

Advanced Algebra  
Homework 9.3  
Solving Rational Equations

Name \_\_\_\_\_

Period \_\_\_\_\_

**SHOW ALL WORK.**

Complete Parts A & B OR Parts B & C

**PART A:**

**Solve the equation. Check for extraneous solutions.**

1.  $\frac{4}{2x} = \frac{5}{x+6}$

2.  $\frac{9}{3x} = \frac{4}{x+2}$

3.  $\frac{6}{x-1} = \frac{9}{x+1}$

4.  $\frac{4}{x} + x = 5$

5.  $\frac{2}{3x} + \frac{1}{6} = \frac{4}{3x}$

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

7.  $\frac{1}{2x} + \frac{3}{x+7} = \frac{-1}{x}$

**PART B:**

Solve the equation. Check for extraneous solutions.

8.  $\frac{8}{3x-2} = \frac{2}{x-1}$

9.  $\frac{x}{x+1} = \frac{3}{x+1}$

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

11.  $\frac{1}{x-2} + 2 = \frac{3x}{x+2}$

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

13.  $\frac{x+1}{x+6} + \frac{1}{x} = \frac{2x+1}{x+6}$

14.  $\frac{2}{x-3} + \frac{1}{x} = \frac{x-1}{x-3}$

**PART C:**

Solve the equation. Check for extraneous solutions.

15.  $\frac{x}{x^2-2} = \frac{-1}{x}$

16.  $\frac{4(x-4)}{x^2+2x-8} = \frac{4}{x+4}$

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

$$18. \frac{6x}{x+4} + 4 = \frac{2x+2}{x-1}$$

$$19. \frac{10}{x} + 3 = \frac{x+9}{x-4}$$

$$20. \frac{18}{x^2-3x} - \frac{6}{x-3} = \frac{5}{x}$$

$$21. \frac{x+3}{x-3} + \frac{x}{x-5} = \frac{x+5}{x-5}$$

Assume  $a$  is a nonzero real number. Tell whether the algebraic statement is *always true*, *sometimes true*, or *never true*. Explain your answer.

22. For the equation  $\frac{1}{x-a} = \frac{x}{x-a}$ ,  $x = a$  is an extraneous solution.

23. The equation  $\frac{3}{x-a} = \frac{x}{x-a}$ , has exactly one solution.

24. The equation  $\frac{1}{x-a} = \frac{2}{x+a} + \frac{2a}{x^2-a^2}$ , has no solution.

## Unit 9.3 Homework Answers

1. 4

2. 6

3. 5

4. 1, 4

5. 4

6.  $\frac{-3 \pm \sqrt{129}}{4}$

7.  $-\frac{7}{3}$

8. 2

9. 3

10. -1

11. 1, 6

12.  $\frac{-1 \pm \sqrt{79}}{3}$

13. -2, 3

14. 1

15. -1, 1

16. no solution

17. 6

18.  $-\frac{3}{2}, 2$

19.  $-\frac{5}{2}, 8$

20. no solution

21. 0, 7

22. always true

23. sometimes true

23. always true