



## RATIONAL EQUATIONS

To solve an equation containing fractions, **clear denominators** by multiplying each term of the equation by the least common multiple, LCM, of the denominators. Then solve for the variable. Occasionally, a value of the variable that appears to be a solution will make one or more of the denominators zero. If that happens, the equation has no solution for that value of the variable.

SOLVE:  $\frac{3X}{X-5} = 5 - \frac{5}{X-5}$       The LCM is  $X - 5$       Multiply each term by  $x - 5$

$$(X-5)\left(\frac{3X}{X-5}\right) = (X-5)5 - (X-5)\left(\frac{5}{X-5}\right)$$

$$3X = 5X - 25 - 5$$

$$3X = 5X - 30$$

$$-2X = -30$$

$$X = 15$$

SIMPLIFY:

15 checks as a solution.

SOLVE THE FOLLOWING RATIONAL EQUATIONS:

1.  $\frac{3X}{X-3} = 2 + \frac{9}{X-3}$

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

3.  $\frac{X}{5} - \frac{2}{9} = \frac{X}{15}$

4.  $\frac{4}{X-4} = \frac{2}{X-2}$

5.  $\frac{X-2}{5} = \frac{1}{X+2}$

6.  $\frac{X+4}{10} = \frac{6}{X-3}$

7.  $3X = \frac{4}{X} - \frac{13}{2}$

8.  $\frac{X}{X-1} = \frac{10}{X+3}$

9.  $\frac{2}{4Y^2-9} + \frac{1}{2Y-3} = \frac{3}{2Y+3}$

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

11.  $\frac{5}{X-2} - \frac{2}{X+2} = \frac{3}{X^2-4}$

12.  $\frac{1}{X-2} - \frac{1}{6} = \frac{2}{3X-6}$

13.  $X+2 = \frac{24}{X}$

14.  $\frac{8}{X-2} = \frac{4}{X+1}$

$$15. \quad \frac{5}{X^2 - 7X + 12} = \frac{2}{X - 3} + \frac{5}{X - 4}$$

$$16. \quad \frac{6}{X + 5} = \frac{2X}{X + 1}$$

$$17. \quad \frac{5X - 22}{X^2 - 6X + 9} - \frac{11}{X^2 - 3X} = \frac{5}{X}$$

$$18. \quad \frac{1}{X} - \frac{5}{X - 1} = \frac{4X + 2}{X^2 - X}$$

$$19. \quad \frac{X}{2} + \frac{20}{X} = 7$$

$$20. \quad \frac{4}{X^2} = 2 + \frac{7}{X}$$

ANSWERS:

$$1. \quad \text{NO SOLUTION}$$

$$11. \quad X = -11/3$$

$$2. \quad X = -5$$

$$12. \quad X = 4$$

$$3. \quad X = 5/3$$

$$13. \quad X = -6, X = 4$$

$$4. \quad X = 0$$

$$14. \quad X = -4$$

$$5. \quad X = -3, X = 3$$

$$15. \quad \text{NO SOLUTION}$$

$$6. \quad X = -9, X = 8$$

$$16. \quad X = -3, X = 1$$

$$7. \quad X = -8/3, X = 1/2$$

$$17. \quad X = -4$$

$$8. \quad X = 2, X = 5$$

$$18. \quad X = -3/8$$

$$9. \quad X = 7/2$$

$$19. \quad X = 4, X = 10$$

$$10. \quad X = 3$$

$$20. \quad X = 1/2, X = -4$$