

Basic Math

Introducing Fractions

Lesson 200

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Lesson 200 , Introducing Fractions

CMR4200

To the Student

In Lesson 200, *Introducing Fractions*, you will learn how to use fractions and fractional amounts.

In this book you will find numbered parts that are called Frames. Within these Frames, you will be asked to respond to many questions about fractions. Write your answers to these questions on a separate piece of paper. Then look at the top of the next page in the book and check your answers.

If you use the lesson in this way, you will easily remember how to use fractional amounts and terms. If you do not understand how to use this book, or if you need assistance with certain Frames, ask your instructor for help.

Now turn the page and begin.

1. Whole numbers are used to count whole things such as whole pies, whole dollars, and books.

Fractions are used to count parts of things.

2. Fractions consist of two numbers, one number on top of another number, with a horizontal line between the two numbers.

The top number is called the numerator, and the bottom number is called the denominator.

3. Indicate which numbers are whole numbers (W) and which are fractions (F).

A. $\frac{1}{2} =$ _____

D. $\frac{3}{4} =$ _____

G. $7 =$ _____

B. $0 =$ _____

E. $\frac{5}{6} =$ _____

H. $267 =$ _____

C. $9 =$ _____

F. $3 =$ _____

I. $\frac{2763}{7} =$ _____

answers to page 1

3. A. F
B. W
C. W
D. F
E. F
F. W
G. W
H. W
I. F

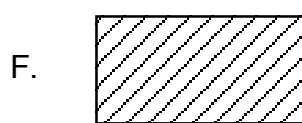
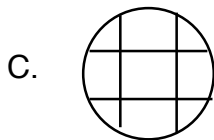
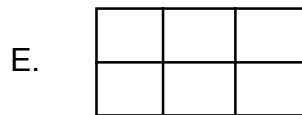
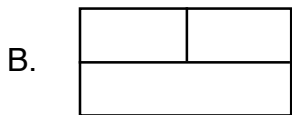
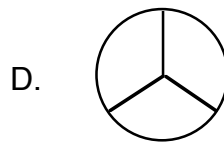
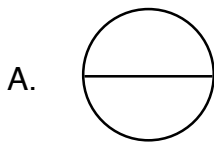
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4. When a dollar or other item is divided into two **equal** parts, the parts are named **halves**.

When an item is divided into three **equal** parts, the parts are named **thirds**.

When an item is divided into four **equal** parts, the parts are named **quarters** (as in a dollar) or **fourths**.

Five equal parts are **fifths**, six equal parts are **sixths**, seven parts are **sevenths**, and so on.

-
5. Which figures below are **not** divided into equal parts?



answers to page 2

5. B,C, F

6. The numerator or top number of a fraction represents a part of the whole. The denominator or bottom number of a fraction represents the total number of parts the whole item is divided into.

7. The **numerator** is the top number in a fraction. It tells you the number of parts of the whole that you have.

The **denominator** is the bottom number in a fraction. It tells you how many parts the whole is divided into.

8. The _____ is the top number in a fraction. It tells you the number of parts of the whole that you have.

9. The _____ is the bottom number in a fraction. It tells you how many parts the whole is divided into.

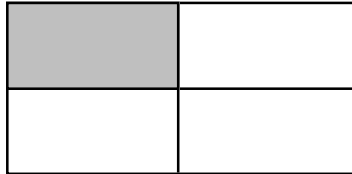
10. The numerator is the top number in a fraction. In the fraction $\frac{1}{6}$, what number is the numerator? _____

11. The denominator is the bottom number of a fraction. In the fraction $\frac{2}{5}$, what number is the denominator? _____

answers to page 3

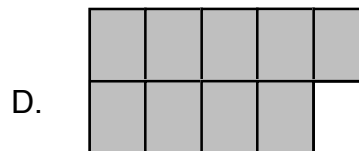
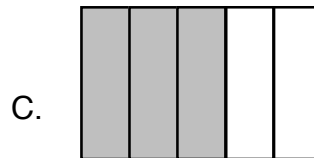
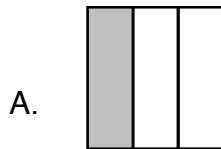
- 8. numerator
- 9. denominator
- 10. 1
- 11. 5

-
12. The fraction $\frac{1}{4}$ represents the shaded area in this shape.



There is one block shaded, so the numerator is 1. There is a total of four parts, so the denominator is 4.

-
13. Name the fraction which represents the shaded area of each shape below.



answers to page 4

13. A. $\frac{1}{3}$ C. $\frac{3}{5}$
B. $\frac{5}{6}$ D. $\frac{9}{10}$

-
14. Now let's write a fraction from information in a word problem. Tim has 5 dogs at his farm, and 3 of these dogs are black. What fraction of the dogs are black?

$$\frac{3}{5} \begin{array}{l} \text{number of black dogs} \\ \text{total number of dogs} \end{array}$$

-
15. There are thirty students in a class. The class will go on a field trip to the university library. The day of the trip only twenty-five students go on the field trip. What fraction of the class went on the field trip? _____

-
16. A child eats 10 jelly beans from a bag which contains 27 jelly beans. What fractional part of the jelly beans did the child eat? _____

-
17. Fractions can also equal one whole. Any fraction with the numerator and denominator the same equals one, except for 0.

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

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

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

$$1 = \frac{10}{10}$$

-
18. List the fractions which equal 1.

A. $\frac{5}{5}$

C. $\frac{256}{256}$

E. $\frac{3067}{3067}$

G. $\frac{11}{11}$

B. $\frac{555}{5555}$

D. $\frac{66}{66}$

F. $\frac{7}{7}$

H. $\frac{56}{55}$

answers to page 5

15. $\frac{25}{30}$

16. $\frac{10}{27}$

18. A, C, D, E, F, G

-
19. Fractions with the same denominator are easily added.

To add fractions with common denominators use the common denominator in the answer. Then add the numerators.

Look at this example:

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

The numerators 1 and 2 are added to get 3. The common denominator of 4 is written as the denominator in the answer. The answer is $\frac{3}{4}$.

-
20. Subtraction is similar to addition. Keep the common denominator in the answer. Then subtract the numerators.

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

In this example, the numerators are subtracted, and we know $2 - 1 = 1$. Keep the common denominator of 3, and the answer is $\frac{1}{3}$.

21. Now try the following addition and subtraction problems.

A. $\frac{1}{4} + \frac{1}{4} =$

D. $\frac{3}{16} + \frac{3}{16} =$

B. $\frac{2}{9} - \frac{1}{9} =$

E. $\frac{3}{8} - \frac{1}{8} =$

C. $\frac{7}{16} + \frac{3}{16} =$

F. $\frac{3}{18} + \frac{3}{18} =$

22. You added the fractions correctly, but the problems in Frame 21 are not finished until the answers are reduced to their lowest terms.

23. In Frame 21, several answers need to be reduced to lowest terms.

When we **reduce** a fraction, we change the fraction to lowest terms without changing the value of the fraction itself.

For example $\frac{2}{4}$ can be reduced to $\frac{1}{2}$.

Let's learn how to reduce fractions using factors.

answers to page 7

21. A. $\frac{2}{4}$ D. $\frac{6}{16}$
 B. $\frac{1}{9}$ E. $\frac{2}{8}$
 C. $\frac{10}{16}$ F. $\frac{6}{18}$
-

24. **Factors** are whole numbers which can be multiplied together to get the same answer or **product**. These factors also divide evenly into the fractions we will **reduce**.

Look at the following numbers and try to think of factors for each number.
Let's try one together.

The number 28 can be factored using 7×4 , 2×14 , or 1×28 . The number 15 can be factored using 5×3 or 1×15 .

Factor the number 24.

24: _____, _____, _____, or _____.

25. Now try factoring these numbers.

- A. 32
B. 7
C. 9
-

26. Numbers which have only two factors are called **prime numbers**.
-

27. The number 7 can be factored using 1×7 . There are no other factors, so 7 is a **prime number**. The number 11 factored is 1×11 , and there are no other factors. The number 11 is also a prime number.

answers to page 8

24. 1 x 24, 2 x 12, 3 x 8, 4 x 6

25. A. 1 x 32, 2 x 16, 4 x 8,
B. 1 x 7
C. 1 x 9, 3 x 3

28. Let's try factoring some fractions. The fraction $\frac{2}{4}$ can be factored.

$$\frac{2}{4} = \frac{1 \times 2}{1 \times 4, 2 \times 2}$$

The factors 1 and 2 are **common factors** of $\frac{2}{4}$ because 2 and 4 can both be factored using 1 and 2.

The factor 2 is the **greatest common factor** of $\frac{2}{4}$ because 2 is the largest factor of both 2 and 4.

29. Find the factors common to the numerator and denominator of each fraction below.

A. $\frac{6}{16}$

B. $\frac{3}{9}$

C. $\frac{4}{8}$

D. $\frac{6}{18}$

answers to page 9

29. A. 1, 2
B. 1, 3
C. 1, 2, 4
D. 1, 2, 3, 6

30. Factor the numerator and denominator of each of the following fractions:

A. $\frac{15}{45}$

B. $\frac{10}{25}$

C. $\frac{4}{24}$

D. $\frac{6}{12}$

E. $\frac{9}{36}$

answers to page 10

30. A. $15 = 1 \times 15, 3 \times 5$
 $45 = 1 \times 45, 3 \times 15, 5 \times 9$
- B. $10 = 1 \times 10, 5 \times 2$
 $25 = 1 \times 25, 5 \times 5$
- C. $4 = 1 \times 4, 2 \times 2$
 $24 = 1 \times 24, 2 \times 12, 3 \times 8,$
 4×6
- D. $6 = 1 \times 6, 3 \times 2$
 $12 = 1 \times 12, 2 \times 6, 3 \times 4$
- E. $9 = 1 \times 9, 3 \times 3$
 $36 = 1 \times 36, 2 \times 18, 3 \times 12,$
 $4 \times 9, 6 \times 6$

-
31. Factor the following fractions. Find the common factors and list the greatest common factors.

FRACTION	COMMON FACTORS	GREATEST COMMON FACTOR
A. $\frac{10}{20}$	_____	_____
B. $\frac{8}{12}$	_____	_____
C. $\frac{15}{30}$	_____	_____
D. $\frac{6}{18}$	_____	_____

answers to page 11

- | | | |
|-----|----------------|----------|
| 31. | Common Factors | Greatest |
| | A. 1, 2, 5, 10 | 10 |
| | B. 1, 2, 4 | 4 |
| | C. 1, 3, 5, 15 | 15 |
| | D. 1, 2, 3, 6 | 6 |

-
32. To reduce a fraction, simply divide **both** the numerator and the denominator by the greatest common factor. Let's reduce these fractions and see how it works.

FRACTION	GREATEST FACTOR	REDUCED FRACTION
A. $\frac{10}{20}$	10	$\frac{10 \div 10}{20 \div 10} = \frac{1}{2}$
B. $\frac{8}{12}$	_____	_____
C. $\frac{15}{30}$	_____	_____
D. $\frac{6}{18}$	_____	_____

answers to page 12

32. B. $4, \frac{2}{3}$

C. $15, \frac{1}{2}$

D. $6, \frac{1}{3}$

33. Use these hints to help you reduce fractions.

1. A prime number denominator cannot be reduced.
2. If the numerator and denominator both end in zeros, divide by 10, 100, etc., to reduce.
3. If the numerator and denominator are even numbers, divide by 2, 4, 6, 8, etc., to reduce.

34. Use the hints above to reduce these fractions to the lowest terms.

A. $\frac{11}{22} =$ C. $\frac{8}{10} =$ E. $\frac{5}{20} =$ G. $\frac{4}{14} =$ I. $\frac{5}{15} =$

B. $\frac{12}{30} =$ D. $\frac{75}{100} =$ F. $\frac{14}{35} =$ H. $\frac{6}{20} =$ J. $\frac{5}{10} =$

35. We know that any fraction with the numerator and denominator the same is equal to one. For example: $\frac{11}{11}$, $\frac{356}{356}$, and $\frac{67}{67}$ are all equal to one.

Any fraction with a numerator of zero is equal to zero. For example: $\frac{0}{5}$, $\frac{0}{13}$, and $\frac{0}{256}$ are all equal to 0.

answers to page 13

34. A. $\frac{1}{2}$ E. $\frac{1}{4}$ I. $\frac{1}{3}$
B. $\frac{2}{5}$ F. $\frac{2}{5}$ J. $\frac{1}{2}$
C. $\frac{4}{5}$ G. $\frac{2}{7}$
D. $\frac{3}{4}$ H. $\frac{3}{10}$

36. Reduce these fractions to lowest terms:

- A. $\frac{4}{24} =$ D. $\frac{16}{20} =$ G. $\frac{8}{12} =$
B. $\frac{6}{11} =$ E. $\frac{0}{10} =$ H. $\frac{12}{12} =$
C. $\frac{15}{20} =$ F. $\frac{10}{30} =$ I. $\frac{12}{27} =$

37. A **mixed number** is a whole number and a fraction: $2\frac{1}{8}$, $10\frac{2}{3}$, and $5\frac{1}{2}$ are all mixed numbers. The mixed number $2\frac{1}{8}$ means that there are 2 whole items and $\frac{1}{8}$ of another item.

Choose the mixed number from each group of numbers below:

- A. $\frac{1}{2}$; 4; $1\frac{3}{8}$
B. 6; $3\frac{2}{7}$; $\frac{5}{13}$
C. $12\frac{6}{8}$; $\frac{0}{17}$; 8

answers to page 14

36. A. $\frac{1}{6}$ D. $\frac{4}{5}$ G. $\frac{2}{3}$

B. $\frac{6}{11}$ E. 0 H. 1

C. $\frac{3}{4}$ F. $\frac{1}{3}$ I. $\frac{4}{9}$

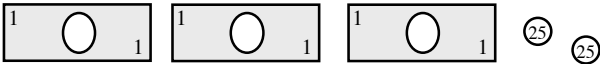
37. A. $1\frac{3}{8}$

B. $3\frac{2}{7}$

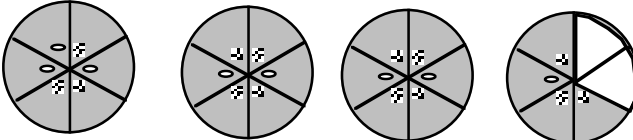
C. $12\frac{6}{8}$

38. Write the mixed numbers for the following pictures:

A. There are 12 eggs in a carton. How many cartons? 

B. How many dollars? 

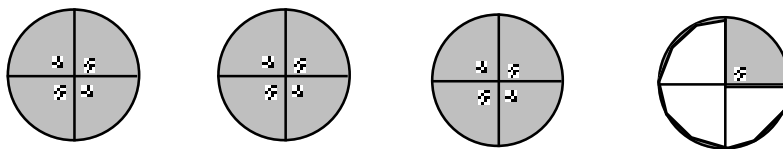
C. How many cups of milk? 

D. How many pies? 

answers to page 15

38. A. $1\frac{4}{12}$
B. $3\frac{2}{4}$
C. $2\frac{1}{4}$
D. $3\frac{4}{6}$

39. A mixed number can also be written in the form of an **improper fraction**. An **improper fraction** has a numerator that is **larger** than the denominator.



The above picture can be called both:

$$3\frac{1}{4} \text{ and } \frac{13}{4}$$

There are 3 whole pies plus $\frac{1}{4}$ of another pie to make $3\frac{1}{4}$ pies.

The total number of shaded pieces is 13, and each pie has 4 parts to make $\frac{13}{4}$ pies.

40. Look at Frame 38 again. Write each mixed number as an improper fraction.
- A. How many cartons of eggs?
B. How many dollars?
C. How many cups of milk?
D. How many pies?

answers to page 16

40. A. $\frac{16}{12}$
B. $\frac{14}{4}$
C. $\frac{9}{4}$
D. $\frac{22}{6}$

-
41. When a fraction has the same numerator and denominator, that fraction is equal to 1.

When a fraction has a numerator **smaller** than the denominator, the fraction is called a **proper** or simple **fraction**.

When a fraction has a numerator **larger** than the denominator, the fraction is called an improper fraction. An improper fraction can be converted to a mixed number.

-
42. Name the following fractions as equal to one, proper, or improper:

A. $\frac{3}{3}$ _____

D. $\frac{3}{5}$ _____

G. $\frac{4}{3}$ _____

B. $\frac{5}{7}$ _____

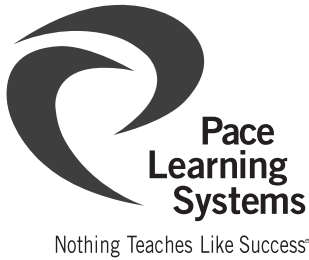
E. $\frac{12}{8}$ _____

H. $\frac{365}{365}$ _____

C. $\frac{8}{3}$ _____

F. $\frac{13}{14}$ _____

I. $\frac{17}{12}$ _____



End of Lesson Sample

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