

Read **SIMPLIFYING RATIONAL EXPRESSIONS** and then use what you know about simplifying fractions and exponents to simplify each expression fully.

1.  $\frac{18x^6}{27x^4} = \frac{2}{3}x^2$

2.  $\frac{12x^3}{3x} = 4x^2$

3.  $\frac{(x+4)(x+5)}{2(x+4)} = \frac{x+5}{2}$

4.  $\frac{6(x+4)}{(x+3)(x+4)} = \frac{6}{x+3}$

5.  $\frac{x^2+6x}{3(x+6)} = \frac{x}{3}$

6.  $\frac{x^2-5x+6}{x^2+2x-15} = \frac{(x-2)(x-3)}{(x+6)(x-3)} = \frac{x-2}{x+6}$

Read **MULTIPLYING RATIONAL EXPRESSIONS** and then multiply the expressions below (remember to factor when necessary) and simplify the results.

7.  $\frac{12x^3}{25} \cdot \frac{40}{9x^2} = \frac{12}{9} \cdot \frac{x^3}{x^2} \cdot \frac{40}{25}$   
 $= \frac{4}{3} \cdot x \cdot \frac{8}{5} = \frac{32x}{15}$

8.  $\frac{6}{(x-5)(x-4)} \cdot \frac{5(x-5)}{15} = \frac{30}{15(x-4)} = \frac{2}{x-4}$

9.  $\frac{6(x-3)}{4x^2} \cdot \frac{x^3}{2(x-3)} = \frac{6x^3}{2 \cdot 4x^2} = \frac{3x}{4}$

10.  $\frac{x+2}{4(x+1)} \cdot \frac{x+2}{(x+3)(x+1)}$   
 $= \frac{(x+2)(x+2)}{4(x+1)(x+3)(x+1)}$

11.  $\frac{5}{x+1} \cdot \frac{x^2-6x-7}{3(x-7)}$   
 $= \frac{5 \cdot (x-7)(x+1)}{(x+1)3(x-7)} = \frac{5}{3}$

12.  $\frac{x^2-2x-8}{x+3} \cdot \frac{x^2+7x+12}{2(x-8)}$   
 $= \frac{(x-4)(x+2)(x+4)}{x+3} \cdot \frac{(x+3)(x+4)}{2(x-8)}$   
 $= \frac{(x-4)(x+2)(x+4)(x+3)(x+4)}{2(x-8)(x+3)}$

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

Read ADDING AND SUBTRACTING RATIONAL EXPRESSIONS and then add or subtract these rational expressions and simplify the results.

$$14. \frac{9}{15x} + \frac{2}{15x} = \frac{11}{15x}$$

$$15. \frac{4x}{2x+3} - \frac{7}{2x+3} = \frac{4x-7}{2x+3}$$

$$16. \frac{x}{x^2-9} + \frac{3}{x^2-9} = \frac{x+3}{x^2-9}$$

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

$$17. \frac{7x+4}{x^2+3x+2} - \frac{3x-2}{x^2+3x+2}$$

$$\frac{7x+4-(3x-2)}{(x+2)(x+1)} = \frac{4x+6}{(x+2)(x+1)}$$

$$18. \frac{2}{4(x+3)} + \frac{7}{(x+3)} \cdot 4$$

$$\frac{2+28}{4(x+3)} = \frac{30}{4(x+3)}$$

$$= \frac{15}{2(x+3)}$$

$$19. \frac{(x-5)}{(x+5)(x+2)} - \frac{4(x+2)}{x-5(x+2)}$$

$$\frac{(x-5) \cdot 7 - 4(x+2)}{(x-5)(x+2)}$$

$$\frac{7x-35-4x-8}{(x-5)(x+2)}$$

$$\frac{3x-43}{(x-5)(x+2)}$$

$$20. \frac{3}{(x+2)(x+5)} + \frac{x}{(x+2)(x+5)}$$

$$\frac{(x+2)3 + x}{(x+2)(x+5)} = \frac{3x+6+x}{(x+2)(x+5)}$$

$$\frac{4x+6}{(x+2)(x+5)}$$

$$21. \frac{1}{x+3} + \frac{4}{x^2+4x+3}$$

$$\frac{(x+1)1}{(x+1)(x+3)} + \frac{4}{(x+3)(x+1)}$$

$$\frac{x+1+4}{(x+3)(x+1)} = \frac{x+5}{(x+3)(x+1)}$$

$$22. \frac{6x-7}{x^2+6x+5} + \frac{4}{x+5}$$

$$\frac{6x-7}{(x+5)(x+1)} + \frac{4(x+1)}{(x+5)(x+1)}$$

$$\frac{6x-7+4x+4}{(x+5)(x+1)}$$

$$\frac{10x-3}{(x+5)(x+1)}$$

$$23. \frac{2x}{x-4} - \frac{8}{x^2-16}$$

Solve each equation for x. SHOW WORK!

$$24. \frac{15}{x-6} + \frac{7x}{x-6} = \frac{-6}{x-6}$$

~~$$x-6 \left( \frac{15+7x}{x-6} = \frac{-6}{x-6} \right) x-6$$~~

$$15+7x = -6$$

$$-15 \quad -15$$

$$7x = -21$$

$$x = -3$$

$$26. \frac{3x}{7x} + \frac{1 \cdot x \cdot 4}{7x \cdot x \cdot 7} = \frac{28}{7x}$$

~~$$x \left( \frac{3x}{7x} = \frac{28}{7x} \right) x$$~~

$$4x = 28$$

$$x = 7$$

$$25. \frac{11x}{4x+9} - \frac{14}{4x+9} = \frac{41}{4x+9}$$

$$\frac{4x+9}{4x+9} \left( \frac{11x-14}{4x+9} = \frac{41}{4x+9} \right) 4x+9$$

$$11x-14 = 41$$

$$11x = 55$$

$$x = 5$$

$$27. \frac{2-2x}{2 \cdot 3x} - \frac{5 \cdot x \cdot 5 \cdot 3}{6 \cdot x \cdot 2x \cdot 3}$$

~~$$x \left( \frac{4x-5x}{6x} = \frac{15}{6x} \right) x$$~~

$$-x = 15$$

$$x = -15$$