

Math Sheet

Name _____ Score _____ / 10 Teacher _____ Date _____

Solve Radical Equations

Isolate when needed, square carefully, and check every candidate in the original equation.

1. $\sqrt{2 \cdot x - 2} = x - 5$

Domain: real variables $x \in \mathbb{R} \quad 2 \cdot x - 2 \geq 0$

2. $\sqrt{10 \cdot x - 5} = x + 2$

Domain: real variables $x \in \mathbb{R} \quad 10 \cdot x - 5 \geq 0$

3. $5 + \sqrt{2 \cdot x + 2} = x + 2$

Domain: real variables $x \in \mathbb{R} \quad 2 \cdot x + 2 \geq 0$

4. $-2 + \sqrt{15 \cdot x - 14} = x$

Domain: real variables $x \in \mathbb{R} \quad 15 \cdot x - 14 \geq 0$

5. $\sqrt{x} = 2$

Domain: real variables $x \in \mathbb{R} \quad x \geq 0$

6. $\sqrt{5 \cdot x + 75} = 5$

Domain: real variables $x \in \mathbb{R} \quad 5 \cdot x + 75 \geq 0$

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Solve Radical Equations

Isolate when needed, square carefully, and check every candidate in the original equation.

7. $\sqrt{x} = 6$

Domain: real variables $x \in \mathbb{R} \quad x \geq 0$

8. $3 + \sqrt{x+2} = x + 3$

Domain: real variables $x \in \mathbb{R} \quad x + 2 \geq 0$

9. $\sqrt{x+54} = x - 2$

Domain: real variables $x \in \mathbb{R} \quad x + 54 \geq 0$

10. $\sqrt{28 \cdot x - 84} = x + 4$

Domain: real variables $x \in \mathbb{R} \quad 28 \cdot x - 84 \geq 0$

Solve Radical Equations

Answer Key

Isolate when needed, square carefully, and check every candidate in the original equation.

1. $\sqrt{2 \cdot x - 2} = x - 5$

Domain: real variables $x \in \mathbb{R} \quad 2 \cdot x - 2 \geq 0$

Work:

$$2 \cdot x - 2 = (x - 5)^2$$

$$(x - 3) \cdot (x - 9) = 0$$

$$x \in \{3, 9\}$$

$$x \in \{9\}$$

Check x = 3

left: 2
right: -2

extraneous: fails the principal-root sign condition

Check x = 9

left: 4
right: 4

valid: satisfies the original equation

2. $\sqrt{10 \cdot x - 5} = x + 2$

Domain: real variables $x \in \mathbb{R} \quad 10 \cdot x - 5 \geq 0$

Work:

$$10 \cdot x - 5 = (x + 2)^2$$

$$(x - 3) \cdot (x - 3) = 0$$

$$x \in \{3\}$$

Check x = 3

left: 5
right: 5

valid: satisfies the original equation

3. $5 + \sqrt{2 \cdot x + 2} = x + 2$

Domain: real variables $x \in \mathbb{R} \quad 2 \cdot x + 2 \geq 0$

Work:

$$\sqrt{2 \cdot x + 2} = x - 3$$

$$2 \cdot x + 2 = (x - 3)^2$$

$$(x - 1) \cdot (x - 7) = 0$$

$$x \in \{1, 7\}$$

$$x \in \{7\}$$

Check x = 1

left: 7
right: 3

extraneous: fails the principal-root sign condition

Check x = 7

left: 9
right: 9

valid: satisfies the original equation

4. $-2 + \sqrt{15 \cdot x - 14} = x$

Domain: real variables $x \in \mathbb{R} \quad 15 \cdot x - 14 \geq 0$

Work:

$$\sqrt{15 \cdot x - 14} = x + 2$$

$$15 \cdot x - 14 = (x + 2)^2$$

$$(x - 2) \cdot (x - 9) = 0$$

$$x \in \{2, 9\}$$

Check x = 2

left: 2
right: 2

valid: satisfies the original equation

Check x = 9

left: 9
right: 9

valid: satisfies the original equation

5. $\sqrt{x} = 2$

Domain: real variables $x \in \mathbb{R} \quad x \geq 0$

Work:

$$x \in \{4\}$$

Check x = 4

left: 2
right: 2

valid: satisfies the original equation

6. $\sqrt{5 \cdot x + 75} = 5$

Domain: real variables $x \in \mathbb{R} \quad 5 \cdot x + 75 \geq 0$

Work:

$$5 \cdot x + 75 = 25$$

$$x \in \{-10\}$$

Check x = -10

left: 5
right: 5

valid: satisfies the original equation

Solve Radical Equations

Answer Key

Isolate when needed, square carefully, and check every candidate in the original equation.

7. $\sqrt{x} = 6$

Domain: real variables $x \in \mathbb{R} \quad x \geq 0$

Work:

$$x \in \{36\}$$

Check x = 36

left: 6

right: 6

valid: satisfies the original equation

8. $3 + \sqrt{x+2} = x + 3$

Domain: real variables $x \in \mathbb{R} \quad x + 2 \geq 0$

Work:

$$\sqrt{x+2} = x$$

$$x + 2 = x^2$$

$$(x+1)(x-2) = 0$$

$$x \in \{-1, 2\}$$

$$x \in \{2\}$$

Check x = -1

left: 4

right: 2

extraneous: fails the principal-root sign condition

Check x = 2

left: 5

right: 5

valid: satisfies the original equation

9. $\sqrt{x+54} = x - 2$

Domain: real variables $x \in \mathbb{R} \quad x + 54 \geq 0$

Work:

$$x + 54 = (x - 2)^2$$

$$(x+5)(x-10) = 0$$

$$x \in \{-5, 10\}$$

$$x \in \{10\}$$

Check x = -5

left: 7

right: -7

extraneous: fails the principal-root sign condition

Check x = 10

left: 8

right: 8

valid: satisfies the original equation

10. $\sqrt{28 \cdot x - 84} = x + 4$

Domain: real variables $x \in \mathbb{R} \quad 28 \cdot x - 84 \geq 0$

Work:

$$28 \cdot x - 84 = (x + 4)^2$$

$$(x-10)(x-10) = 0$$

$$x \in \{10\}$$

Check x = 10

left: 14

right: 14

valid: satisfies the original equation