

4th Grade Math: Renaming Improper Fractions and Mixed Numbers

Lesson Objective:

By the end of this lesson, students will be able to:

- Convert improper fractions to mixed numbers.
- Convert mixed numbers to improper fractions.
- Understand the relationship between improper fractions and mixed numbers.

1. Introduction to Fractions

Before diving into renaming, let's recall the basics:

- **Fractions** are made up of a **numerator** (top number) and a **denominator** (bottom number).
- A **proper fraction** is when the numerator is smaller than the denominator, like $\frac{3}{4}$.
- An **improper fraction** has a numerator larger than or equal to the denominator, like $\frac{7}{4}$.
- A **mixed number** is made up of a whole number and a proper fraction, like $1\frac{3}{4}$.

2. Converting Improper Fractions to Mixed Numbers

Steps to Rename an Improper Fraction as a Mixed Number:

1. Divide the numerator by the denominator.
2. The quotient (result of the division) becomes the whole number.
3. The remainder becomes the numerator, and the denominator stays the same.

Example 1: Convert $\frac{9}{4}$ to a Mixed Number

1. Divide 9 by 4: $9 \div 4 = 2$ remainder 1.
2. The quotient is 2, so the whole number is 2.
3. The remainder is 1, so the fraction is $\frac{1}{4}$.
4. The mixed number is $2\frac{1}{4}$.

Example 2: Convert $\frac{11}{3}$ to a Mixed Number

1. Divide 11 by 3: $11 \div 3 = 3$ remainder 2.
2. The quotient is 3, so the whole number is 3.
3. The remainder is 2, so the fraction is $\frac{2}{3}$.
4. The mixed number is $3\frac{2}{3}$.

3. Converting Mixed Numbers to Improper Fractions

Steps to Rename a Mixed Number as an Improper Fraction:

1. Multiply the whole number by the denominator.
2. Add the product to the numerator.
3. The result becomes the new numerator, and the denominator stays the same.

Example 1: Convert $2\frac{1}{5}$ to an Improper Fraction

1. Multiply the whole number by the denominator: $2 \times 5 = 10$.
2. Add the numerator: $10 + 1 = 11$.
3. The improper fraction is $\frac{11}{5}$.

Example 2: Convert $3\frac{4}{7}$ to an Improper Fraction

1. Multiply the whole number by the denominator: $3 \times 7 = 21$.
2. Add the numerator: $21 + 4 = 25$.
3. The improper fraction is $\frac{25}{7}$.

4. Visualizing Improper Fractions and Mixed Numbers

Use **fraction bars** or **circles** to help students visualize improper fractions and their corresponding mixed numbers.

Example:

- $\frac{9}{4}$ means you have 9 pieces, with each whole divided into 4 parts.
- Visually, you can see that 8 pieces make 2 wholes, and 1 piece remains, forming $2\frac{1}{4}$.

5. Real-World Examples

Scenario 1: Cooking

You have $3\frac{2}{5}$ cups of flour. How much flour do you have if you express this amount as an improper fraction?

- Convert the mixed number to an improper fraction: $3\frac{2}{5} = \frac{17}{5}$.
- You have $\frac{17}{5}$ cups of flour.

Scenario 2: Cutting Pizza

If you have $\frac{11}{8}$ of a pizza, how many whole pizzas and remaining slices do you have?

- Convert the improper fraction to a mixed number: $\frac{11}{8} = 1\frac{3}{8}$.
- You have 1 whole pizza and $\frac{3}{8}$ of another pizza left.

6. Practice Problems

Convert the following improper fractions to mixed numbers:

1. $\frac{13}{5}$
2. $\frac{10}{3}$
3. $\frac{16}{6}$

Convert the following mixed numbers to improper fractions:

1. $4\frac{1}{2}$
2. $5\frac{3}{7}$
3. $2\frac{5}{8}$

7. Comparing Improper Fractions and Mixed Numbers

Question: Which is greater?

1. $\frac{13}{4}$ or $3\frac{1}{2}$?

2. $2\frac{2}{3}$ or $\frac{9}{4}$?

To compare:

- Convert the mixed number to an improper fraction or vice versa.
- Then compare numerators if the denominators are the same.

8. Class Discussion

- Why do we need to convert between improper fractions and mixed numbers?
- Can you think of situations in daily life where using mixed numbers makes more sense than improper fractions?

9. Review and Wrap-Up

- Improper fractions have a numerator greater than the denominator.
- Mixed numbers are whole numbers combined with proper fractions.
- You can convert between improper fractions and mixed numbers using division and multiplication.

Exit Question: Convert $3\frac{2}{5}$ to an improper fraction and compare it with $\frac{17}{5}$. Are they equal?