

Conceptual Multiple Choice Questions: Radical Equations (Exercise 4.3)

Class 11 Mathematics (Chapter 4)

Prepared by ExpertGuy

MCQs

1. The equation $3x^2 + 2x - \sqrt{3x^2 + 2x - 1} = 3$ is of:
 - (a) Type I
 - (b) Type II
 - (c) Type III
 - (d) Type IV
2. For $3x^2 + 2x - \sqrt{3x^2 + 2x - 1} = 3$, the substitution is:
 - (a) $\sqrt{3x^2 + 2x - 1} = y$
 - (b) $3x^2 + 2x = y$
 - (c) $\sqrt{3x^2 + 2x} = y$
 - (d) $x^2 = y$
3. The solution set of $3x^2 + 2x - \sqrt{3x^2 + 2x - 1} = 3$ is:
 - (a) $\{-\frac{5}{3}, 1\}$
 - (b) $\{-1, \frac{1}{3}\}$
 - (c) $\{\frac{-1 \pm \sqrt{7}}{3}\}$
 - (d) $\{0, 2\}$
4. The equation $2x^2 - \frac{x}{2} - 7 = x - 3\sqrt{2x^2 - 3x + 2}$ uses the substitution:
 - (a) $\sqrt{2x^2 - 3x + 2} = y$
 - (b) $2x^2 - 3x = y$
 - (c) $\sqrt{2x^2 - 3x} = y$
 - (d) $x = y$
5. The solution set of $2x^2 - \frac{x}{2} - 7 = x - 3\sqrt{2x^2 - 3x + 2}$ is:
 - (a) $\{-\frac{1}{2}, 2\}$
 - (b) $\{\frac{3 \pm \sqrt{505}}{4}\}$
 - (c) $\{0, 1\}$
 - (d) $\{-1, 3\}$
6. The equation $\sqrt{2x + 8} + \sqrt{x + 5} = 7$ is of:

- (a) Type I
 - (b) Type II
 - (c) Type III
 - (d) Type IV
7. The solution set of $\sqrt{2x+8} + \sqrt{x+5} = 7$ is:
- (a) $\{4\}$
 - (b) $\{284\}$
 - (c) $\{4, 284\}$
 - (d) \emptyset
8. For $\sqrt{3x+4} = 2 + \sqrt{2x-4}$, the first step is:
- (a) Substitute $\sqrt{3x+4} = y$
 - (b) Square both sides
 - (c) Isolate $\sqrt{2x-4}$
 - (d) Factorize the equation
9. The solution set of $\sqrt{3x+4} = 2 + \sqrt{2x-4}$ is:
- (a) $\{4, 20\}$
 - (b) $\{4\}$
 - (c) $\{20\}$
 - (d) \emptyset
10. The equation $\sqrt{x+7} + \sqrt{x+2} = \sqrt{6x+13}$ is of:
- (a) Type I
 - (b) Type II
 - (c) Type III
 - (d) Type IV
11. The solution set of $\sqrt{x+7} + \sqrt{x+2} = \sqrt{6x+13}$ is:
- (a) $\{2\}$
 - (b) $\{-\frac{5}{3}\}$
 - (c) $\{2, -\frac{5}{3}\}$
 - (d) \emptyset
12. For $\sqrt{x^2+x+1} - \sqrt{x^2+x-1} = 1$, the substitution is:
- (a) $\sqrt{x^2+x+1} = a, \sqrt{x^2+x-1} = b$
 - (b) $x^2+x = y$
 - (c) $\sqrt{x^2+x} = y$

- (d) $x = y$
13. The solution set of $\sqrt{x^2 + x + 1} - \sqrt{x^2 + x - 1} = 1$ is:
- $\left\{ \frac{-1 \pm \sqrt{6}}{2} \right\}$
 - $\{1, -1\}$
 - $\{0, 2\}$
 - \emptyset
14. The equation $\sqrt{x^2 + 2x - 3} + \sqrt{x^2 + 7x - 8} = \sqrt{5(x^2 + 3x - 4)}$ uses:
- Substitution $x^2 = y$
 - Factoring $\sqrt{x - 1}$
 - Squaring both sides directly
 - Substituting $x + 3 = y$
15. The solution set of $\sqrt{x^2 + 2x - 3} + \sqrt{x^2 + 7x - 8} = \sqrt{5(x^2 + 3x - 4)}$ is:
- $\{-3, 1\}$
 - $\{1\}$
 - $\{-3\}$
 - \emptyset
16. For $\sqrt{2x^2 - 5x - 3} + 3\sqrt{2x + 1} = \sqrt{2x^2 + 25x + 12}$, the key step is:
- Factor $\sqrt{2x + 1}$
 - Substitute $2x^2 - 5x = y$
 - Square both sides
 - Substitute $x = y$
17. The solution set of $\sqrt{2x^2 - 5x - 3} + 3\sqrt{2x + 1} = \sqrt{2x^2 + 25x + 12}$ is:
- $\left\{-\frac{1}{2}, 4\right\}$
 - $\{1, 4\}$
 - $\left\{-\frac{1}{2}\right\}$
 - \emptyset
18. The equation $(x + 4)(x + 1) = \sqrt{x^2 + 2x - 15} + 3x + 31$ uses the substitution:
- $\sqrt{x^2 + 2x - 15} = y$
 - $x^2 + 2x = y$
 - $x + 4 = y$
 - $x = y$
19. The solution set of $(x + 4)(x + 1) = \sqrt{x^2 + 2x - 15} + 3x + 31$ is:
- $\{-1 \pm 4\sqrt{2}\}$

(b) $\{-6, 4\}$

(c) $\{0, 1\}$

(d) \emptyset

20. The solution set of $\sqrt{3x^2 - 2x + 9} + \sqrt{3x^2 - 2x - 4} = 13$ is:

(a) $\{4, -\frac{10}{3}\}$

(b) $\{4\}$

(c) $\{-\frac{10}{3}\}$

(d) \emptyset

Answers and Explanations

1. **Answer: a**

Matches $l(ax^2 + bx) + m\sqrt{ax^2 + bx + c} = k$ (PDF p.240).

2. **Answer: a**

$\sqrt{3x^2 + 2x - 1} = y$ reduces to a quadratic in y (PDF p.241).

3. **Answer: a**

After checking, $\{-\frac{5}{3}, 1\}$ are valid; others are extraneous (PDF p.242).

4. **Answer: a**

$\sqrt{2x^2 - 3x + 2} = y$ simplifies the equation (PDF p.243).

5. **Answer: a**

$\{-\frac{1}{2}, 2\}$ satisfy; others are extraneous (PDF p.244).

6. **Answer: b**

Matches $\sqrt{x+a} + \sqrt{x+b} = \sqrt{x+c}$ (PDF p.240).

7. **Answer: a**

$x = 4$ satisfies; $x = 284$ is extraneous (PDF p.245).

8. **Answer: c**

Isolating $\sqrt{2x-4}$ leads to squaring (PDF p.246).

9. **Answer: a**

Both $x = 4, 20$ satisfy the equation (PDF p.246).

10. **Answer: b**

Matches $\sqrt{x+a} + \sqrt{x+b} = \sqrt{x+c}$ (PDF p.240).

11. **Answer: a**

$x = 2$ satisfies; $-\frac{5}{3}$ is extraneous (PDF p.247).

12. **Answer: a**

Use $a = \sqrt{x^2 + x + 1}$, $b = \sqrt{x^2 + x - 1}$ to solve (PDF p.248).

13. **Answer: a**
 $\left\{\frac{-1 \pm \sqrt{6}}{2}\right\}$ are valid solutions (PDF p.248).
14. **Answer: b**
Factoring $\sqrt{x-1}$ simplifies the equation (PDF p.249).
15. **Answer: a**
 $\{-3, 1\}$ satisfy after checking (PDF p.250).
16. **Answer: a**
Factor $\sqrt{2x+1}$ to simplify (PDF p.251).
17. **Answer: a**
 $\left\{-\frac{1}{2}, 4\right\}$ are valid solutions (PDF p.251).
18. **Answer: a**
 $\sqrt{x^2 + 2x - 15} = y$ reduces to a quadratic (PDF p.253).
19. **Answer: a**
 $\{-1 \pm 4\sqrt{2}\}$ satisfy; others are extraneous (PDF p.254).
20. **Answer: a**
Both $4, -\frac{10}{3}$ satisfy the equation (PDF p.256).