Fractions

Academic Center for Enrichment

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To:

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Workbook Practice Solutions

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

3) $\frac{18}{7}$ 4) $\frac{11}{9}$

5) $4\frac{1}{4}$ 6) $4\frac{1}{9}$

7) $\frac{2}{7} \div \frac{5}{4} = \frac{2}{7} \times \frac{4}{5} = \frac{2 \times 4}{7 \times 5} = \frac{8}{35}$

8) $\frac{1}{5} \times \frac{3}{4} = \frac{1 \times 3}{5 \times 4} = \frac{3}{20}$

9) $\frac{3}{7} + \frac{1}{2} = \frac{3 \times \mathbf{2}}{7 \times \mathbf{2}} + \frac{1 \times \mathbf{7}}{2 \times \mathbf{7}} = \frac{6}{14} + \frac{7}{14} = \frac{13}{14}$

10) $\frac{3}{4} + \frac{1}{8} = \frac{3 \times \mathbf{2}}{4 \times \mathbf{2}} + \frac{1}{8} = \frac{6}{8} + \frac{1}{8} = \frac{7}{8}$

Booklet

This booklet was developed to help Central Lakes College students refresh their skills in fraction operations. It is not intended to replace any math course.

Booklet Guide

This booklet is divided into chapters. Each chapter consists of rules, examples and practice problems. You should attempted each problem and check their solutions. Incorrect answers should be attempted until they are correct.

A ‘workbook practice’ is given at the end of the booklet. Do not look back into the booklet to solve the problems. Check your answers when done. If you have an incorrect answer, return to that section and review.

Stop by or call the ACE department for more practice problems.
218 - 855 - 8121
1- 800 - 933 - 0346 Ext. 8121

Warm-up

Answers are found in each section.

Reduce Fractions

1) $\frac{8}{10}$ 2) $\frac{15}{20}$

Types of Fractions

Convert the mixed number into an improper fraction.

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

Convert the improper fraction into a mixed number.

4) $\frac{9}{4}$

Multiplication of Fractions

5) $\frac{1}{2} \times \frac{3}{5} =$ 6) $\frac{4}{5} \times \frac{1}{4} =$

Division of Fractions

7) $\frac{1}{5} \div \frac{1}{3} =$ 8) $\frac{2}{9} \div \frac{1}{4} =$

Addition / Subtraction of Fractions

9) $\frac{1}{5} + \frac{2}{5} =$ 10) $\frac{1}{6} + \frac{1}{2} =$

11) $\frac{2}{3} + \frac{1}{2} =$

Workbook Practice

Reduce Fractions

1) $\frac{8}{12}$ 2) $\frac{25}{40}$

Convert the mixed number into an improper fraction.

3) $2\frac{4}{7}$ 4) $1\frac{2}{9}$

Convert the improper fraction into a mixed number.

5) $\frac{17}{4}$ 6) $\frac{37}{9}$

Solve. Reduce if necessary.

7) $\frac{2}{7} \div \frac{5}{4} =$ 8) $\frac{1}{5} \times \frac{3}{4} =$

9) $\frac{3}{7} + \frac{1}{2} =$ 10) $\frac{3}{4} + \frac{1}{8} =$

Solutions

Reduce Fractions

1) $\frac{1}{2}$ 2) $\frac{1}{2}$
3) $\frac{1}{4}$ 4) $\frac{1}{2}$
5) $\frac{1}{3}$ 6) $\frac{3}{5}$
7) $\frac{1}{2}$ 8) $\frac{4}{5}$
9) $\frac{3}{4}$ 10) $\frac{7}{8}$

Mixed Numbers / Improper Fractions

1) $\frac{10}{7}$ 2) $\frac{14}{5}$
3) $\frac{11}{6}$ 4) $\frac{22}{3}$
5) $3\frac{3}{4}$ 6) $2\frac{3}{5}$
7) $4\frac{1}{10}$ 8) $2\frac{1}{3}$
9) $1\frac{2}{3}$ 10) $5\frac{1}{7}$

Mulliplication

1) $\frac{3}{14}$ 2) $\frac{2}{15}$
3) $\frac{5}{24}$ 4) $\frac{4}{21}$
5) $\frac{2}{9}$ 6) $\frac{1}{10}$
7) $\frac{14}{27}$ 8) $\frac{5}{32}$
9) $\frac{1}{9}$ 10) $\frac{35}{72}$

Division

1) $\frac{2}{3}$ 2) $\frac{5}{6}$
3) $1\frac{1}{8}$ 4) 1
5) $\frac{1}{2}$ 6) $1\frac{17}{18}$
7) $\frac{9}{14}$ 8) $\frac{35}{48}$
9) $\frac{8}{27}$ 10) $1\frac{1}{7}$

Addition / Subtraction

1) $\frac{13}{14}$ 2) $\frac{1}{15}$
3) $\frac{1}{10}$ 4) $\frac{11}{12}$
5) $\frac{1}{3}$ 6) $\frac{17}{63}$
7) $\frac{23}{30}$ 8) $1\frac{5}{12}$
9) $\frac{11}{40}$ 10) $\frac{31}{35}$

What is a fraction?

There is a special collection of numbers called fractions.

Fractions are usually denoted by a/b,
where “a” and “b” are whole numbers
and “b” is not equal to “0.”

The division symbol (“/” or “÷”) is used to represent a fraction. It tells you that everything above the division symbol is the numerator, and everything below the division symbol is the denominator.

$$\frac{\text{numerator}}{\text{denominator}}$$

Fractions can also represent a piece of something. For example, if there are 5 slices of pizza and one is gone, you can say that $\frac{1}{5}$ of the pizza has been eaten.

Reduce Fractions

In math, we like to have answers in simplest form, and this is true of fractions. A fraction is considered reduced when there is no number other than 1 that can divided into the numerator (top) and denominator (bottom) evenly.

How to:

1) Write the numerator (top) as a product of two numbers.
2) Write the denominator (bottom) as a product of two numbers.
3) Cross out common factors in the numerator (top) and denominator (bottom).
4) Continue steps 1 & 2 until there are no more common factors.
5) Multiply the remaining numbers in the numerator (top) and denominator (bottom) – separately.

$$\frac{8}{10} = \frac{2 \times 4}{2 \times 5} = \frac{4}{5}$$

$$\frac{15}{20} = \frac{5 \times 3}{5 \times 4} = \frac{3}{4}$$

$$\frac{24}{36} = \frac{2 \times 12}{2 \times 18} = \frac{2 \times 6}{2 \times 9} = \frac{3 \times 2}{3 \times 3} = \frac{2}{3}$$

Practice

Find the sum or difference, reduce if needed.

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

2) $\frac{2}{5} - \frac{1}{3} =$

3) $\frac{3}{5} - \frac{1}{2} =$

4) $\frac{2}{3} + \frac{1}{4} =$

5) $\frac{2}{3} - \frac{1}{3} =$

6) $\frac{5}{9} - \frac{2}{7} =$

7) $\frac{3}{5} + \frac{1}{6} =$

8) $\frac{3}{4} + \frac{2}{3} =$

9) $\frac{2}{5} - \frac{1}{8} =$

10) $\frac{2}{7} + \frac{3}{5} =$

11) Explain how to find a common denominator (bottom).

Types of Fractions

Proper Fraction: A proper fraction is when the numerator (top) is smaller than the denominator (bottom).

Improper Fraction: An improper fraction is when the numerator (top) is larger than the denominator (bottom).

Mixed Number: A mixed number is when a whole number appears in front of a proper fraction.

Convert a mixed number into an improper fraction:

1) Multiply denominator (bottom) by the whole number plus the numerator (top).
2) Denominator does not change.
3) Reduce if needed.

$$1\frac{3}{8} = 1\frac{3}{8} = \frac{8 \times 1 + 3}{8} = \frac{11}{8}$$

add

multiply

Convert an improper fraction into a mixed number:

1) Divide denominator (bottom) into numerator (top).
2) Remainder is written over denominator (bottom).
3) Reduce if needed.

$$\frac{9}{4} = 4\overline{)9}\ \begin{array}{r} 2 \\ -8 \\ \hline 1 \end{array} = 2\frac{1}{4}$$

Practice

Divide, reduce if needed.

1) $\frac{1}{2} \div \frac{3}{4} =$

2) $\frac{2}{3} \div \frac{4}{5} =$

3) $\frac{9}{10} \div \frac{4}{5} =$

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

5) $\frac{1}{3} \div \frac{2}{3} =$

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

7) $\frac{3}{7} \div \frac{2}{3} =$

8) $\frac{5}{8} \div \frac{6}{7} =$

9) $\frac{1}{9} \div \frac{3}{8} =$

10) $\frac{8}{9} \div \frac{7}{9} =$

11) Explain how to divide fractions in your own words.

Adding / Subtracting

How to:

1) To add or subtract fractions, there needs to be a common denominator (bottom).
2) If there is a common denominator, simply add / subtract the numerators (tops) and leave the denominator (bottom) the same.
3) If the denominators (bottoms) are not the same:
   a) Multiply the denominators (bottoms) to find the common number.
   b) Multiply the numerators (top) by the same number you multiplied by in the denominator (bottom) in each fraction.
   c) Add the numerators (tops) and leave the denominator (bottom) the same.
4) Reduce if necessary.

$$\frac{1}{5} + \frac{2}{5} = \frac{3}{5}$$

$$\frac{1}{2} - \frac{2}{5} = \frac{1 \times \mathbf{5}}{2 \times \mathbf{5}} - \frac{2 \times \mathbf{2}}{5 \times \mathbf{2}} = \frac{5}{10} - \frac{4}{10} = \frac{1}{10}$$

$$\frac{1}{4} + \frac{1}{3} = \frac{1 \times \mathbf{3}}{4 \times \mathbf{3}} + \frac{1 \times \mathbf{4}}{3 \times \mathbf{4}} = \frac{3}{12} + \frac{4}{12} = \frac{7}{12}$$

$$\frac{1}{6} + \frac{1}{2} = \frac{1 \times \mathbf{2}}{6 \times \mathbf{2}} + \frac{1 \times \mathbf{6}}{2 \times \mathbf{6}} = \frac{2}{12} + \frac{6}{12} = \frac{8}{12} \text{ reduce } = \frac{2}{3}$$

$$\frac{2}{3} + \frac{1}{2} = \frac{2 \times \mathbf{2}}{3 \times \mathbf{2}} + \frac{1 \times \mathbf{3}}{2 \times \mathbf{3}} = \frac{4}{6} + \frac{3}{6} = \frac{7}{6} \text{ mixed number } = 1\frac{1}{6}$$

Practice

Reduce the fractions to lowest terms.

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

2) $\frac{4}{8}$

3) $\frac{3}{12}$

4) $\frac{9}{18}$

5) $\frac{12}{36}$

6) $\frac{15}{25}$

7) $\frac{21}{42}$

8) $\frac{16}{20}$

9) $\frac{24}{32}$

10) $\frac{42}{48}$

11) Explain how to reduce fractions in your own words.

Division of Fractions

How to:

1) Flip second fraction.
2) Rewrite as a multiplication problem.
3) Multiply straight across.
4) Reduce if necessary.

You do NOT need a common denominator!

$$\frac{1}{5} \div \frac{1}{3} = \frac{1}{5} \times \frac{3}{1} \text{ (flip)} = \frac{1 \times 3}{5 \times 1} = \frac{3}{5}$$

$$\frac{4}{5} \div \frac{1}{4} = \frac{4}{5} \times \frac{4}{1} \text{ (flip)} = \frac{4 \times 4}{5 \times 1} = \frac{16}{5} = 3\frac{1}{5}$$

$$\frac{3}{7} \div \frac{2}{3} = \frac{3}{7} \times \frac{3}{2} \text{ (flip)} = \frac{3 \times 3}{7 \times 2} = \frac{9}{14}$$

$$\frac{2}{9} \div \frac{1}{4} = \frac{2}{9} \times \frac{4}{1} \text{ (flip)} = \frac{2 \times 4}{9 \times 1} = \frac{8}{9}$$

Practice

Convert each mixed number into an improper fraction.

1) $1\frac{3}{7} =$

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

3) $1\frac{5}{6} =$

4) $7\frac{1}{3} =$

Convert each improper fraction into a mixed number.

5) $\frac{15}{4} =$

6) $\frac{13}{5} =$

7) $\frac{41}{10} =$

8) $\frac{21}{9} =$

9) $\frac{5}{3} =$

10) $\frac{36}{7} =$

11) Explain how to convert an improper fraction into a mixed number in your own words.

Multiplication of Fractions

How to:

1) Multiply straight across.
2) Reduce if necessary.

You do NOT need a common denominator!

$$\frac{1}{2} \times \frac{3}{5} = \frac{3}{10}$$

$$\frac{4}{5} \times \frac{1}{4} = \frac{4 \times 1}{5 \times 4} = \frac{4}{20} = \frac{1}{5}$$

$$\frac{3}{7} \times \frac{2}{5} = \frac{3 \times 2}{7 \times 5} = \frac{6}{35}$$

$$\frac{2}{3} \times \frac{5}{6} = \frac{2 \times 5}{3 \times 6} = \frac{10}{18} = \frac{5}{9}$$

Practice

Multiply, reduce if needed.

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

2) $\frac{1}{3} \times \frac{2}{5} =$

3) $\frac{5}{9} \times \frac{3}{8} =$

4) $\frac{6}{7} \times \frac{2}{9} =$

5) $\frac{1}{3} \times \frac{2}{3} =$

6) $\frac{1}{6} \times \frac{3}{5} =$

7) $\frac{7}{9} \times \frac{2}{3} =$

8) $\frac{5}{8} \times \frac{1}{4} =$

9) $\frac{1}{9} \times \frac{3}{3} =$

10) $\frac{5}{9} \times \frac{7}{8} =$

11) Explain how to multiply fractions in your own words.