NAME _____ DATE _____ PERIOD _____

12-8 Mixed Expressions and Complex Fractions *(Pages 684–689)*

A **mixed expression** is an algebraic expression that contains a monomial and a rational expression. Simplifying a mixed expression is similar to the process used in rewriting a mixed number as an improper fraction.

Simplifying a Complex Fraction	Any complex fraction $\frac{\frac{a}{b}}{\frac{c}{d}}$, where $b \neq 0$, $c \neq 0$, and $d \neq 0$, can be expressed as $\frac{ad}{bc}$.

Example

Simplify $\dfrac{3 + \frac{6}{x}}{\frac{x+2}{4}}$.

$\dfrac{3 + \frac{6}{x}}{\frac{x+2}{4}} = \dfrac{\frac{3(x)}{x} + \frac{6}{x}}{\frac{x+2}{4}}$ *The LCD of the numerator is x.*

$= \dfrac{\frac{3x+6}{x}}{\frac{x+2}{4}}$ *Add to simplify the numerator.*

$= \dfrac{3x+6}{x} \cdot \dfrac{4}{x+2}$ *Multiply by the reciprocal of the divisor.*

$= \dfrac{3(x+2)}{x} \cdot \dfrac{4}{x+2}$ *Factor to simplify before multiplying.*

$= \dfrac{3(\cancel{x+2})}{x} \cdot \dfrac{4}{\cancel{x+2}}$ *Divide by the common factor of x + 2.*

$= \dfrac{12}{x}$ *Multiply.*

Practice

Write each mixed expression as a rational expression.

1. $x - \dfrac{4}{x}$

2. $4 - \dfrac{2}{x+7}$

3. $9 - \dfrac{n+4}{n-1}$

4. $3 + \dfrac{x+5}{x^2-25}$

Simplify.

5. $\dfrac{\frac{a}{b}}{\frac{2a}{b^5}}$

6. $\dfrac{\frac{xyz}{x^2}}{\frac{y^5z}{x^4}}$

7. $\dfrac{m + \frac{5}{m}}{\frac{m+7}{m}}$

8. $\dfrac{t + \frac{3}{t-2}}{2 + \frac{4}{t-2}}$

9. **Standardized Test Practice** Simplify $\dfrac{\frac{x}{x+2}}{\frac{1}{x-5}}$.

A $\dfrac{x+1}{2x-3}$ **B** $\dfrac{x^2-5x}{x+2}$ **C** $\dfrac{x}{x^2-3x-10}$ **D** $\dfrac{2x-5}{x+3}$

Answers: 1. $\frac{x^2-4}{x}$ 2. $\frac{4x+26}{x+7}$ 3. $\frac{8n-13}{n-1}$ 4. $\frac{3x-14}{x-5}$ 5. $\frac{b^4}{2}$ 6. $\frac{x^3}{y^4}$ 7. $\frac{m^2+5}{m+7}$ 8. $\frac{t^2-2t+3}{2t}$ 9. B