Simplifying Rational Expressions Exercise

Simplify the following rational expressions. If possible, state any restrictions on the expressions.

1. \( \frac{24x^2y^3}{16x^3y} \)

2. \( \frac{9y^2 - 121}{12y + 44} \)

3. \( \frac{14a^3bc}{-91abc^4} \)

4. \( \frac{c - 10}{10 - c} \)

5. \( \frac{-k + 9}{3k - 27} \)

6. \( \frac{6x - 2y}{2y - 6x} \)
7. \[ \frac{d^3 + 4d^2}{d^2} \]

8. \[ \frac{3y + 2y}{5} \]

9. \[ \frac{4bc + 2ac}{8bd + 4ad} \]

10. \[ \frac{a^2 + 3a + 2}{a^2 + a - 2} \]

11. \[ \frac{b^2 + 5b}{3b + 15} \]

12. \[ \frac{6x^2 + 4x - 10}{3x^2 + 2x - 5} \]
13. \[ \frac{4g^2 - 1}{4g^2 - 4g + 1} \]

14. \[ \frac{3x^2 - 48}{x^2 + x - 12} \]

15. \[ \frac{y^2 + 7y}{3y + 21} \]

16. \[ \frac{3r - 12}{36 - 9r} \]

17. \[ \frac{f^2 - 14f + 49}{49 - f^2} \]
ANSWER KEY:

1. \( \frac{3y^2}{2x} \) \( x, y \neq 0 \)

2. \( \frac{3y - 11}{4} \) \( y \neq -\frac{11}{3} \)

3. \( -\frac{2a^2}{13c} \) \( a, b, c \neq 0 \)

4. \(-1\) \( c \neq 10 \)

5. \( -\frac{1}{3} \) \( k \neq 9 \)

6. \(-1\) \( x \neq \frac{1}{3} y \) or \( y \neq 3x \)

7. \( d + 4 \) \( d \neq 0 \)

8. \( y \) \( \text{none} \)

9. \( \frac{c}{2d} \) \( d \neq 0, \ a \neq -2b \) or \( b \neq -\frac{1}{2}a \)

10. \( \frac{a + 1}{a - 1} \) \( a \neq -2, 1 \)

11. \( \frac{b}{3} \) \( b \neq -5 \)

12. \( 2 \) \( x \neq -\frac{5}{3}, 1 \)

13. \( \frac{2g + 1}{2g - 1} \) \( g \neq \frac{1}{2} \)

14. \( \frac{3(x - 4)}{(x - 3)} \) \( g \neq -4, 3 \)

15. \( \frac{y}{3} \) \( y \neq -7 \)