

Algebra 2                    8.1  
Simplify rational expressions  
Simplify complex fractions

rational  
simplify (a fraction)  
GCF  
Is it ever OK to divide by zero?  
complex fraction  
whiteboards

Answer when undefined only if they ask (for now...)

• **Guided Practice**

Simplify each expression.

$$3A. \frac{(xz - 4z)}{z^2(4 - x)} = \frac{\cancel{z} (x - 4)}{\cancel{z} (4 - x)}$$

$$\frac{-1}{z}$$

► **Guided Practice**

4A.  $\frac{12c^3d^2}{21ab} \cdot \frac{14a^2b}{8c^2d}$

4B.  $\frac{6xy}{15ab^2} \cdot \frac{21a^3}{18x^4y}$

$$\frac{7a^2}{15b^2x^3}$$

$$\frac{\cancel{2} \cdot \cancel{3} \cdot y \cdot \cancel{7} \cdot \cancel{2} \cdot a \cdot a}{\cancel{3} \cdot \cancel{5} \cdot \cancel{2} \cdot b \cdot b \cdot \cancel{7} \cdot \cancel{7} \cdot \cancel{3} \cdot x \cdot x \cdot x \cdot y}$$

$$\frac{7a^2}{15b^2x^3}$$

4C.  $\frac{16mt^2}{21a^4b^3} \odot \frac{24m^3}{7a^2b^2}$

4D.  $\frac{12x^4y^2}{40a^4b^4} \div \frac{6x^2y^4}{16a^2x}$

$2 \cdot 2 \cdot 3 \cdot 2 \cdot x \cdot x \cdot y \cdot y \quad 2 \cdot 2 \cdot 2 \cdot 2 \cdot a \cdot x$

$2 \cdot 2 \cdot 2 \cdot 5 \cdot a \cdot a \cdot b \cdot b \cdot b \cdot b \quad 2 \cdot 2 \cdot 2 \cdot y \cdot y \cdot y$

$\frac{4x^3}{5a^2b^4y^2}$


~~Example 5~~ Polynomials in the Numerator and Denominator

Simplify each expression.

~~64~~  
~~8~~ ~~2~~  
~~-16~~ a.  $\frac{x^2 - 6x - 16}{x^2 - 16x + 64} \cdot \frac{x - 8}{x^2 + 5x + 6}$

~~3~~ ~~6~~ ~~2~~  
~~5~~

$$\frac{(x-8)(x+2)(x+8)}{(x+8)(x-8)(x+3)(x+2)} = \frac{1}{x+3}$$

b.  $\frac{x^2 - 16}{12y + 36} \div \frac{x^2 - 12x + 32}{y^2 - 3y - 18}$  

### Guided Practice

$$5A. \frac{8x - 20}{x^2 + 2x - 35} \cdot \frac{x^2 - 7x + 10}{4x^2 - 16}$$

$$5B. \frac{x^2 - 9x + 20}{x^2 + 10x + 21} \div \frac{x^2 - x - 12}{6x + 42}$$

$$1/4 \div 3/8$$

$$\frac{1}{4} \div \frac{3}{8} = \frac{1}{4} \times \frac{8}{3} = \frac{8}{12} = \frac{2}{3}$$



Multiply by recip (why does that work?)

### Example 6 Simplify Complex Fractions

Simplify each expression.

a.  $\frac{\frac{a+b}{4}}{\frac{a^2+b^2}{4}}$

$\frac{4(a+b)}{4(a^2+b^2)}$

$\frac{a+b}{a^2-b^2} = \frac{1(a+b)}{(a+b)(a-b)}$

~~$\frac{ab}{a^2b^2}$~~

$\frac{1}{a-b}$

$$\begin{aligned}
 & \left( \frac{x^2}{x^2 - y^2} \right) \cdot \frac{y-x}{4y} \\
 \text{b. } & \left( \frac{4x}{y-x} \right) \frac{y-x}{4x} \\
 & \frac{-1x^2(-y+x)}{(x^2-y^2)(4x)} \\
 & \frac{-x}{4(x+y)} = -\frac{1}{4} \frac{x}{x+y}
 \end{aligned}$$

## Guided Practice

Simplify each expression.

6A. 
$$\frac{\frac{(x-2)^2}{2(x^2-5x+4)}}{\frac{x^2-4}{4x-10}}$$

**6B.**  $\frac{\frac{x^2 - y^2}{y^2 - 49}}{\frac{y - x}{y + 7}}$

