# QUIZ REVIEW: OPERATIONS OF RATIONAL EXPRESSIONS

Name: _____

**Simplify the following expressions.**

1. $\frac{x^2-16}{x^2+x-12}$

$\frac{(x-4)(x+4)}{(x+4)(x-3)}$

$\frac{x-4}{x-3}$

2. $\frac{x^2-2x+1}{x^2-1}$

$\frac{(x-1)(x-1)}{(x+1)(x-1)}$

$\frac{x-1}{x+1}$

3. $\frac{x^2-8x+12}{x^2+3x-10}$

$\frac{(x-6)(x-2)}{(x+5)(x-2)}$

$\frac{x-6}{x+5}$

**Multiply and simplify.**

4. $\frac{4x^2y}{5x^2} \cdot \frac{2xy}{4x^2}$

$\frac{8x^3y}{5x^2y^2}$

$\frac{8x}{5y}$

5. $\frac{x^2-2x}{x^2+2x+1} \cdot \frac{x^2+4x+3}{x^2+3x}$

$\frac{x(x-2)}{(x+1)(x+1)} \cdot \frac{(x+3)(x+1)}{x(x+3)}$

$\frac{x-2}{x+1}$

6. $\frac{x-8}{12x^2} \cdot \frac{6x}{8-x}$

$\frac{x-8}{12x^2} \cdot \frac{6x}{-(8-x)}$

$\frac{x}{2x^2(-1)}$

$\frac{1}{-2x}$

7. $\frac{3x^2-12}{5x-10} \cdot \frac{1}{2x+4}$

$\frac{3(x^2-4)}{5(x-2)} \cdot \frac{1}{2(x+2)}$

$\frac{3(x-2)(x+2)}{5(x-2)\cdot 2(x+2)}$

$\frac{3}{10}$

**Divide and simplify.**

8. $\frac{x^2}{x^2-1} \div \frac{3x}{x+1}$

$$\frac{x^2}{x^2-1} \cdot \frac{x+1}{3x}$$

$$\frac{x(x+1)}{3(x-1)(x+1)}$$

$$\frac{x}{3(x-1)}$$

9. $\frac{x^2-9x-22}{x^2+5x-24} \div \frac{x+2}{x-3}$

$$\frac{x^2-9x-22}{x^2+5x-24} \cdot \frac{x-3}{x+2}$$

$$\frac{(x-11)(x+2)}{(x+8)(x-3)} \cdot \frac{(x-3)}{(x+2)}$$

$$\frac{x-11}{x+8}$$

10. $\frac{x^2+4x-5}{x^3-1} \div \frac{4x^2-100}{2x^2-2x+2}$

$$\frac{x^2+4x-5}{x^3-1} \cdot \frac{2x^2-2x+2}{4x^2-100}$$

$$\frac{(x+5)(x-1)}{(x-1)(x^2+x+1)} \cdot \frac{2(x^2-x+1)}{4(x^2-25)}$$

$$\frac{(x+5)(x-1)}{(x-1)(x^2+x+1)} \cdot \frac{2(x^2-x+1)}{4(x+5)(x-5)}$$

$$\frac{x^2-x+1}{2(x-5)(x^2+x+1)}$$

Add/Subtract. LCD $= (x+8)(x-3)$

11. $\frac{12}{x^2+5x-24} + \frac{3}{x-3}$

$$\frac{12}{(x+8)(x-3)} + \frac{3}{x-3}\cdot\frac{(x+8)}{(x+8)}$$

$$\frac{12}{(x+8)(x-3)} + \frac{3(x+8)}{(x+8)(x-3)}$$

$$\frac{12+3(x+8)}{(x+8)(x-3)}$$

$$\frac{12+3x+24}{(x+8)(x-3)}$$

$$\frac{3x+36}{(x+8)(x-3)}$$

$$\frac{3(x+12)}{(x+8)(x-3)}$$

12. $\frac{9}{x-3} + \frac{2x}{x+1}$ LCD $= (x-3)(x+1)$

$$\frac{9}{x-3}\cdot\frac{(x+1)}{(x+1)} + \frac{2x}{x+1}\cdot\frac{(x-3)}{(x-3)}$$

$$\frac{9(x+1)}{(x-3)(x+1)} + \frac{2x(x-3)}{(x-3)(x+1)}$$

$$\frac{9x+9+2x^2-6x}{(x+1)(x-3)}$$

$$\frac{2x^2+3x+9}{(x+1)(x-3)}$$

LCD = $(x+2)(x-2)$

13. $\frac{x+4}{x^2-4} - \frac{15}{x-2}$

$\frac{x+4}{(x+2)(x-2)} - \frac{15(x+2)}{(x-2)(x+2)}$

$\frac{x+4}{(x+2)(x-2)} - \frac{15(x+2)}{(x+2)(x-2)}$

$\frac{x+4-15(x+2)}{(x+2)(x-2)}$

$\frac{x+4-15x-30}{(x+2)(x-2)}$

$\frac{-14x-26}{(x+2)(x-2)} = \frac{-2(7x+13)}{(x+2)(x-2)}$

LCD = $2x(x-4)^2$

14. $\frac{-15x}{x^2-8x+16} + \frac{12}{2x^2-8x}$

$\frac{2x\cdot(-15x)}{(x-4)(x-4)} + \frac{12(x-4)}{2x(x-4)(x-4)}$ (2x)

$\frac{-30x^2}{2x(x-4)(x-4)} + \frac{12(x-4)}{2x(x-4)(x-4)}$

$\frac{-30x^2+12x-48}{2x(x-4)^2}$

$\frac{-2(15x^2-6x+24)}{2x(x-4)^2}$

LCD = $(x-4)(x+2)(x-8)$

15. $\frac{x}{x^2-9} + \frac{x+1}{x^2+6x+9}$ LCD = $(x+3)^2(x-3)$

$\frac{(x+3)\,x}{(x+3)(x-3)(x+3)} + \frac{x+1\,(x-3)}{(x+3)(x+3)(x-3)}$

$\frac{x(x+3)}{(x+3)^2(x-3)} + \frac{(x+1)(x-3)}{(x+3)^2(x-3)}$

$\frac{x(x+3)+(x+1)(x-3)}{(x+3)^2(x-3)}$

$\frac{x^2+3x+x^2-2x-3}{(x+3)^2(x-3)}$

$\frac{2x^2+x-3}{(x+3)^2(x-3)}$

$\frac{(2x+3)(x-1)}{(x+3)^2(x-3)}$

16. $\frac{x+3}{x^2-2x-8} - \frac{x-5}{x^2-12x+32}$

$\frac{(x+3)\,x\,3}{(x-4)(x+2)} - \frac{(x-5)\,(x+2)}{(x-8)(x-4)\,(x+2)}$

$\frac{(x+3)(x-8)}{(x-4)(x+2)(x-8)} - \frac{(x-5)(x+2)}{(x-4)(x+2)(x-8)}$

$\frac{(x^2-5x-24)-(x^2-3x-10)}{(x-4)(x+2)(x-8)}$

$\frac{x^2-5x-24-x^2+3x+10}{(x-4)(x+2)(x-8)}$

$\frac{-2x-14}{(x-4)(x+2)(x-8)}$

$\frac{-2(x+7)}{(x-4)(x+2)(x-8)}$

# Do you need an LCD?

For each problem, determine if an LCD is needed to solve the problem. If not, cross out the problem. If so, determine the LCD. You do not need to solve the problems.

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

LCD = $x(x+1)$

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

$(x-3)(x+3)$

LCD = $(x-3)(x+3)$

3. $\frac{8x^2}{4x+16} \cdot \frac{x+2}{2x}$

$4(x+4)$

LCD = _____

4. $\frac{2x^2+7x+6}{x^2-3x-10} \div \frac{x+1}{5-x}$

LCD = _____

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

$2(x-2)$

LCD = $2(x-2)(x+2)$

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

$2(x-3)(x+1)$ $(x+1)$

LCD = $(2x-6)(x+1)$

7. $\frac{x+5}{2x-1} + \frac{(3x-1)}{1}$

LCD = $2x-1$

8. $\frac{3xyz}{9x^3y} \cdot \frac{-2}{y^5z^2}$

LCD = _____