

# Unit 13 Multiplying and Dividing Mixed Numbers

## 1. Procedure

### A. Change mixed numbers to fractions

1. Multiply the denominator by the whole number.
2. Add this answer to the existing numerator.
3. The answer is the new numerator.
4. Keep original denominator.

Convert  $3\frac{1}{2}$  to a fraction.

$$3\frac{1}{2} = \frac{2 \times 3 + 1}{2} = \frac{7}{2}$$

### B. Multiply and divide as in Unit 11.

1. To multiply: multiply numerators, then multiply denominators
2. To divide: invert divisor, multiply numerators, then multiply denominators

### C. Cancel if possible.

### D. Reduce answers to lowest terms.

## 2. Multiplying mixed numbers

$$2\frac{4}{7} \times \frac{1}{2}$$

Convert to fractions

$$\frac{7 \times 2 + 4}{7} = \frac{18}{7}$$

$$= \frac{18}{7} \times \frac{1}{2}$$

Cancel

$$= \frac{\cancel{18}^9}{7} \times \frac{1}{\cancel{2}_1}$$

Multiply numerators  
Multiply denominators

$$= \frac{9}{7} = 1\frac{2}{7}$$

Reduce

$$1\frac{1}{2} \times 2\frac{2}{3}$$

Convert to fractions

$$1\frac{1}{2} = \frac{2 \times 1 + 1}{2} = \frac{3}{2}$$

$$2\frac{2}{3} = \frac{3 \times 2 + 2}{3} = \frac{8}{3}$$

Cancel

$$= \frac{\cancel{3}^1}{2} \times \frac{\cancel{8}_4}{\cancel{3}_1}$$

Multiply

$$= \frac{4}{1} = 4$$

Reduce

## 3. Dividing mixed numbers

$$3 \div \frac{1}{6}$$

Convert to fractions

$$3 = \frac{3}{1}$$

Invert

$$= \frac{3}{1} \div \frac{1}{6}$$

Multiply

$$= \frac{3}{1} \times \frac{6}{1}$$

$$= \frac{3 \times 6}{1 \times 1}$$

$$= \frac{18}{1} = 18$$

Reduce

$$1\frac{2}{5} \div 1\frac{1}{6}$$

Convert to fractions

$$1\frac{2}{5} = \frac{5 \times 1 + 2}{5} = \frac{7}{5}$$

$$1\frac{1}{6} = \frac{6 \times 1 + 1}{6} = \frac{7}{6}$$

Invert and cancel

$$= \frac{7}{5} \div \frac{7}{6}$$

Multiply

$$= \frac{\cancel{7}^1}{5} \times \frac{6}{\cancel{7}_1}$$

$$= \frac{6}{5} = 1\frac{1}{5}$$

Reduce