Important Concepts . . .

Preview Review

Mathematics Grade 6 TEACHER KEY

W1 - Lesson 2: Place Value, Whole Numbers, Decimals, and Common Fractions

V5-07

Important Concepts of Grade 6 Mathematics

Materials Required: A textbook is not needed. This is a stand-alone course.

Mathematics Grade 6
Version 5
Preview/Review W1 - Lesson 2 TEACHER KEY

Publisher: Alberta Distance Learning Centre
Author: Elgin Pawlak
In-House Teacher: Sue Rees

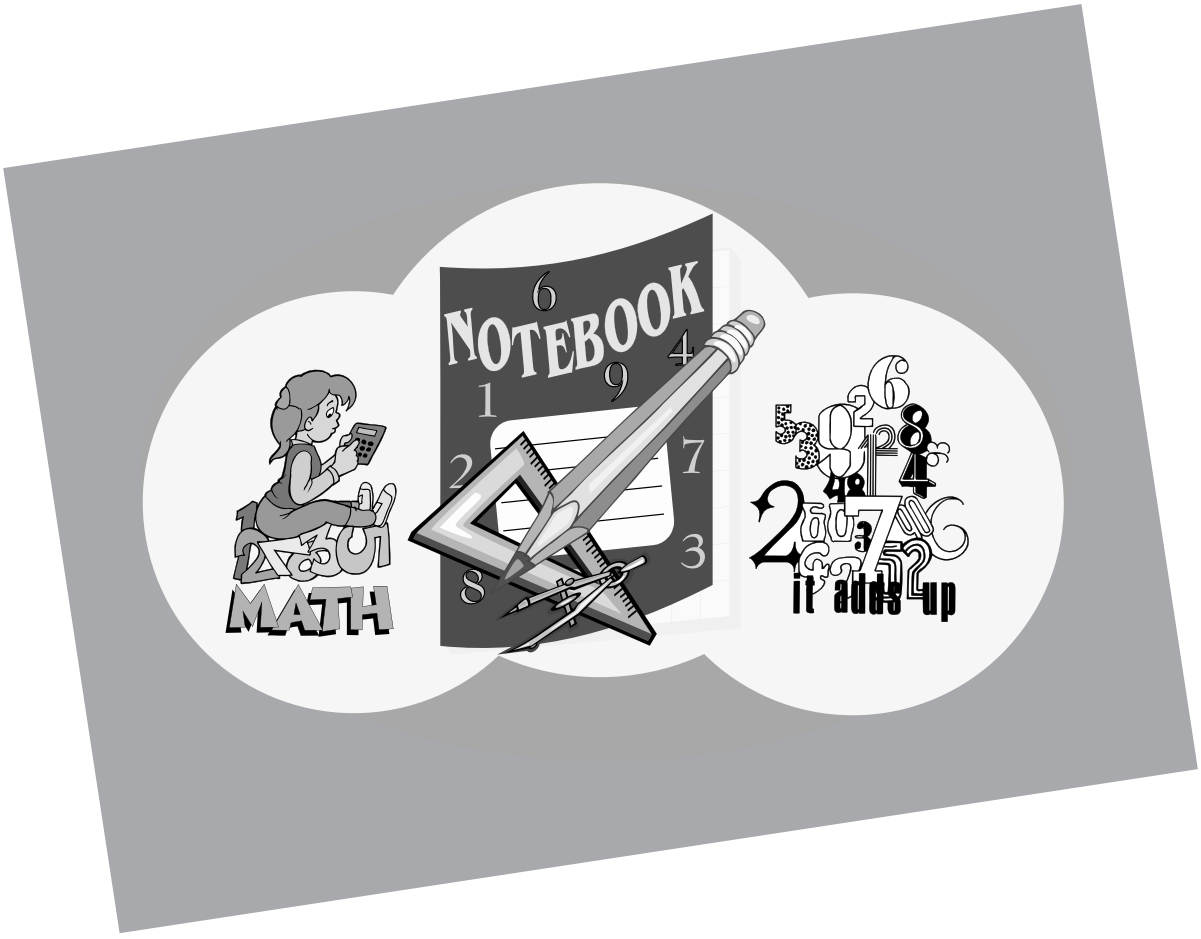
Project Coordinator: Dennis McCarthy
Preview/Review Publishing Coordinating Team: Nina Johnson, Laura Renkema, and Donna Silgard

Alberta Distance Learning Centre has an Internet site that you may find useful. The address is as follows: **http://www.adlc.ca**

The use of the Internet is optional. Exploring the electronic information superhighway can be educational and entertaining. However, be aware that these computer networks are not censored. Students may unintentionally or purposely find articles on the Internet that may be offensive or inappropriate. As well, the sources of information are not always cited and the content may not be accurate. Therefore, students may wish to confirm facts with a second source.

Preview/Review Concepts
for
Grade Six Mathematics

TEACHER KEY



W1 - Lesson 2:
Place Value, Whole Numbers, Decimals, and Common Fractions

OBJECTIVES

By the end of this lesson, you should

- understand and use place value
- understand whole numbers
- understand that decimal fractions have values of less than one
- use correctly the signs for *greater than*, *less than*, and *equals*

GLOSSARY

decimal fractions: the numerals to the right of the decimal point with a value less than one

decimal point: in a number, the period used to separate the whole number from the fractional number with it

denominator: the bottom numeral of a fraction

equivalent fractions: two or more fractions that have the same value

e.g., $\frac{1}{2}$ $\frac{2}{4}$ $\frac{3}{6}$

numerator: the top numeral of a fraction

place value: the value of a digit determined by its position left or right of the decimal

proper fraction: a fraction in which the numerator is less than the denominator

e.g., $\frac{2}{5}$

whole numbers: numbers that are complete, without fractions

W1 - Lesson 2: Place Value, Whole Numbers, Decimals, and Common Fractions

Welcome to W1 - Lesson 2! In this lesson you will examine place value with whole numbers and with numbers that are less than one. You will consider three topics:

- Place Value and Whole Numbers
- Place Value and Decimal Fractions
- Proper Fractions and Equivalent Fractions

You will write numbers in words, numbers in numerals, and numbers in expanded notation. You will review the signs for *greater than*, *less than*, and *equals*. You will create equivalent fractions by multiplying and dividing.

Place Value and Whole Numbers

You likely know that whole numbers are complete. That is, they do not have any fractions. *John has 2 apples. Sue has 14 jelly beans.*

However, if John ate half of one of his apples, how many apples would he have? You can write your answer to this in several ways.

John now has one and a half apples.

John now has $1\frac{1}{2}$ *apples.*

John now has 1.5 apples.

A decimal point in a number means a fraction–a part of one in addition to the whole number. Therefore, John now has one and a part of another apple.

Numbers are made of digits. The value of the number is determined by the location of its digits. If we change the position of digits, we change the value of the number.

How do we read the number 123 456 789 012?

Billions			Millions			Thousands			Ones		
100s	10s	1s	100s	10s	1s	100s	10s	1s	100s	10s	1s
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**0**	**1**	**2**

Using the place value chart, you see that this number is made of

1 hundred billions
2 ten billions
3 billions
4 hundred millions
5 ten millions
6 millions
7 hundred thousands
8 ten thousands
9 thousands
0 hundreds
1 tens
2 ones

Therefore, 123 456 789 012 is read as *one hundred twenty-three billion, four hundred fifty-six million, seven hundred eighty-nine thousand, twelve*.

Notice that the number is grouped in sets of three. Each set of three digits in a number is a **triad**.

Questions

1. Rewrite the following numerals in words.

   Example: 74 826 = seventy-four thousand eight hundred twenty-six

   a. 4 566 ***Four thousand five hundred sixty-six***

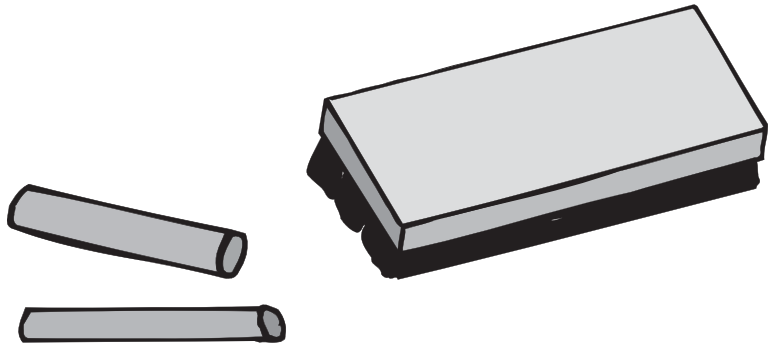
   b. 72 291 ***Seventy-two thousand two hundred ninety-one***

   c. 845 032 ***Eight hundred forty-five thousand thirty-two***

   d. 64 334 981 ***Sixty-four million three hundred thirty-four thousand nine hundred eighty-one***

   e. 5 092 246 ***Five million ninety-two thousand two hundred forty-six***

   f. 24 024 012 012 ***Twenty-four billion twenty-four million twelve thousand twelve***



2. Below are some numbers in word form. Change them into numeral form (also referred to as standard form).

   Example: eight hundred forty-nine thousand two hundred thirty-two = 849 232

   a. seven hundred ninety-one

   791

   b. eighty-six thousand three hundred eleven

   86 311

   c. two hundred sixteen thousand four hundred twenty-five

   216 425

   d. three million nine thousand seven hundred

   3 009 700

   e. nine hundred thousand two hundred seventy-eight

   900 278

   f. twenty-two million five hundred six thousand thirty-one

   22 506 031

   g. seventeen million sixteen thousand and ten

   17 016 010

   h. sixty-five billion four hundred nine thousand eighty-eight

   65 000 409 088

3. Write the value of the digit shown in **bold** type.

Examples: 123 **4**56 789 = 4 hundred thousands; 67 **9**03 = 9 hundreds

a. 5**6** 254 ***6 thousands***

b. **2** 445 771 ***2 millions***

c. 348 **9**95 ***9 hundreds***

d. 2 0**3**4 ***3 tens***

e. **8**79 547 ***8 hundred thousands***

f. 2**3**4 764 560 ***3 ten millions***

g. 4 **2**12 659 559 ***2 hundred millions***

h. 58 90**5** ***5 ones***

i. 3**4**0 662 ***4 ten thousands***

j. 98**4** 707 033 ***4 millions***

4. We sometimes write in numerals the place values we speak as words. Write the following numbers in the **expanded notation** form.

   Examples: 579 135 = 500 000 + 70 000 + 9 000 + 100 + 30 + 5
   20 508 604 = 20 000 000 + 500 000 + 8 000 + 600 + 4

   a. 1 357 = ***1000 + 300 + 50 + 7***

   b. 3 905 = ***3000 + 900 + 5***

   c. 677 321 = ***600 000 + 70 000 + 7 000 + 300 + 20 +1***

   d. 26 789 343 = ***20 000 000 + 6 000 000 + 700 000 + 80 000 + 9 000 + 300 + 40 + 3***

   e. 99 876 322 = ***90 000 000 + 9 000 000 + 800 000 + 70 000 + 6 000 + 300 + 20 + 2***

   f. 451 672 893 014 = ***400 000 000 000 + 50 000 000 000 + 1 000 000 000 + 600 000 000 + 70 000 000 + 2 000 000 + 800 000 + 90 000 + 3 000 + 10 + 4***

5. Write the numbers represented by these place-value statements.

   Example: 7 hundred thousands + 6 thousands + 9 hundreds + 2 tens = 706 920

   a. 3 thousands + 5 hundreds + 6 tens + 3 ones =

   3 563

   b. 9 ten thousands + 7 thousands + 2 hundreds + 2 ones =

   97 202

   c. 3 ten millions + 9 millions + 3 hundred thousands + 6 thousands + 7 hundreds + 4 tens =

   39 306 740

   d. 9 hundred millions + 5 hundred thousands + 2 ten thousands + 9 tens =

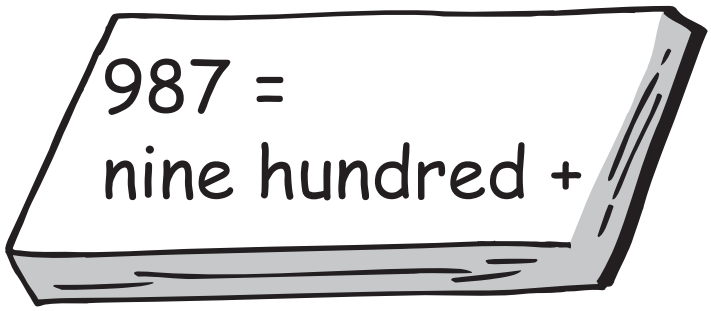
   900 520 090

   e. 3 ten millions + 8 ten thousands + 9 hundreds + 6 ones =

   30 080 906

   f. 4 hundred billions + 1 billion + 9 ten millions + 2 hundred thousands + 4 ten thousands + 9 thousands + 6 hundreds + 4 ones =

   401 090 249 604



Mathematicians use many symbols! You are familiar with + for plus or add, - for subtract, $\times$ for multiply, = for equals, and so on.

Perhaps you remember that > means *greater than* and < means *less than*. However, do you sometimes forget which way to draw the sign? Try to remember that it is an arrowhead that points to the smaller one.

For example, 6 is **greater than** 4, or 6 > 4. Because 4 is less than 6, we write 4 < 6, and we say 4 is **less than** 6. (Perhaps you can hear 6 saying, *"Hey, little guy! I'm bigger than you!"* Sometimes he points the other way, but large always points at small.)

6. Insert the correct sign to make the following statements true (= or > or <) (**Examples**: 22 > 10, 16 < 100 and 33 = 33)

   a. 109 ___<___ 901

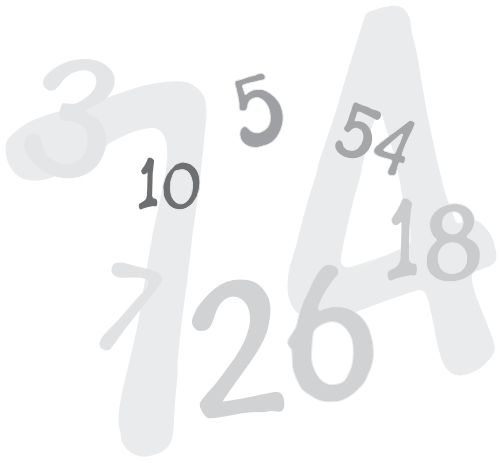
   b. 7 666 ___>___ 6 777

   c. 333 220 ___>___ 333 022

   d. 987 789 987 ___=___ 987 789 987

   e. 876 543 345 ___<___ 876 543 354

   f. 620 620 123 456 ___>___ 620 602 123 456



7. Construct numbers by following the instructions. Underline the requested digits in your answer.

   Example: Write a five-digit number with a six in the tens place. Use the 6 only once. Answers may vary: 23 4**6**8 is one example.

   a. Write a five-digit number with a 7 in the ten thousands location and a 3 in the hundreds location. Use the 7 and 3 only once.

   Answers will vary except for underlined digits 7 1 3 2 3

   b. Write an eight-digit number with a 2 in the ten millions location and a 4 in the tens location. Use the 4 and 2 only once.

   Example 2 1 356 7 4 8 (Answers will vary.)

   c. Write a seven-digit number with a 9 in the millions location and a 1 in the ten thousands location. Use the 9 and 1 only once.

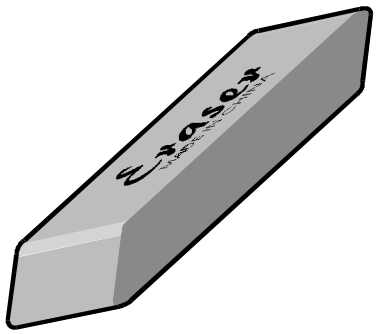
   Example 9 2 1 3 456 (Answers will vary.)

   d. Use the following digits (1, 3, 5, 7, 9, 2, 4, 6, 0) to write the largest nine-digit number possible. Use each digit only once.

   976 543 210 (This answer should not vary.)

   e. Start with 998 877 665 and create a new number by subtracting eight thousand.

   998 869 665



Place Value and Decimal Numbers

Place Value Chart

When we read and write decimal fractions, the words always end in **-ths**.

- 0.4 = four ten**ths**
- 0.17 = seventeen hundred**ths**
- 0.234 = two hundred thirty-four thousand**ths**

How do you read the number 456.789?

100s	10s	1s	[decimal]	10ths	100ths	1 000ths
4	**5**	**6**	**.**	**7**	**8**	**9**

Using the place value chart you see that this number is made of

4 hundreds
5 tens
6 ones
7 tenths
8 hundredths
9 thousandths

Therefore, 456.789 is read as *four hundred fifty-six and seven hundred and eighty nine thousandths*.

Questions

1. Rewrite the following numerals in words.

   Example: 20.45 = twenty and forty-five hundredths

   a. 8.6 = ***eight and six tenths***

   b. 3.19 = ***three and nineteen hundredths***

   c. 0.254 = ***two hundred fifty-four thousandths***

   d. 2.07 = ***two and seven hundredths***

   e. 9.306 = ***nine and three hundred six thousandths***

2. Below are some numbers in word form. Change them into numeral form.

   Example: two hundred ten and three hundred fifteen thousandths = 210.315

   a. one and seven tenths = ***1.7***

   b. three and twenty-four hundredths = ***3.24***

   c. six and six hundred three thousandths = ***6.603***

   d. nine and five hundredths = ***9.05***

   e. eight and twenty-two thousandths = ***8.022***

   f. sixty-six and eight thousandths = ***66.008***

3. Write the value of the digit shown in **bold** type.

Example: 89.6**8**3 = eight hundredths

a. 7.**8**6 = ***8 tenths***

b. 2.6**5**4 = ***5 hundredths***

c. 9.07**1** = ***1 thousandths***

d. 4**3**.85 = ***3 ones***

e. 67.80**8** = ***8 thousandths***

f. 0.**4**54 = ***4 tenths***

g. 33.1**6**3 = ***6 hundredths***

4. Write the following numbers in the expanded notation form.

Example: $18.286 = 10 + 8 + \frac{2}{10} + \frac{8}{100} + \frac{6}{1\,000}$

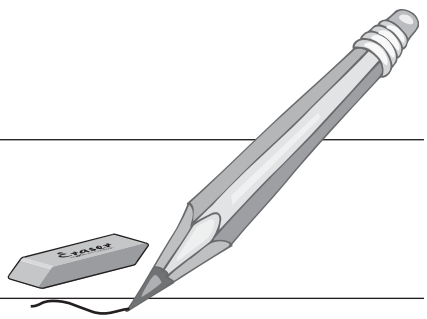
a. 7.8 = $7 + \frac{8}{10}$

b. 9.56 = $9 + \frac{5}{10} + \frac{6}{100}$

c. 28.386 = $20 + 8 + \frac{3}{10} + \frac{8}{100} + \frac{6}{1000}$

d. 3.047 = $3 + \frac{4}{100} + \frac{7}{1000}$

e. 345.507= $300 + 40 + 5 + \frac{5}{10} + \frac{7}{1000}$



5. Write the numbers represented by these place-value statements.

   Example: 4 ones + 3 tenths + 6 hundredths = 4.36

   a. 7 ones + 8 tenths + 4 hundredths = ***7.84***

   b. 8 ones + 5 hundredths + 2 thousandths = ***8.052***

   c. 4 tens + 16 hundredths = ***40.16***

   d. 8 hundreds + thirty-six thousandths = ***800.036***

   e. 5 thousands + one hundred seven thousandths = ***5 000.107***

6. Insert the correct sign to make the following statements true (= or > or <).

   a. 25.6 ___>___ 2.56

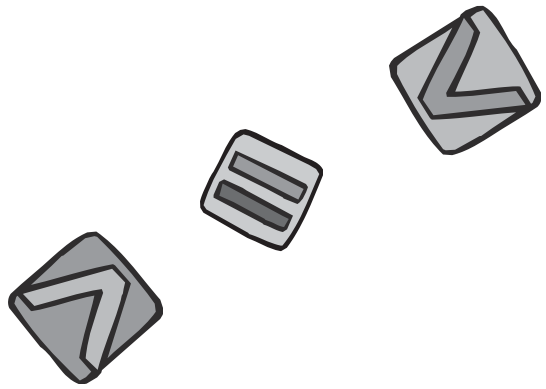
   b. 78.45 ___<___ 784.5

   c. 45.90 ___=___ 45.9

   d. 23.099 ___<___ 23.11

   e. 122.4 ___>___ 122.334

   f. 4.7 ___>___ 0.998



7. Construct numbers by following the instructions below. Underline the designated digits in your answers.

   Example: Write a four-digit number with a 6 in the ones place and a 5 in the hundredths place. Use the 6 and 5 only once. Answer may vary. One answer is 86.25.

   Answers may vary

   a. Write a four-digit number with a 9 in the tens place and the hundredths place. Use the 9 only twice. ***91.09***

   b. Write a four-digit number smaller than 1 with a 3 in the thousandths place. Use the 3 only once. ***0.003***

c. Write a seven-digit number with a 2 in the thousands place and the thousandths place. Use the 2 only twice. ***2000.002***

Proper Fractions and Equivalent Fractions

The **numerator** is the top numeral of a fraction.

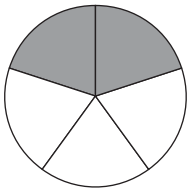
The **denominator** - the bottom number of a fraction.

$\frac{2}{5}$ ← numerator

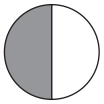
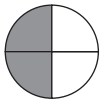
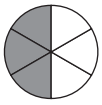
$\frac{2}{5}$ ← denominator

A **proper fraction** is a fraction in which the numerator is less than the denominator. The value of a proper fraction is always less than one.

$\frac{2}{5}$ (numerator)
(denominator)



Equivalent Fractions are two or more fractions that have the same value.

$\frac{1}{2}$,  $\frac{2}{4}$,  and $\frac{3}{6}$  are equivalent fractions.

Making Equivalent Fractions

A fraction is changed into an equivalent fraction by **multiplying** both the numerator and denominator of the fraction by the same number. Any multiplier may be used.

$$\frac{\text{Numerator} \times n}{\text{Denominator} \times n} = \text{Equivalent Fraction}$$

$\frac{1}{2} \times \frac{2}{2} = \frac{2}{4}$ ($\frac{1}{2}$ and $\frac{2}{4}$ are equivalent fractions) $\frac{2}{8} \div \frac{2}{2} = \frac{1}{4}$

Equivalent fractions are made by **dividing** both the numerator and denominator by the same number.

$\frac{6}{24} \div \frac{3}{3} = \frac{2}{8}$ ($\frac{6}{24}$ and $\frac{2}{8}$ are equivalent fractions)

So, $\frac{6}{24}, \frac{2}{8}$, and $\frac{1}{4}$ are all equivalent fractions.

Questions

1. Rewrite the following numerals in words.

Example: $\frac{3}{5}$ = three fifths $\frac{17}{35}$ = seventeen thirty-fifths

a. $\frac{1}{4}$ = ***one fourth or one quarter***

b. $\frac{73}{100}$ = ***seventy-three hundredths***

c. $\frac{5}{8}$ = ***five eighths***

d. $\frac{41}{50}$ = ***forty-one fiftieths***

e. $\frac{779}{1\ 000}$ = ***seven hundred seventy-nine thousandths***

2. Rewrite the following numbers as proper fractions.

   Example: four tenths = $\frac{4}{10}$

   a. six hundredths = $\frac{\boldsymbol{6}}{\boldsymbol{100}}$

   b. eleven hundredths = $\frac{\boldsymbol{11}}{\boldsymbol{100}}$

   c. two hundred and twenty-two thousandths = $\frac{\boldsymbol{222}}{\boldsymbol{1\,000}}$

   d. three twentieths = $\frac{\boldsymbol{3}}{\boldsymbol{20}}$

   e. eighty-one two hundredths = $\frac{\boldsymbol{81}}{\boldsymbol{200}}$

3. Make three equivalent fractions for each of the following fractions by **multiplying**. Choose your own multipliers.

   Example: $\frac{1}{2} = \frac{2}{4}, \frac{3}{6}, \frac{4}{8}$ The multipliers used were 2, 3, and 4.

   Answers will vary

   a. $\frac{4}{7} = \frac{\boldsymbol{8}}{\boldsymbol{14}}, \frac{\boldsymbol{12}}{\boldsymbol{21}}, \frac{\boldsymbol{16}}{\boldsymbol{28}}$

   b. $\frac{7}{10} = \frac{\boldsymbol{14}}{\boldsymbol{20}}, \frac{\boldsymbol{21}}{\boldsymbol{30}}, \frac{\boldsymbol{28}}{\boldsymbol{40}}$

   c. $\frac{9}{25} = \frac{\boldsymbol{18}}{\boldsymbol{50}}, \frac{\boldsymbol{27}}{\boldsymbol{75}}, \frac{\boldsymbol{36}}{\boldsymbol{100}}$

   d. $\frac{22}{100} = \frac{\boldsymbol{44}}{\boldsymbol{200}}, \frac{\boldsymbol{66}}{\boldsymbol{300}}, \frac{\boldsymbol{88}}{\boldsymbol{400}}$

   e. $\frac{333}{1\,000} = \frac{\boldsymbol{666}}{\boldsymbol{2\,000}}, \frac{\boldsymbol{999}}{\boldsymbol{3\,000}}, \frac{\boldsymbol{1\,332}}{\boldsymbol{4\,000}}$

4. Make three equivalent fractions for each of the following fractions by **dividing**. Choose your own divisors.

Example: $\frac{50}{100} = \frac{25}{50}, \frac{5}{10}, \frac{1}{2}$. The divisors used were 2, 10, and 50.

Answers will vary

a. $\frac{150}{200} =$ ***$\frac{75}{100}, \frac{15}{20}, \frac{30}{40}$***

b. $\frac{100}{1\ 000} =$ ***$\frac{50}{100}, \frac{10}{100}, \frac{1}{10}$***

c. $\frac{60}{80} =$ ***$\frac{30}{40}, \frac{12}{16}, \frac{6}{8}$***

d. $\frac{100}{150} =$ ***$\frac{50}{75}, \frac{20}{30}, \frac{2}{3}$***

e. $\frac{48}{60} =$ ***$\frac{24}{30}, \frac{12}{15}, \frac{4}{5}$***

5. Insert the correct sign to make the following statements true (= or > or <):

a. $\frac{34}{100}$ **<** $\frac{87}{100}$

b. $\frac{66}{100}$ **>** $\frac{66}{1\ 000}$

c. $\frac{2}{10}$ **>** $\frac{2}{100}$

d. $\frac{11}{1\ 000}$ **<** $\frac{111}{100}$

e. $\frac{23}{25}$ < $\frac{93}{100}$

6. Determine whether the following pairs of fractions are equivalent. Write **equivalent** or **not equivalent** in the answer spaces.

Examples: $\frac{3}{5}, \frac{6}{10}$ *equivalent*; $\frac{3}{5}, \frac{3}{10}$ *not equivalent*

a. $\frac{2}{3}, \frac{10}{15}$ ***equivalent***

b. $\frac{3}{4}, \frac{9}{12}$ ***equivalent***

c. $\frac{25}{30}, \frac{25}{60}$ ***not equivalent***

d. $\frac{2}{5}, \frac{30}{100}$ ***not equivalent***

e. $\frac{24}{32}, \frac{3}{4}$ ***equivalent***

Homework Assignment

Use the following numbers to answer the questions below.

325.615	2 399 994.821	404 715 666.102	4 286.4
278.61	151.926	6 401 235.57	
2 488.4	78 845 789.3	691 461 287.251	

1. Which number is the largest?

   691 461 287.251

2. Which number is the smallest?

   151.926

3. Which number has the smallest digit in the tenths place value location?

   404 715 666.102

4. Which number has the largest digit in the hundred thousands place value location?

   78 845 789.3

5. Which number has a 9 in the ten millions place value location?

   691 461 287.251

6. Write the three largest numbers, and then calculate their sum.

   691 461 287.251 + 404 715 666.102 + 78 845 789.3 =

   1 175 022 742.653

7. Write the largest and smallest numbers and then calculate their difference.

   691 461 287.251 - 151.926 = 691 461 135.325

Self-Evaluation

Ask yourself some important questions. Write your answers in sentences for your teacher.

1. In this lesson, what part of your work was **excellent**?

2. In this lesson, what part of your work **needs improvement**?

3. If you want help for some of the work in this lesson, ask your teacher in this space.