

Lesson 1.3 – Solving Linear & Rational Linear Equations (pages 81-90, 154-156 in Red 9/10 textbook)

I. Warm-up: Balancing Equations

For any equation the left-hand side must always equal the right-hand side. If we add/subtract/multiply/divide the same number of both sides, the equation is still true.

1. Write down the equation that results when:
 - a. 5 is added to both sides of $2x - 5 = 7$

 - b. 3 is taken from both sides of $5x + 3 = 18$

 - c. Both sides of $\frac{3x-2}{4} = -1$ are multiplied by 4.

 - d. Both sides of $5x = -15$ are divided by 5.

II. Linear Equations: Solving for x

2. Solve for x: $3x + 7 = 22$. Plug your solution back in for x to check.

3. Solve for x: $11 - 5x = 26$. Plug your solution back in for x to check.

4. Solve for x: $\frac{x}{3} + 2 = -2$. Plug your solution back in for x to check.

5. Solve for x: $\frac{4x+3}{5} = -2$. Plug your solution back in for x to check.

6. Solve for x: $5(x + 1) - 2x = -7$. Plug your solution back in for x to check.

7. Solve for x: $5x + 2 = 3x - 5$. Plug your solution back in for x to check.

8. Solve for x: $\frac{2x+3}{4} = \frac{x-2}{3}$. Plug your solution back in for x to check.

III. Practice on Your Own

9. Solve the equation $-8 + 9r = -5r$

10. Solve the equation $6x + 5 = 4$

11. Solve the equation $10(x + 4) = 5x + 5$

12. Solve the equation $6(b + 1) + 5 = -6(b - 4) - 7$

13. Solve the equation $\frac{7b+4}{2b-6} = \frac{7}{10}$

14. Solve the equation $\frac{5}{5-a} = \frac{7}{a-2}$

15. Solve the equation $\frac{2}{x} = \frac{3}{4x} + 5$

16. Solve the equation $\frac{x}{7x-3} = \frac{3}{5}$

17. Solve the equation $4x - \frac{1}{2}(5 - x) = -\frac{1}{4}(x + 6)$

18. Solve the equation $0.4(g - 9) = 0.9(g - 2)$

19. Solve the equation $-\frac{1}{3}k + \left(-\frac{2}{5}\right) = 1 - \left(-\frac{5}{6}k\right)$

20. Solve the equation $7(x + 3) = 4(x + 3) + 2$

21. Solve the equation $9(x - 38778869) + 2 = -3(x - 38778869) - 22$

IV. Rational Equations

For rational equations, write all fractions with the same lowest common denominator, then equate the numerators.

22. Solve for x: $\frac{6}{x} = \frac{2}{3}$. Plug your solution back in for x to check.

23. Solve for x: $\frac{5}{x+2} = \frac{2}{x-1}$. Plug your solution back in for x to check.

24. Solve for x: $\frac{-4x}{x-8} - \frac{11}{x-8} = \frac{25}{x-8}$.

25. Solve for x: $\frac{3}{4} - \frac{2x}{4x-24} = \frac{8}{x-6}$.

26. Solve for x: $\frac{3}{6x} - \frac{9}{12} = \frac{11}{4x}$.

27. Solve for x: $\frac{18}{5x-10} + \frac{4}{5} = \frac{-6}{x+2}$.

28. Solve for x: $\frac{12}{x^2+5x+6} + \frac{7}{x+3} = \frac{2}{x+2}$.

29. Solve for x: $\frac{1}{10} + \frac{4x}{5x} = \frac{-9}{2x}$.

30. Solve for x: $\frac{2}{x-6} + \frac{7}{x+2} = \frac{4x+2}{x^2-4x-12}$.