

Section 3.4 Notes

Solving Rational Equations and Radical Equations

1 Rational Equations

Method

1. Find the least common denominator for every fraction and multiply both sides of the equation by this. This should cancel out all the fractions.
2. Solve the equation to find *potential* solutions.
3. Some of the answers you found might not be solutions! Check your answers against the domain of the original problem. Since the original problem has fractions, you have to make sure you never divide by zero.

Example

Solve for x :

1. $\frac{2}{5} - \frac{x+1}{4} = \frac{x}{10}$

$$x = \frac{3}{7}$$

2. $\frac{x+3}{x-2} + \frac{3}{x-3} = \frac{-5}{x^2-5x+6}$

$$x = -5$$

3. $\frac{6}{x+3} + \frac{2}{x} = \frac{5x-3}{x^2-9}$

$$x = -1 \text{ or } x = 6$$

2 Square Root Equations

Method

1. Isolate a single root on one side of the equation.
2. Square both sides to cancel out the root.
3. Repeat steps 1 and 2 for any other roots.
4. Solve the equation to find *potential* solutions.
5. Check the answers in the original equation - some of them might not actually be solutions!

ExampleSolve for x :

1. $\sqrt{4x+9} + 3x = 2x - 1$

$$x = -2$$

2. $\sqrt{y+1} + \sqrt{y-2} = 3$

$$y = 3$$

3 Solve for One Variable in Terms of Others

Examples

1. Solve for y : $\frac{xy+z}{wy+z} = 3$

$$y = \frac{2z}{x-3w}$$

2. Solve for c : $\frac{1}{a} + \frac{1}{b} = \frac{1}{c}$

$$c = \frac{ab}{a+b}$$