

GRADE 6

Mathematics



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Dear Parents,

Helping kids understand and apply mathematics knowledge and skills is a collective responsibility of parents, teachers, and principals.

Students need to learn mathematics in a way that will serve them throughout their lives. Understanding mathematics can provide our students with many job and career opportunities.

This is why students need to know why mathematics works the way it does, how to use it with confidence and competence when solving problems.

Understanding mathematics enables us to:

- Solve problems, make sound decisions and perform calculations with ease
- Explain how we solved a problem and why we made a particular decision
- Understand patterns and trends so that we can make predictions
- Understand Financial Literacy to manage time and money
- Handle everyday situations that involve numbers and feel confident

Before your child can learn mathematics, he or she needs to believe in his or her ability to do so. That's where you come in!

Parents, you are your child's first role model for learning. When you engage with your child in a supportive, relaxed atmosphere, your child will enjoy exploring the world of mathematics.

Dynamic Math is committed to helping parents and students. We understand that not everyone learns the same way, and not everyone feels the same about math. This is why we are continually working to create math resources that help students of all abilities, while supporting the many learning styles and varying levels of enthusiasm towards math.

From our clear concise instructions and straightforward guided examples to our additional practice material and tests, there's something to suit everyone. Combined with our video tutorials, students will be able to get a tutor-like experience from anywhere and at a fraction of the cost of standard tutoring or after-school help programs.

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CHAPTER 1

NUMBER CONCEPTS

1.1 Place Value

1.2 Rounding Numbers

1.3 Solving Problems with Large Numbers

1.4 Factors and Multiples

1.5 Greatest Common Factor and Least Common Multiple

1.6 Improper Fractions and Mixed Numbers

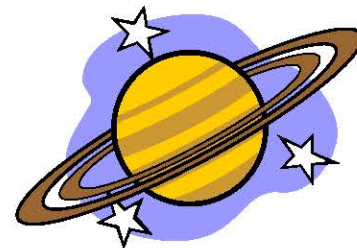
1.7 Ordering and Comparing Fractions and Decimals

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1.1 Place Value

Numerals Greater than 1 000 000

Large numbers are used when we talk about distances in the universe, numbers of cells or bacteria, the memory in a computer, or the population of a country. For example, the population of Canada is over 37 000 000 (thirty-seven million) and the distance from the earth to the sun is about 146 000 000 km (one hundred forty-six million). When these large numbers are written with digits, they are called numerals (125 320 000). When we read these numbers using words, they are called number words (one hundred twenty-five million three hundred twenty thousand).



To gain a better understanding of these large numbers, it is important to know what the value of each digit is. We do this with place value, which you have used before with smaller numbers.

Example: The number **2 538 094** is shown next with the place value for each of its digits.

2	5	3	8	0	9	4
↑ millions	↑ hundred thousands	↑ ten thousands	↑ thousands	↑ hundreds	↑ tens	↑ ones
two million	five hundred thirty-eight thousand			zero hundreds	Ninety-four	

The above numeral (number) has 2 millions, 5 hundred thousands, 3 ten thousands, 8 thousands, 0 hundreds, 9 tens, and 4 ones. When we describe the numeral with a number word, we usually combine the millions, the thousands, and the tens and ones. The **number word** is two million five hundred thirty-eight thousand ninety-four.

Examples with Solutions

1. Which digit is located in each of the following place-values for the numeral **7 029 438**?

- | | |
|------------------|----------------------------------|
| a. millions | 7, which represents 7 million. |
| b. ten thousands | 2, which represents 20 thousand. |
| c. thousands | 9, which represents 9 thousand. |
| d. hundreds | 4, which represents 4 hundreds. |
| e. tens | 3, which represents 3 tens. |

f. ones

8, which represents 8 ones.

2. Write number words for the following numerals.

a. 235 608

235 608

There are 235 thousands (2 hundred thousands, 3 ten thousands, and 5 one thousands), 6 hundreds, and 8 ones. The number word is two hundred thirty-five thousand six hundred eight.

b. 3 065 240

3 065 240

There are 3 millions, 65 thousands (6 ten thousands and 5 one thousands), two hundreds, and 4 tens (or forty). The number word is three million sixty-five thousand two hundred forty.

c. 12 560 032

12 560 032

There are 12 millions, 560 thousands, 3 tens and 2 ones (or thirty-two). The number word is twelve million five hundred sixty thousand thirty-two.

3. Write the following number words as numerals.

a. five million thirty thousand eight hundred forty-seven

5 030 847

b. seventy thousand fifteen

70 015

c. twelve million two hundred six

12 000 206

d. three million seven hundred five thousand thirty-four

3 705 034

When we write numbers with more than 4 digits, we use a space instead of a comma to separate groups of three. This is done because Canada has adopted the metric system and in many other countries a comma is used as a decimal point.

Examples:

1. 27 500 instead of 27,500
2. 5 345 420 instead of 5,345,420
3. 3540 instead of 3,540 (We don't leave a space if there are only 4 digits.)

Exercises 1.1a

1. What is the value of the digit asked for in each of the following numbers?

- | | |
|--------------|---------|
| a. 405 632 | digit 6 |
| b. 1 040 670 | digit 7 |
| c. 9 840 035 | digit 9 |
| d. 1 302 670 | digit 3 |
| e. 2 086 075 | digit 8 |

2. Write the numeral for each number word.

- a. three hundred ten thousand thirty
- b. two million five hundred three thousand four hundred twenty-one
- c. seven million seventy thousand seventy
- d. five hundred thousand five
- e. six million six thousand six
- f. forty thousand fifteen
- g. one million twenty thousand three hundred
- h. one hundred thousand one hundred one

3. Write the number word for each numeral.

- a. 2 506 320
- b. 1 035 028
- c. 6 060 060

d. 5 505 055

e. 10 010 001

f. 3 000 033

g. 50 001 001

h. 707 077 007

4. The distance from the earth to the moon is about 384 403 km. Write this numeral as a number word.
5. A byte is a measure of information storage on a computer. A file in a computer takes up 1 250 344 bytes. Write this numeral as a number word.
6. The population of the United States is about three hundred twenty-nine million nine hundred seventy thousand. Write this number word as a numeral.
7. There are about fifty-five million six hundred nineteen thousand people in England. Write this number word as a numeral.
8. A provincial park has about two hundred twenty-three thousand six hundred trees in it. Write this number word as a numeral.

Extra for Experts

Who Am I?

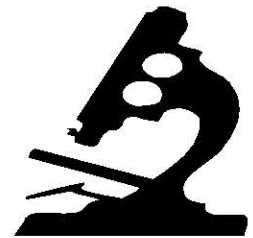
9. I am a number with 6 digits. My ones digit is 6 and my tens digit is one less. My other four digits are all one less than my tens digit.

10. I have 7 digits. All of my digits are the same and their sum is 14.
11. I have 7 digits. Both my millions digit and my ones digit are equal to 5. Each of the digits in between are two less than five.
12. I have nine digits, each of which is equal. My digits sum to 27.
13. I am greater than one hundred thousand but less than one hundred thousand one hundred. I have a total of six digits and all of them are either zeros or ones. My digits sum to 2. What possible numbers am I?
14. I have 7 digits. My millions digit is 3 and all other digits to the right of it are one more than the digit on its left. What number am I?
15. There are five digits in my number. The first and the last are 1. The second is twice the sum of the first and last, the third is half the second and the fourth is one more than the third. What number am I?

Numerals less than One Thousandth

Small Numbers

We can think of small numbers as numbers that are little when compared with the numbers we use in everyday life. These small numbers often occur in fields such as chemistry, electronics, and quantum physics.



The Decimal Point

We can write numbers as large or as small as we want, using our decimal system of numbers. In this system, digits can be placed to the left or to the right of a **decimal point**. Numbers to the left are equal to or greater than one, and numbers to the right are less than one.

Place Value and the Decimal Point

To the **right** of the ones column is a decimal point, followed by the columns corresponding to place values of tenths, hundredths, and thousandths.

Example: The number 725.135 is shown with the place value for each of its digits below.

7	2	5	.	1	3	5
↑ hundreds	↑ tens	↑ ones	↑ decimal point	↑ tenths	↑ hundredths	↑ thousandths
seven hundred	twenty-five	and		one hundred thirty-five thousandths		

The above **numeral** (number) has 7 hundreds, 2 tens, 5 ones, 1 tenth, 3 hundredths, and 5 thousandths. The **number word** is seven hundred twenty-five **and** one hundred thirty-five thousandths.

Writing Decimal Numerals and Decimal Number Words

We usually use the word “**and**” to represent the decimal point.

Example: Write each of the following numerals as a number word.

<u>Numeral</u>	<u>Number word</u>
7.9	seven and nine tenths
81.04	eighty-one and four hundredths
357.019	three hundred fifty-seven and nineteen thousandths
105.21	one hundred five and twenty-one hundredths
261.011	two hundred sixty-one and eleven thousandths
500.007	five hundred and seven thousandths
205 000.04	two hundred five thousand and four hundredths

Examples with Solutions

1. Which digit is located in each of the following place values for the numeral **3005.267**?

- | | |
|----------------|------------------------------------|
| a. thousands | 3, which represents 3 thousands. |
| b. hundreds | 0, which represents zero hundreds. |
| c. tens | 0, which represents zero tens. |
| d. ones | 5, which represents 5 ones. |
| e. tenths | 2, which represents 2 tenths. |
| f. hundredths | 6, which represents 6 hundredths. |
| g. thousandths | 7, which represents 7 thousandths. |

2. Write number words for the following numerals.

- | | |
|--------------|---|
| a. 30.501 | <u>30.501</u>
The number is thirty and five hundred one thousandths. |
| b. 9.05 | <u>9.05</u>
The number is nine and five hundredths. |
| c. 1033.054 | <u>1033.054</u>
The number is one thousand thirty-three and fifty-four thousandths. |
| d. 23 006.03 | <u>23 006.03</u>
The number is twenty-three thousand six and three hundredths. |

Exercises 1.1b

1. What is the value of each of the following digits in the number **23.468**?

- a. 2
- b. 4
- c. 6
- d. 8
- e. 3

2. Write each of the following numerals as number words.

- | | |
|---------------|--------------|
| a. 25.015 | b. 250.006 |
| c. 45.111 | d. 2300.508 |
| e. 250.013 | f. 3030.03 |
| g. 1003.003 | h. 7000.077 |
| i. 205 000.29 | j. 310 005.6 |

3. Write each of the following number words as numerals.

- a. three hundred fifty and twenty-nine thousandths
- b. forty-five and forty-five thousandths
- c. two hundred five and two hundredths
- d. seven thousand five hundred and seventy-five thousandths

- e. one hundred thousand ten and one tenth
- f. six hundred thousand six and six hundredths
- g. one hundred thousand one hundred one and one hundredth

Extra for Experts

4. Find each of the following numbers based on their descriptions.
- a. My thousandths digit is 8. My hundredths digit is half my thousandths, my tenths digit is half my hundredths, and my ones digit is half my tenths digit. I have four digits altogether. Who am I?
 - b. I have 4 digits altogether. My thousandths digit is the same as my tenths and my ones digits. My hundredths digit is zero. All of my digits sum up to twenty-one. Who am I?
 - c. I have a total of 5 digits. My ones digit is 3. My tens digit, which is one more than my ones, is twice my tenths digit. My hundreds digit, which is two more than my tens digit, is six times my hundredths digit. Who am I?

ANSWERS TO EXERCISES AND CHAPTER TESTS

CHAPTER 1**Exercises 1.1a (page 4)**

1. a) 600 b) 70 c) 9 000 000 d) 300 000
 e) 80 000 2. a) 310 030 b) 2 503 421
 c) 7 070 070 d) 500 005 e) 6 006 006
 f) 40 015 g) 1 020 300 h) 100 101
 3. a) two million five hundred six thousand
 three hundred twenty b) one million thirty-five
 thousand twenty-eight c) six million sixty
 thousand sixty d) five million five hundred five
 thousand fifty-five e) ten million ten thousand
 one f) three million thirty-three g) fifty
 million one thousand one h) seven hundred
 seven million seventy seven thousand seven
 4. three hundred eighty-four thousand four
 hundred three 5. one million two hundred fifty
 thousand three hundred forty-four
 6. 300 050 000 7. 50 425 000 8. 223 600
 9. 444 456 10. 2 222 222 11. 5 333 335
 12. 333 333 333 13. 100 010 or 100 001
 14. 3 456 789 15. 14 231

Exercises 1.1b (page 9)

1. a) 20 b) $\frac{4}{10}$ or 0.4 c) $\frac{6}{100}$ or 0.06 d) $\frac{8}{1000}$ or
 0.008 e) 3 2. a) twenty-five and fifteen
 thousandths b) two hundred fifty and six
 thousandths c) forty-five and one hundred
 eleven thousandths d) two thousand three
 hundred and five hundred eight thousandths
 e) two hundred fifty and thirteen thousandths
 f) three thousand thirty and three hundredths
 g) one thousand three and three thousandths
 h) seven thousand and seventy-seven
 thousandths i) two hundred five thousand and
 twenty-nine hundredths j) three hundred ten
 thousand five and six tenths 3. a) 350.029
 b) 45.045 c) 205.02 d) 7500.075
 e) 100 010.1 f) 600 006.06 g) 100 101.01
 4. a) 1.248 b) 7.707 c) 643.21

Exercises 1.2 (page 12)

1. a) 53 b) 53.5 c) 53.46 2. a) 600 b) 610
 c) 607 d) 607.1 e) 607.05 3. 130 4. 1900
 5. \$123.30 6. 35.81 7. 5, 6, 7, 8 or 9
 8. 0, 1, 2, 3 or 4 9. 5, 6, 7, 8 or 9

10. 0, 1, 2, 3 or 4

Exercises 1.3 (page 16)

1. 14 000 000 2. \$4 049 000 3. 89 000
 4. 960 000 5. About 30 720 000 6. \$726 000
 7. 440 000 8. 1 014 000 bytes

Exercises 1.4 (page 20)

1. a) 5, 71 b) 7, 29 c) 3, 73 d) 11, 31
 e) 13, 23, 43, 53 f) 5 2. a) 1, 2, 4, 5, 8, 10, 20,
 40; 2, 5 b) 1, 5, 11, 55; 5, 11 c) 1, 2, 5, 7, 10,
 14, 35, 70; 2, 5, 7 d) 1, 2, 4, 5, 10, 20, 25, 50,
 100; 2, 5 e) 1, 3, 5, 15, 25, 75; 3, 5 3. a) 3, 6,
 9, 12 b) 2, 4, 6, 8, 20 c) 6, 12, 72 d) 8, 16
 4. a) prime b) composite c) prime
 d) composite e) composite f) composite
 5. a) 49, 56, 63, 70, 77 b) 108, 117, 126, 135
 c) 220, 240, 260 6. 2, 3, 5, 7, 11, 13, 17, 19
 7. a) 1, 5, 25 b) 1, 3 8. a) 35, 70 b) 24, 48,
 72, 96 9. 1, 2, 4 10. 1, 6 11. 30, 60, 90
 12. 2 13. 66, 72, 78, 84, 90, 96 Who am I?
 210

Exercises 1.5 (page 25)

1. GCF = 4, LCM = 224 2. GCF = 4,
 LCM = 240 3. LCM = 60 4. GCF = 14
 5. GCF = 15, LCM = 1050 6. GCF = 3,
 LCM = 420 7. 60 minutes 8. 35 or 105
 9. 7 10. 5 11. 10, 20, 40 12. 15 and 30
 13. a) 9:00 am b) Bus A will have completed 3
 trips. c) Bus B will have completed 2 trips.

Exercises 1.6 (page 29)

1. a) proper b) improper c) proper
 d) improper e) improper f) proper
 g) improper h) proper i) improper j) proper
 k) improper l) improper m) improper
 n) proper 2. a) $\frac{5}{2}$ b) $\frac{11}{3}$ c) $\frac{41}{8}$ d) $\frac{21}{5}$ e) $\frac{101}{10}$
 f) $\frac{101}{5}$ g) $\frac{33}{5}$ h) $\frac{103}{20}$ i) $\frac{1003}{10}$ j) $\frac{85}{4}$ k) $\frac{63}{4}$ l) $\frac{69}{8}$
 m) $\frac{12}{11}$ n) $\frac{601}{20}$ 3. a) $1\frac{1}{3}$ b) $1\frac{2}{3}$ c) $1\frac{1}{8}$ d) $1\frac{4}{7}$
 e) $1\frac{2}{7}$ f) $4\frac{1}{2}$ g) $2\frac{1}{3}$ h) $4\frac{1}{3}$ i) $2\frac{2}{3}$ j) $3\frac{1}{4}$ k) $3\frac{1}{7}$
 l) $2\frac{2}{13}$ m) $5\frac{5}{9}$ n) $1\frac{1}{999}$ 4. $\frac{8}{6}$ or $\frac{4}{3}$ 5. $\frac{5}{2}$, $\frac{7}{4}$, $\frac{8}{5}$, $\frac{9}{6}$
 6. $1\frac{1}{2}$ 7. $3\frac{1}{4}$ 8. $7\frac{3}{4}$



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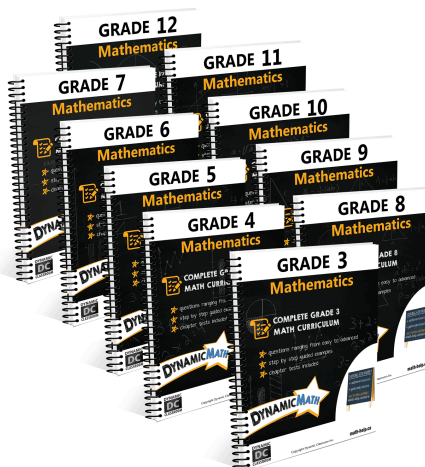
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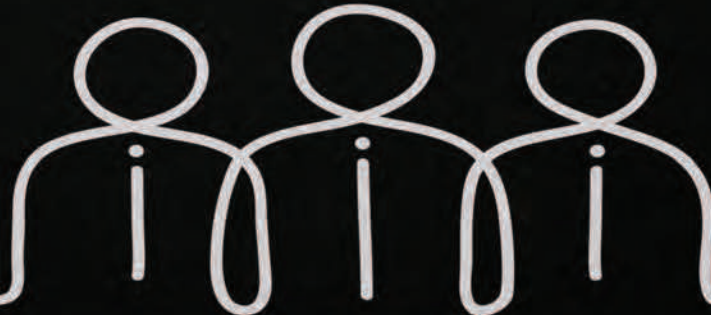
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