

## Mixed Numbers

To convert a mixed number,  $5\frac{2}{7}$ , to an improper fraction,  $\frac{37}{7}$ :

$$5\frac{2}{7} = \frac{37}{7}$$

$$5\frac{2}{7}$$

Work in a clockwise direction, beginning with the denominator, (7).

$$5 \times 7 = 35$$

Multiply the denominator (7) by the whole number, (5)

$$35 + 2 = 37$$

Add that product, (35), to the numerator (2) of the fraction.

$$\frac{(5 \times 7) + 2}{7} = \frac{37}{7}$$

The denominator remains the same for the mixed number and the improper fraction.

### Convert to Improper Fractions:

1)  $4\frac{2}{5} =$

6)  $14\frac{3}{4} =$

11)  $9 =$   
Hint: See #10

2)  $5\frac{3}{8} =$

7)  $6\frac{3}{5} =$

12)  $7\frac{3}{4} =$

3)  $2\frac{4}{9} =$

8)  $9\frac{1}{10} =$

13)  $12\frac{5}{9} =$

4)  $5\frac{6}{7} =$

9)  $16\frac{1}{2} =$

14)  $10\frac{3}{8} =$

5)  $8\frac{1}{8} =$

10)  $8\frac{0}{1} =$

15)  $28\frac{2}{3} =$

## Finding Equivalent Fractions with Larger Denominators

This process is sometimes called "Boosting"

$$\text{Example: } \frac{5}{8} = \frac{?}{56}$$

$$56 \div 8 = 7$$

Divide the larger denominator by the smaller to find the factor used to multiply the denominator. (Note: The product of the smaller denominator and the factor is the larger denominator)

$$\frac{5}{8} \times \frac{7}{7} = \frac{5 \times 7}{8 \times 7}$$

Use this factor to multiply the numerator.

$$\frac{5}{8} = \frac{35}{56}$$

The result is two equivalent fractions.

*Notes: Equal denominators are required for addition and subtraction of fractions.*

**Find the equivalent fractions as indicated:**

1)  $\frac{2}{5} = \frac{\quad}{15}$

6)  $\frac{3}{4} = \frac{\quad}{44}$

11)  $\frac{8}{9} = \frac{\quad}{81}$

2)  $\frac{3}{8} = \frac{\quad}{32}$

7)  $\frac{3}{5} = \frac{\quad}{45}$

12)  $\frac{3}{4} = \frac{\quad}{68}$

3)  $\frac{4}{9} = \frac{\quad}{54}$

8)  $\frac{1}{10} = \frac{\quad}{60}$

13)  $\frac{5}{9} = \frac{\quad}{108}$

4)  $\frac{6}{7} = \frac{\quad}{49}$

9)  $\frac{1}{2} = \frac{\quad}{28}$

14)  $\frac{3}{8} = \frac{\quad}{112}$

5)  $\frac{1}{8} = \frac{\quad}{48}$

10)  $\frac{10}{100} = \frac{\quad}{700}$

15)  $\frac{2}{3} = \frac{\quad}{462}$

## Equivalent Fractions with Smaller Denominators

### Reducing Fractions

*Example:* Reduce the following fraction to lowest terms

$$\frac{90}{105}$$

There are **three common methods**, DO NOT mix steps of the methods!

#### Method 1:

$$\frac{90 \div 15}{105 \div 15} = \frac{6}{7}$$

The Greatest Common Factor for 90 and 105 is 15. Divide the numerator and the denominator by the GCF, 15.

#### Method 2:

$$\frac{90 \div 5}{105 \div 5} = \frac{18}{21}$$

Examine the numerator and denominator for any common factors, divide both numerator and denominator by that common factor. Repeat as needed.

➤ Both 90 and 105 are divisible by 5.

$$\frac{18 \div 3}{21 \div 3} = \frac{6}{7}$$

➤ Both 18 and 21 are divisible by 3.

#### Method 3:

$$\frac{90}{105} = \frac{2 \times 3 \times 3 \times 5}{7 \times 3 \times 5}$$

Express the numerator and denominator as a product of prime factors.

$$\frac{90}{105} = \frac{2 \times 3 \times (3 \times 5)}{7 \times (3 \times 5)}$$

Divide numerator and denominator by common factors, (3x5)

$$= \frac{2 \times 3}{7} = \frac{6}{7}$$

Multiply remaining factors.

**Reduce these fractions.**

1)  $\frac{28}{50} =$

5)  $\frac{32}{48} =$

9)  $\frac{36}{216} =$

2)  $\frac{8}{24} =$

6)  $\frac{36}{54} =$

10)  $\frac{35}{42} =$

3)  $\frac{30}{54} =$

7)  $\frac{14}{56} =$

11)  $12 \frac{54}{99} =$

4)  $\frac{18}{42} =$

8)  $\frac{18}{28} =$

12)  $15 \frac{280}{320} =$

## Improper Fractions

*Example:* Convert  $\frac{14}{3}$  to an Improper Fraction

$14 \div 3 = 4$       Remember: Dividend  $\div$  Divisor = Quotient  
Remainder 2      Divide the numerator (14) by the denominator (3).

$$\frac{14}{3} = 4\frac{2}{3}$$

Write the mixed number in the form:  $Quotient\frac{remainder}{divisor}$

*Note: Check your answer to see if you can reduce the fraction.*

**Convert these improper fractions to mixed numbers. *Be sure to reduce when it's possible.***

#11, 12 Hint: how many wholes will there be?

1)  $\frac{8}{5} =$

6)  $\frac{114}{5} =$

11)  $15\frac{280}{6} =$

2)  $\frac{18}{7} =$

7)  $\frac{128}{3} =$

12)  $8\frac{315}{3} =$

3)  $\frac{37}{9} =$

8)  $\frac{401}{3} =$

13)  $\frac{54}{8} =$

4)  $\frac{127}{5} =$

9)  $\frac{36}{6} =$

14)  $\frac{26}{8} =$

5)  $\frac{32}{9} =$

10)  $\frac{235}{2} =$

15)  $\frac{258}{9} =$

**In each exercise, find the LCM of the given numbers.**

1) 4 and 18

7) 50 and 75

2) 16 and 40

8) 24 and 30

3) 20 and 28

9) 36 and 45

4) 5 and 8

10) 8 and 20

5) 12 and 18

11) 16 and 20

6) 12 and 16

12) 28, 35, and 21

## Addition and Subtraction of Fractions with the Same Denominator

To add or subtract fractions, the denominators **MUST** be the same.

*Example 1:*

$$\frac{3}{5} - \frac{1}{5} = ?$$

$$\begin{aligned}\frac{3}{5} - \frac{1}{5} &= \frac{3-1}{5} \\ &= \frac{2}{5}\end{aligned}$$

Because both fractions have the same denominator, you may subtract the numerators and keep the denominator.

*Example 2:*

$$\frac{5}{9} + \frac{7}{9} = ?$$

$$\begin{aligned}\frac{5}{9} + \frac{7}{9} &= \frac{5+7}{9} \\ &= \frac{12}{9} \\ &= 1\frac{3}{9} \\ &= 1\frac{1}{3}\end{aligned}$$

Because both fractions have the same denominator, you may add the numerators and keep the denominator.

Always change improper fractions to a mixed number.

Reduce, when possible.

**Add or Subtract as indicated.**

1.  $\frac{4}{8} + \frac{3}{8}$

4.  $\frac{40}{37} - \frac{3}{37}$

7.  $\frac{2}{3} + \frac{4}{3} - \frac{6}{3}$

2.  $\frac{7}{10} - \frac{1}{10}$

5.  $\frac{10}{13} + \frac{4}{13}$

8.  $\frac{7}{6} - \frac{5}{6} + \frac{1}{6}$

3.  $\frac{7}{48} + \frac{9}{48} + \frac{4}{48}$

6.  $\frac{9}{17} + \frac{11}{17} + \frac{17}{17}$

9.  $\frac{7}{13} + \frac{9}{13}$

## Addition and Subtraction of Fractions with Different Denominators

*Remember: In order to add or subtract fractions, the denominators MUST be the same.*

*Example:*

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

LCM = 24

$$\begin{array}{r} \frac{2}{3} \times \frac{8}{8} = \frac{16}{24} \\ + \frac{3}{8} \times \frac{3}{3} = \frac{9}{24} \\ \hline \end{array}$$

$$\frac{25}{24}$$

$$\frac{25}{24} = 1\frac{1}{24}$$

Find the LCM

Write the problem vertically.

Find the equivalent fractions with the LCM as a denominator.

Add the fractions with the same denominator.

Remember to write as a mixed number and reduce when possible!

**Add or Subtract:**

1)  $\frac{7}{8} + \frac{3}{4}$

5)  $\frac{15}{24} - \frac{10}{27}$

9)  $\frac{11}{4} + \frac{23}{18}$

2)  $\frac{7}{8} - \frac{3}{4}$

6)  $\frac{7}{12} + \frac{5}{16}$

10)  $\frac{29}{8} + \frac{9}{7}$

3)  $\frac{11}{12} + \frac{17}{18}$

7)  $\frac{16}{27} - \frac{5}{24}$

11)  $2\frac{13}{35} - 1\frac{5}{14}$

4)  $\frac{3}{7} + \frac{2}{5}$

8)  $1\frac{1}{4} + \frac{3}{8}$

12)  $\frac{2}{3} + \frac{1}{21} - \frac{2}{7}$

**Solve the following problems.**

1. An empty box weighs  $2\frac{1}{4}$  pounds. It is then filled with  $16\frac{2}{3}$  pounds of fruit. What is the weight of the box when it is full?
2. Yanni is making formula for the baby. Each bottle contains  $6\frac{2}{5}$  scoops of formula. The formula container holds 320 scoops of formula. How many bottles of formula can Yanni make?
3. Miguel bought  $2\frac{1}{4}$  pounds of hamburger,  $1\frac{1}{5}$  pounds of sliced turkey, and 2 pounds of cheese. What was the total weight of all of his purchases?
4. Sheila had 8 yards of fabric. She used  $2\frac{1}{4}$  yards to make a dress. How much fabric does she have left?
5. A father leaves his money to his four children. The first received  $\frac{1}{3}$ , the second received  $\frac{1}{6}$ , and the third received  $\frac{2}{5}$ . How much did the remaining child receive? (Hint: You can think of father's money as one whole.)
6. Find the total perimeter (sum of the sides) of an equilateral triangle, (triangle with equal sides), if each side measures  $2\frac{1}{4}$  inches.