 20 km/hr
d. None of these

Answer Key

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

Problems on Quadratic Equation

Past Year Questions

PYQ May 18

- (1) If $\alpha + \beta = -2$ and $\alpha\beta = -3$, then α, β are the roots of the equation, which is:
- $x^2 - 2x - 3 = 0$
 - $x^2 + 2x - 3 = 0$
 - $x^2 + 2x + 3 = 0$
 - $x^2 - 2x + 3 = 0$

PYQ May 18

- (2) If α, β are the roots of the equation $x^2 + x + 5 = 0$ then $\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}$ is equal to
- 16/5
 - 2
 - 3
 - 14/5

PYQ Nov. 18

- (3) Let α and β be the roots of $x^2 + 7x + 12 = 0$. Then the value of $\left(\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}\right)$ will be:
- $\frac{7}{12} + \frac{12}{7}$
 - $\frac{49}{144} + \frac{144}{49}$
 - $\frac{91}{12}$
 - None of these

PYQ Nov. 18

- (4) When two roots of QE are $\alpha, 1/\alpha$ then what will be the quadratic equation:
- $ax^2 - (a^2 + 1)x + a = 0$
 - $ax^2 - a^2x + 1 = 0$
 - $ax^2 - (a^2 + 1)x + 1 = 0$
 - None of these

PYQ June 19

- (5) Find the condition that one roots is double the other of $ax^2 + bx + c = 0$
- $2b^2 = 3ac$
 - $b^2 = 3ac$
 - $2b^2 = 9ac$
 - $2b^2 > 9ac$

PYQ Nov. 19

- (6) Find the value of K in $3x^2 - 2kx + 5 = 0$ if $x = 2$
- 17/4
 - 7/14
 - 4/17
 - 4/17

PYQ Nov. 20

- (7) The rational root of the equation $\star 0 = 2p^3 - p^2 - 4p + 2$ is:
- 2
 - 2
 - 1/2
 - 1/2

PYQ Nov. 20

- (8) If $2x^2 - (a+6)2x + 12a = 0$, then the roots are:
- 6 and a
 - 4 and a^2
 - 3 and 2a
 - 6 and 3a

(16)

PYQ Nov. 20

- (9) Solving equation $m + \sqrt{m} = 6/25$, the value of m works out to:
- 1/25
 - 2/25
 - 3/25
 - 1

(17)

PYQ Jan. 21

- (10) The value of p for which the difference between the root of equation $x^2 + px + 8 = 0$ is 2
- ± 2
 - ± 4
 - ± 6
 - ± 8

(18)

PYQ Jan. 21

- (11) If the quadratic equation $x^2 + px + q = 0$ and $\star x^2 + qx + p = 0$ have a common root then $p + q = ?$
- 0
 - 1
 - 1
 - 2

(19)

PYQ Jan. 21

- (12) The harmonic mean of the roots of the equation $\star (5 + \sqrt{2})x^2 - (4 + \sqrt{5})x + 8 + 2\sqrt{5} = 0$ is
- 2
 - 4
 - 6
 - 8

(20)

PYQ July 21

- (13) If α and β are the roots of the equation $\star 2x^2 + 5x + k = 0$, and $4(\alpha^2 + \beta^2 + \alpha\beta) = 23$, then which of the following is true?
- $k^2 + 3k - 2 = 0$
 - $k^2 - 2k + 3 = 0$
 - $k^2 - 2k - 3 = 0$
 - $k^2 - 3k + 2 = 0$

(21)

PYQ July 21

- (14) The sum of square of any real positive quantity and its reciprocal is never less than:
- 1
 - 2
 - 3
 - 4

(22)

PYQ Dec. 21

- (15) If one root is half of the other of a quadratic equation and the difference in roots is a, then the equation is
- $x^2 + ax + 2a^2 = 0$
 - $x^2 - 3ax - 2a = 0$
 - $x^2 - 3ax + 2a^2 = 0$
 - $x^2 + 3ax - 2a^2 = 0$

(23)

- PYQ Dec. 21**
 (16) If the square of a number exceeds twice of the number by 15, then number that satisfies the condition is

a. -5 b. 3
 c. 5 d. 15

- PYQ June 22**
 (17) If the second root of the given equation is reciprocal of first root then value of 'K' in the equation $5x^2 - 13x + k = 0$

a. 3 b. 2
 c. 1 d. 5

- PYQ Dec 22**
 (18) If the roots of the equation $x^2 - px + q = 0$ are in the ratio 2:3, then:

a. $p^2 = 25q$ b. $p^2 = 6q$
 c. $6p^3 = 5q$ d. $6p^2 = 25q$

- PYQ Dec 22**
 (19) 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

- PYQ Jun 23**
 (20) If α and β are roots of the quadratic equation $x^2 - 2x - 3 = 0$ then the equation whose roots are $\alpha + \beta$ and $\alpha - \beta$ is:

a. 18 a. 20
 c. 19 c. 21

- PYQ Jun 23**
 (21) If α and β are roots of the equation $x^2 - (n^2 + 1)x + \frac{1}{2}(n^4 + n^2 + 1) = 0$ then the value of $\alpha^2 + \beta^2$ is:

a. $2n$ b. n^2
 c. $2n^2$ d. n^3

- PYQ Dec 23**
 (22) If α, β are the roots of the equation $x^2 - 4x + 1 = 0$, then value of $\alpha^3 + \beta^3$ will be

a. -76 b. 76
 c. -52 d. 52

- PYQ June 24**
 (23) If α and β are roots of the equation $ax^2 + bx + c = 0$ then the equation whose roots are $\frac{1}{\alpha}$ and $\frac{1}{\beta}$ is:

a. $cx^2 - bx + a = 0$ b. $cx^2 + bx + a = 0$
 c. $x^2 + bx + a = 0$ d. $x^2 + bx - a = 0$

PYQ June 24

- (24) If α and β are roots of the equation

$$x^2 - 8x + 12 = 0 \text{ then } \frac{1}{\alpha} + \frac{1}{\beta} = \underline{\hspace{2cm}}$$

a. $\frac{2}{3}$ b. $\frac{2}{4}$
 c. $\frac{3}{4}$ d. $\frac{4}{5}$

PYQ June 24

- (25) The roots of the equation $x^2 - 7x + 10 = 0$ are:

a. 2 and 5 b. -2 and -5
 c. 2 and -5 d. -2 and 5

PYQ Sep 24

- (26) If one of the root of the equation $x^2 - 3x + k = 0$ is 1 then the value of 'k' is

a. 1 b. 2
 c. -2 d. -1

Answer Key

1	b	2	d	3	c
4	a	5	c	6	a
7	c	8	a	9	a
10	c	11	c	12	b
13	d	14	b	15	c
16	c	17	d	18	d
19	b	20	b	21	b
22	b	23	b	24	a
25	a	26	b		

Problems on Quadratic Equations

Mock Test Paper Questions

MTP May 18

- (1) The equation $x^2 - (p+4)x + 2p + 5 = 0$ has equal roots. The value of p is

a. 2 b. -2
 c. ± 2 d. 3

MTP May 19

- (2) Let α, β be the roots of equation $x^2 + 7x + 12 = 0$

then the value of $\left(\frac{\alpha^2}{\beta} + \frac{\beta^2}{\alpha}\right)$ will be

a. $\frac{49}{144} + \frac{144}{49}$
 b. $\frac{7}{12} + \frac{12}{7}$

c. $\frac{-91}{12}$

d. None of these

MTP May 19

- (3) When two roots of quadratic equations are α and $\frac{1}{\alpha}$ then what will be quadratic equation.

- a. $\alpha x^2 - (\alpha^2 + 1)x + \alpha = 0$
 b. $\alpha x^2 - \alpha^2 x + 1 = 0$
 c. $\alpha x^2 - (\alpha^2 + 1)x + 1 = 0$
 d. None of these

MTP May 19 Series II

- (4) If α and 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

MTP May 19 Series II

- (5) If one root of the equation $x^2 + 7x + p = 0$ be reciprocal of the other, then the value of p is

- a. 1 b. -1
 c. 7 d. -7

MTP Nov 19

- (6) If one root of the quadratic equation is $2 + \sqrt{3}$, the equation is

- a. $x^2 - 4x + 1$ b. $x^2 + 4x + 1$
 c. $x^2 - 4x - 1$ d. None of these

MTP May 20

- (7) The roots of the quadratic equation $x^2 - 4x + k = 0$ are coincident if

- a. $k = 4$ b. $k = 3$
 c. $k = 2$ d. $k = 1$

MTP May 20

- (8) 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. $p \leq 1/4$

MTP Nov 20

- (9) The roots of the quadratic equation $9x^2 + 3kx + 4 = 0$ are equal if

- a. $k = \pm 2$
 b. $k = \pm 3$
 c. $k = \pm 4$
 d. $k = \pm 5$

MTP Nov 20

- (10) If one root of a equation is $2 + \sqrt{5}$, then the quadratic equation is

- a. $x^2 + 4x - 1 = 0$

- b. $x^2 - 4x - 1 = 0$
 c. $x^2 + 4x + 1 = 0$
 d. $x^2 - 4x + 1 = 0$

MTP March 21

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

- a. -10 b. 0
 c. 2 d. 10

MTP March 21

- (12) If arithmetic mean between roots of a quadratic equation is 8 and the geometric mean between them is 5, the equation is

- a. $x^2 - 16x - 25 = 0$ b. $x^2 - 16x + 25 = 0$
 c. $x^2 + 16x + 25 = 0$ d. None of these

MTP Apr 21

- (13) 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. $k = 14$

MTP Apr 21

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

- a. -10 b. 0
 c. 2 d. 10

MTP Apr 21

- (15) If arithmetic mean between roots of a quadratic equation is 8 and the geometric mean between them is 5, the equation is

- a. $x^2 - 16x - 25 = 0$ b. $x^2 - 16x + 25 = 0$
 c. $x^2 + 16x + 25 = 0$ d. None of these

MTP Nov 21

- (16) The equation $3x^2 + mx + n = 0$ has roots that are double that of equation $x^2 + 10x + 12 = 0$. What is the value of $m + n$?

- a. 104 b. 204
 c. 102 d. 202

MTP Nov 21

- (17) If α, β are the roots of equation $x^2 + 7x + 12 = 0$ then the equation whose roots $(\alpha + \beta)^2$ and $(\alpha - \beta)^2$ will be

- a. $x^2 - 14x + 49 = 0$
 b. $x^2 - 24x + 144 = 0$
 c. $x^2 - 50x + 49 = 0$
 d. $x^2 - 19x + 49 = 0$

(18) Given the Quadratic Equation $\frac{x+1}{x} - \frac{x}{x+1} = \frac{3}{2}$

- a. 1 and $-2/3$ b. -1 and $2/3$
c. -1 and $-2/3$ d. 1 and $2/3$

MTP Oct 21

(19) The roots of equation $9^{x+2} - 6 \cdot 3^{x+1} + 1 = 0$ are

- a. -2 b. 2
c. $\sqrt{2}$ d. 0

MTP Oct 21

(20) The roots of the equation $x^2 - x + 1 = 0$ are

- a. Imaginary and unequal
b. Real and unequal
c. Real and equal
d. Imaginary and equal

MTP Oct 21

(21) If one root of the QE is $2 + \sqrt{3}$, the equation is

- a. $x^2 - 4x + 1 = 0$ b. $x^2 + 4x + 1 = 0$
c. $x^2 - 4x - 1 = 0$ d. None of these

MTP Mar 22

(22) If α and β are the roots of the equation $x^2 + 7x + 12 = 0$, then the equation whose roots $(\alpha + \beta)^2$ and $(\alpha - \beta)^2$ will be:

- a. $x^2 - 14x + 49 = 0$
b. $x^2 - 24x + 144 = 0$
c. $x^2 - 50x + 49 = 0$
d. $x^2 - 19x + 144 = 0$

MTP March 22

(23) Roots of the equation $2x^2 + 3x + 7 = 0$ are α and β then the value of $\alpha\beta^{-1} + \beta\alpha^{-1}$ is

- a. 2 b. $3/7$
c. $7/2$ d. $-19/14$

MTP June 22

(24) If the ratio of the roots of the equation $4x^2 - 6x + p = 0$ is $1:2$ then the value of p is:

- a. 1 b. 2
c. -2 d. -1

MTP June 22

(25) If roots of equation $x^2 + x + r = 0$ are α and β and

★ $\alpha^3 + \beta^3 = -6$. Find the value of 'r'

- a. $-5/3$ b. $7/3$
c. $-4/3$ d. 1

MTP Dec 22 - Series I

(26) If one root is $5z^2 + 13z + y$ is 0 be reciprocal of the other, then the value of y is

C

- a. $\frac{1}{5}$ b. $\frac{1}{5}$
c. 5 d. -5

MTP Dec 22 Series II

(27) Find value of $x^2 - 10x + 1$, if $x = \frac{1}{5 - 2\sqrt{6}}$

- a. 25 b. 1
c. 0 d. 49

MTP Dec 22 Series II

(28) Find the value of k in $3x^2 - 2kx + 5 = 0$ if $x = 2$.

- a. $17/4$ b. $-7/14$
c. $4/17$ d. $-4/17$

MTP Jun 23 Series I

(29) If one root of the quadratic equation is $2 - \sqrt{3}$ from the equation given that the roots are irrational. Then find the Quadratic equation.

- a. $x^2 - 4x + 1 = 0$ b. $x^2 + 4x - 1 = 0$
c. $x^2 - 4x - 1 = 0$ d. $x^2 + 4x + 1 = 0$

MTP Jun 23 Series I

(30) If the roots of $(k-4)x^2 - 2kx + (k+5) = 0$ are coincident. Then the value of k ?

- a. 14 b. 20
c. 18 d. 22

MTP Dec 23 Series I

(31) ★ If $x = 3^{\frac{1}{4}} + 3^{\frac{1}{4}}$ and $y = 3^{\frac{1}{4}} - 3^{\frac{1}{4}}$ then the value $3(x^2 + y^2)^2$ will be

- a. 12 b. 18
c. 46 d. 64

MTP Dec 23 Series I

(32) If the ratio of the roots of the Equation $4x^2 - 6x + p = 0$ is $1:2$ then the value of p is:

- a. 1 b. 2
c. -2 d. -1

MTP Dec 23 - Series II

(33) ★ If arithmetic mean between roots of a quadratic equation is 8 and the geometric mean between them is 5 , the equation is _____.

- a. $x^2 - 16x - 25 = 0$ b. $x^2 - 16x + 25 = 0$
c. $x^2 - 16x + 5 = 0$ d. None of these

MTP Mar 21

(34) The value of $\sqrt{6 + \sqrt{6 + \sqrt{6 + \dots \infty}}}$

- a. -3 b. 2
c. 3 d. 4

MTP June 24 Series I

- (35) One root of the eq. $x^2 - 2(5+m) + 3(7+m) = 0$ is reciprocal of the other. Find the value of m .
- a. $-20/3$ b. 7
c. $1/7$ d. 117

MTP June 24 Series III

- (36) The equation $x^2 - (p+4)x + 2p + 5 = 0$ has equal roots. The value of p is
- a. 2 b. -2
c. ± 2 d. 3

MTP Sep 24 Series I

- (37) If α and β are roots of the equation $x^2 - 8x + 12 = 0$ then $1/\alpha + 1/\beta =$ _____
- a. $2/3$ b. $2/4$
c. $3/4$ d. $4/5$

MTP Sep 24 Series I

- (38) The roots of the equation $x^2 - 7x + 10 = 0$ are:
- a. -2 and -5 b. 2 and 5
c. 2 and -5 d. -2 and 5

MTP Sep 24 Series I

- (39) If the ratio of the roots of the equation $4x^2 - 6x + p = 0$ is 1:2 then the value of p is:
- a. 1 b. 2
c. -2 d. -1

MTP Sep 24 Series II

- (40) If α, β are the roots of the QE $3x^2 - 4x + 1 = 0$; the eq. having roots $\frac{\alpha^2}{\beta}, \frac{\beta^2}{\alpha}$
- a. $9x^2 - 28x + 3 = 0$;
b. $9x^2 - 28x + 1 = 0$
c. $9x^2 - 28x + 5 = 0$;
d. None of these

RTP Sep 24

- (41) If α and β are the roots of the equation $x^2 + 7x + 12 = 0$, then the equation whose roots $(\alpha + \beta)^2$ and $(\alpha - \beta)^2$ will be:
- a. $x^2 - 14x + 49 = 0$
b. $x^2 - 24x + 144 = 0$
c. $x^2 - 50x + 49 = 0$
d. $x^2 - 19x + 144 = 0$

Answer Key

- | | | |
|------|------|------|
| 1 c | 2 c | 3 a |
| 4 b | 5 a | 6 a |
| 7 a | 8 d | 9 c |
| 10 b | 11 c | 12 b |
| 13 c | 14 c | 15 b |

- | | | |
|------|------|------|
| 16 b | 17 c | 18 a |
| 19 a | 20 a | 21 a |
| 22 c | 23 d | 24 b |
| 25 a | 26 c | 27 c |
| 28 a | 29 a | 30 b |
| 31 d | 32 b | 33 b |
| 34 c | 35 a | 36 c |
| 37 a | 38 b | 39 b |
| 40 a | 41 c | |

Problems on Cubic Equations

Past Year Questions

PYQ Nov. 19

- (1) Roots of the equation $x^3 + 9x^2 - x - 9 = 0$.
- a. 1, 2, 3 b. 1, -1, -9
c. 2, 3, -9 d. 1, 3, 9

PYQ July 21

- (2) The value of 'k' is _____, if 2 is the root of the following cubic equation: $x^3 - (k+1)x + k = 0$
- a. 2 b. 6
c. 1 d. 4

PYQ Dec. 21

- (3) Solve $x^3 - 7x + 6 = 0$
- a. $x = 6, 7, -4$ b. $x = -1, -2, -3$
c. $x = 1, 2, -3$ d. $x = 2, 4, 6$

PYQ Dec 23

- (4) The sol. of cubic eq. $x^3 - 23x^2 + 142x - 120 = 0$ is given by the triplet:
- a. (1, 10, 12) b. (1, -10, 12)
c. (-1, -10, -12) d. (1, 10, -12)

PYQ Dec 23

- (5) The roots of the equation $x^3 + x^2 - x - 1 = 0$ are
- a. $x = 1, x = -1, x = -1$
b. $x = 1, x = 1, x = -1$
c. $x = -1, x = -1, x = -1$
d. $x = 1, x = 1, x = 1$

PYQ June 24

- (6) The equation $x^3 - 3x^2 - 4x + 12 = 0$ has three real roots. They are:
- a. -2, 2, 3 b. -2, -2, 3
c. 2, -2, -3 d. -2, 2, -3

PYQ Sep 24

(7) If one of the root of the cubic equation

A $3x^3 - 5x^2 - 11x - 3 = 0$ is $-\frac{1}{3}$, then other two

roots are:

a. $-1 \& 3$

b. $1 \& 3$

c. $1 \& -3$

d. $-1 \& -3$

Answer Key

1 b

2 b

3 c

4 a

5 a

6 a

7 a

MTP Sep 24 Series I

(6) The equation $x^3 - 3x^2 - 4x + 12 = 0$ has three real roots, they are:

a. $-2, 2, 3$

b. $-2, -2, 3$

c. $2, -2, -3$

d. $-2, 2, -3$

Answer Key

1 c

2 b

3 c

4 b

5 c

6 a

Problems on Cubic Equations

Mock Test Paper Questions

MTP Nov 18

(1) if α, β, γ are the roots of equation

$x^3 - 4x^2 + x + 6 = 0$ then the equation having

roots are $\frac{1}{\alpha}, \frac{1}{\beta}, \frac{1}{\gamma}$ is

a. $x^3 - 4x^2 + x + 6 = 0$

b. $4x^3 - 6x^2 + x - 1 = 0$

c. $6x^3 + x^2 - 4x + 1 = 0$

d. $6x^3 - x^2 + 4x - 1 = 0$

Note: Out of syllabus - you can leave this.

MTP May 19

(2) If $x = 5^{1/3} + 5^{-1/3}$, then $5x^3 - 15x$ is given by

a. 25

b. 26

c. 27

d. 30

MTP Nov 21

(3) $(x + 4)$ is a factor of $x^4 + 4x^3 - ax^2 - bx + 24$.★ Also, $a + b = 29$. Find the value of b .

a. 7

b. 16

c. 22

d. 13

MTP Dec 22 Series I

(4) Roots of the equation $x^3 + 9x^2 - x - 9 = 0$.

a. 1, 2, 3

b. 1, -1, -9

c. 2, 3, -9

d. 1, 3, 9

MTP Dec 22 Series II

(5) The roots of the cubic eq. $x^3 - 7x + 6 = 0$ are:

a. 1, 2 and 3

b. 1, -2 and 3

c. 1, 2 and -3

d. 1, -2 and -3