CHAPTER 1.6

Solving Other Types of Equations

Multiple-Choice Old Exam Questions

31 questions • 5 topics • options A–E • two questions per page

Topic 1 | Radical Equations

Isolating radicals, squaring both sides, and rejecting extraneous solutions • Questions 1–8

Q **1**

The product of all the solutions of $\sqrt{2x+1}+1=x$ is equal to

A) 4

B) 0

C) 2

D) -2

E) 1

Q **2**

The solution set of the equation $\sqrt{3x+1}=2+\sqrt{x+1}$ has

A) one positive integer only.

B) two positive integers.

C) one positive and one negative integer.

D) two negative integers.

E) one negative integer only.

Q
3

The solution set of the equation $\sqrt{x+5} = x+3$ consists of

A) only one positive integer

B) only one negative integer

C) two positive integers

D) two negative integers

E) two nonnegative integers

Q
4

The equation $\sqrt{2\sqrt{7x+2}} = \sqrt{3x+2}$ has

A) two rational solutions

B) one rational solution only

C) no solution

D) two irrational solutions

E) one irrational solution only

Q
5

If $x = k$ is the solution of the equation $2x = 1 - \sqrt{2 - x}$, then $8k + 1 =$

A) -1

B) 1

C) 3

D) -3

E) 5

Q
6

The sum of all real solutions of the equation $\sqrt{2x + 3} - \sqrt{x + 1} - 1 = 0$ is

A) 0

B) -3

C) 3

D) -1

E) 2

Q
7

The sum of the solutions which satisfy the equation $\sqrt{x+1} - \sqrt{2x-5} = 1$ is

A) 3

B) 18

C) 15

D) 5

E) 8

Q
8

The sum of all the solution(s) of the equation $x = \sqrt{x+5} + 7$ is

A) 11

B) -7

C) 4

D) 15

E) 7

Topic 2 | Fourth Roots and Radical Quadratic Type

Equations involving fourth roots, or quadratic in form with a radical • Questions 9–12

Q **9**

The sum of the solutions of the equation $x - \sqrt{x} - 12 = 0$ is

A) 16

B) 25

C) 9

D) 7

E) 4

Q **10**

The sum of all solutions of the equation $\sqrt{x} - \sqrt[4]{x} - 2 = 0$ is

A) 16

B) -16

C) -1

D) 17

E) 1

Q
11

The sum of the distinct solutions of the equation $\sqrt[4]{x^3 + 6x^2} = x$ is

A) 3

B) 2

C) -2

D) 1

E) -3

Q
12

The sum of the distinct solutions of the equation $\sqrt[4]{x^3 + 2x^2} = x$ is

A) 3

B) -1

C) 2

D) 0

E) 1

Topic 3 | Rational Exponents

Equations with fractional exponents, solved by raising to a power or by substitution • Questions 13–18

Q **13**

The sum of all the solutions of the equation $(x+1)^{2/3} = 4$ is

A) -2

B) -9

C) 7

D) -7

E) 3

Q **14**

The sum of all the solutions of the equation $16(x+5)^{-2/3} - (x+5)^{4/3} = 0$ is

A) -10

B) 12

C) 8

D) -14

E) 10

Q
15

The sum of all the solutions of the equation $9(2x+1)^{-1/3} - (2x+1)^{2/3} = 0$ is

A) -5

B) 5

C) $\frac{7}{2}$

D) -4

E) 4

Q
16

The sum of all the solutions of the equation $x^{2/3} - 4x^{1/3} - 32 = 0$ is

A) 448

B) 576

C) 512

D) 64

E) 4

Q
17

The sum of all the solutions of the equation $(y+3)^{2/3} - 2(y+3)^{1/3} - 3 = 0$ is

A) 20

B) -18

C) -27

D) 28

E) 30

Q
18

The sum of all the solutions of the equation $(x+1)^{2/3} = (x+1)^{1/3} + 6$ is

A) 17

B) 35

C) 19

D) 3

E) -17

Topic 4 | Rational Equations

Clearing denominators and excluding values that make a denominator zero • Questions 19–24

Q **19**

The sum of all the solution(s) of the equation $\frac{4x}{x-5} - \frac{1}{x+1} = \frac{3x^2+3}{x^2-4x-5}$ is

A) -2

B) -3

C) -1

D) 2

E) 3

Q **20**

The solution set of the equation $\frac{3}{x+4} + \frac{4}{x+3} = \frac{4}{x^2+7x+12}$ contains

A) no real solution

B) one positive real number only

C) two negative real numbers

D) one negative real number only

E) two positive real numbers

Q
21

The solution set of the equation $\frac{x+2}{2-x}+\frac{1}{x}=\frac{-2}{x^2-2x}$ contains

A) one negative integer.

B) one positive integer.

C) two integers.

D) no real solution.

E) one negative and one positive integer.

Q
22

The sum of all the solution(s) of the equation $\frac{x-3}{x+6}+\frac{x-2}{x-3}=\frac{x^2}{x^2+3x-18}$ is

A) -1

B) 3

C) 1

D) -4

E) 2

Q
23

The sum of all the solution(s) of the equation $\frac{x^2+2x}{x^2-36}+\frac{2}{x+6}=\frac{1}{x-6}$ is

A) 3

B) -3

C) 6

D) -6

E) 0

Q
24

The solution set of the equation $\frac{x-1}{x^2-1}=\frac{1}{2}$ consists of

A) no real numbers

B) only one positive integer

C) only one negative integer

D) one positive and one negative integer

E) two negative integers

Topic 5 | Quadratic Type, Factoring and Higher Degree

Substitution, factoring, and counting or summing the real solutions • Questions 25–31

Q **25**

The sum of the real solutions of the equation $\frac{1}{x^6}+\frac{9}{x^3}+8=0$ is

A) $-\frac{3}{2}$

B) $-\frac{9}{8}$

C) -9

D) $-\frac{1}{2}$

E) $\frac{1}{2}$

Q **26**

The sum of all the solutions of the equation $\left(\frac{x-1}{x}\right)^2-\frac{x-1}{x}=2$ is

A) $-\frac{1}{2}$

B) $\frac{1}{2}$

C) $\frac{3}{2}$

D) $-\frac{3}{2}$

E) 2

Q
27

The number of real solutions of the equation $8x^6 + 1 = -9x^3$ is

A) 1

B) 2

C) 4

D) 3

E) 6

Q
28

The solution set of the equation $(x + 3)^4 - 5(x + 3)^2 + 4 = 0$ consists of

A) four negative integers

B) one positive and three negative integers

C) two positive and two negative integers

D) four positive integers

E) two negative integers and two nonreal complex numbers

Q
29

The solution set of the equation $(x+2)^3 - 64 = 0$ consists of

A) one real solution and two nonreal complex solutions

B) one real solution and one nonreal complex solution

C) two real solutions and one nonreal complex solution

D) three nonreal complex solutions

E) one real solution only

Q
30

The sum of all the solution(s) of the equation $(x-5)(x^3 - 3x^2 - 3x + 12) = (x-5)x$ is

A) 8

B) 3

C) 5

D) 6

E) 10

Q
31

The solution set of the equation $x^5 - x^4 - x^3 + x^2 + x - 1 = 0$ consists of

A) two negative integers

B) five real numbers

C) three negative integers

D) only one positive integer

E) no real number

Answer Key

"Original" shows the question number in the source worksheet.

Q	Original	Ans.	Value	Q	Original	Ans.	Value
1	1	**A**	4	**17**	10	**A**	20
2	4	**A**	one positive integer only.	**18**	14	**A**	17
3	29	**B**	only one negative integer	**19**	3	**A**	-2
4	8	**A**	two rational solutions	**20**	7	**A**	no real solution
5	15	**A**	-1	**21**	19	**A**	one negative integer.
6	17	**E**	2	**22**	23	**A**	-1
7	21	**A**	3	**23**	24	**A**	3
8	22	**A**	11	**24**	30	**A**	no real numbers
9	20	**A**	16	**25**	9	**A**	$-\frac{3}{2}$
10	11	**A**	16	**26**	28	**A**	$-\frac{1}{2}$
11	5	**A**	3	**27**	16	**B**	2
12	26	**C**	2	**28**	18	**A**	four negative integers
13	6	**A**	-2	**29**	12	**A**	one real solution and two nonreal complex solutions
14	2	**A**	-10	**30**	27	**A**	8
15	25	**E**	4	**31**	31	**D**	only one positive integer
16	13	**A**	448				