

6.3 Addition and Subtraction of Rational Expressions

Least Common Multiples

Review of Addition and Subtraction of Fractions

Addition of Rational Expressions

Subtraction of Rational Expressions

Key Terms

Use the vocabulary terms and expressions listed below to complete the statements in exercises 1-4. Note that some terms or expressions may be used more than once.

least common denominator**least common multiple****numerator****denominator**

$$\frac{a+b}{c}$$
$$\frac{a-b}{c}$$

1. To add two rational expressions with like denominators, add the _____s. The _____ does not change.

$$\frac{a}{c} + \frac{b}{c} = \underline{\hspace{2cm}}$$

2. To subtract two rational expressions with like denominators, subtract the _____s. The _____ does not change.

$$\frac{a}{c} - \frac{b}{c} = \underline{\hspace{2cm}}$$

3. The _____ of 5 and 6 is 30.

4. The _____ of $\frac{1}{4}$ and $\frac{2}{3}$ is 12.

Least Common Multiples

Exercises 1-4: Find the least common multiple for each pair of expressions.

1. $2x, 7x^3$ 1. _____

2. $x^2 - x, (x-1)^2$ 2. _____

3. $x+2, x-4$ 3. _____

4. $x^2 + 6x + 9, x^2 + 4x + 3$ 4. _____

Review of Addition and Subtraction of Fractions*Exercises 5-8: Find the sum.*

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

5. _____

6. $\frac{1}{4} + \frac{3}{8}$

6. _____

7. $\frac{2}{5} + \frac{1}{7}$

7. _____

8. $\frac{7}{8} + \frac{5}{6}$

8. _____

Exercises 9-12: Find the difference.

9. $\frac{5}{6} - \frac{1}{3}$

9. _____

10. $\frac{3}{4} - \frac{3}{8}$

10. _____

11. $\frac{3}{5} - \frac{2}{7}$

11. _____

12. $\frac{5}{8} - \frac{1}{6}$

12. _____

Addition of Rational Expressions*Exercises 13-20: Add and simplify.*

13. $\frac{x}{x-1} + \frac{4x+3}{x-1}$ 13. _____

14. $\frac{3x}{x+2} + \frac{x+8}{x+2}$ 14. _____

15. $\frac{2x}{3x^2-x-2} + \frac{x+2}{3x^2-x-2}$ 15. _____

16. $\frac{x+15}{3x^2+7x-20} + \frac{2x-3}{3x^2+7x-20}$ 16. _____

17. $\frac{1}{x^2} + \frac{3}{x}$ 17. _____

18. $\frac{3}{b^2-25} + \frac{1}{b-5}$ 18. _____

19. $\frac{x}{x+y} + \frac{y}{x-y}$ 19. _____

20. $\frac{1}{t-2} + \frac{1}{2-t}$ 20. _____

Subtraction of Rational Expressions*Exercises 21-28: Subtract and simplify.*

21. $\frac{2+x}{x^2} - \frac{2}{x^2}$ 21. _____

22. $\frac{3x}{x-3} - \frac{x+6}{x-3}$ 22. _____

23. $\frac{3x-5}{x^2-4} - \frac{x-1}{x^2-4}$ 23. _____

24. $\frac{15-x}{2x^2-9x-5} - \frac{2x}{2x^2-9x-5}$ 24. _____

25. $\frac{7a}{b^2} - \frac{7b}{a^2}$ 25. _____

26. $\frac{x-2}{x} - \frac{3}{x+1}$ 26. _____

27. $\frac{9}{x^2+4x+4} - \frac{7}{x^2-4}$ 27. _____

28. $\frac{1}{x^2+5x+4} - \frac{1}{x^2+2x-8}$ 28. _____

29. A 100-watt light bulb with a resistance of $R_1 = 120$ ohms and a 75-watt light bulb with a resistance of $R_2 = 100$ ohms are placed in an electrical current. Find their combined resistance using the formula $\frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2}$. **29.** _____

30. A lens in a camera has a focal length, which is important in focusing the camera. If an object is at a distance D from a lens that has a focal point F , then to be in focus, the distance S between the lens and the film should satisfy the equation $\frac{1}{S} = \frac{1}{F} - \frac{1}{D}$. If the focal length is $F = 0.2$ foot, and the object is $D = 15$ feet from the camera, find S . **30.** _____