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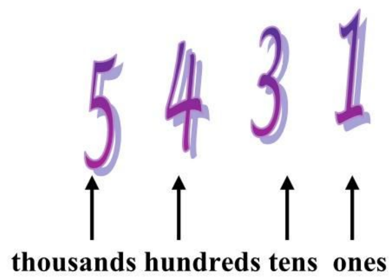

5/4 = 1.25

UNIT 1

NUMBER CONCEPTS

1.1 Place Value

1.2 Rounding Numbers

1.3 Solving Problems with Large Numbers

1.4 Factors and Multiples

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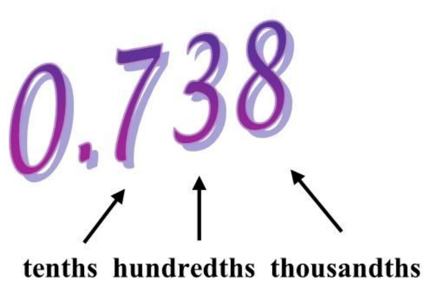
1.6 Improper Fractions and Mixed Numbers

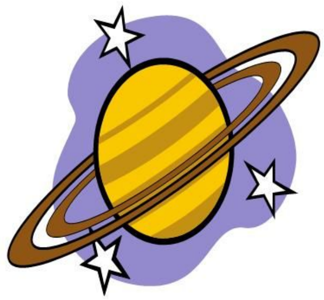
1.7 Ordering and Comparing Fractions and Decimals

3/4 = 0.75



1.1 Place Value

Numerals Greater than 1 000 000



- Large numbers are used when we talk about distances in the universe or when scientists talk about numbers of cells or bacteria; when we talk about the memory in a computer or when we talk about the population of a country. For example, the population of Canada is over 32 000 000 (thirty two 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* (e.g. 125 320 000). When we read these numbers using words they are called *number words* (e.g. 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.
- Recall *place value* as follows.
  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 <u>millions</u>, 5 <u>hundred thousands</u>, 3 <u>ten thousands</u>, 8 <u>thousands</u>, 0 <u>hundreds</u>, 9 <u>tens</u> and 4 <u>ones</u>.
- 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 as follows: *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 shown below?

7 029 438

a. millions	*a. 7 which represents 7 million*
b. ten thousands	*b. 2 which represents 20 thousand*
c. thousands	*c. 9 which represents 9 thousand*
d. hundreds	*d. 4 which represents 4 hundreds*
e. tens	*e. 3 which represents 3 tens*
f. units	*f. 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 word number is as follows: 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 word number is as follows: 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*

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

e.g. 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

Solution

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

a. 405 632	digit 6 ; Value = ____
b. 1 040 670	digit 7 ; Value = ____
c. 9 840 035	digit 9 ; Value = ____
d. 1 302 670	digit 3 ; Value = ____
e. 2 086 075	digit 8 ; Value = ____

2. Write the numeral for each number word.

a. three hundred ten thousand thirty	Answer:___________
b. two million five hundred three thousand four hundred twenty one	Answer:___________
c. seven million seventy thousand seventy	Answer:___________
d. five hundred thousand five	Answer:___________
e. six million six thousand six	Answer:___________

f. forty thousand fifteen

Answer:___________

g. one million twenty thousand three hundred

Answer:___________

h. one hundred thousand one hundred one

Answer:___________

3. Write the word number word for each numeral.

Answer

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 word number.

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 word number.

6. The population of the United States is about three hundred million fifty thousand. Write this word number as a numeral.

7. There are about fifty million four hundred twenty five thousand people in England. Write this word number as a numeral.

8. A provincial park has about two hundred twenty three thousand six hundred trees in it. Write this word number as a numeral.

<u>Extra for Experts</u>

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.

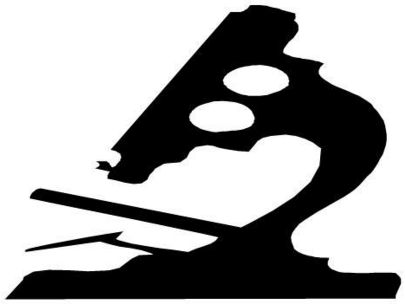
12. I have nine digits, each of which is equal. My digits sum to 27.

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 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 1's column is a decimal point, followed by the columns corresponding to place values of tenths, hundredths and thousandths
  e.g. 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	↑	↑ tenths	↑ hundredths	↑ thousandths
seven hundred	twenty five		and	one hundred thirty five thousandths		

Decimal point

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

Writing Decimal Numerals and Decimal Number Words

- We usually use the word "**and**" to denote the decimal point.

  Write each of the following numerals as a word number.

Numeral	Word Number
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 and Solutions

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

   3005.267

a. thousands	▪ *a. 3 which represents 3 thousands*
b. hundreds	▪ *b. 0 which zero hundreds*
c. tens	▪ *c. 0 which represents zero tens*
d. units (ones)	▪ *d. 5 which represents 5 ones*
e. tenths	▪ *e. 2 which represents 2 tenths*
f. hundredths	▪ *f. 6 which represents 6 hundredths*
g. thousandths	▪ *g. 7 which represents 7 thousandths*

2. Write number words for the following numerals.

a. 30.501	▪ *30.501* ▪ *The number is thirty and five hundred one thousandths.*
b. 9.05	▪ *9.05* ▪ *The number is nine and five hundredths.*
c. 1033.054	▪ *1033.054* ▪ *The number is one thousand thirty three and fifty four thousandths.*
d. 23 006.03	▪ *23 006.03* ▪ *The number is twenty three thousand six and three hundredths.*

Exercises 1.1b

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

a. 2 *Value* ______

b. 4 *Value* ______

c. 6 *Value* ______

d. 8 *Value* ______

e. 3 *Value* ______

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.

Solution

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.

Who Am I?

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?

1.2 Rounding Numbers

Estimating Answers

- **Estimation** is used in many day-to-day situations where we don't need an exact answer. For example, we may want to estimate how much money to bring to the grocery store in order to buy groceries, how much lawn seed is needed for a lawn, or how much paint is needed to paint the house.

Rounding Numbers

- It is often helpful to **round** numbers before we estimate. For example, if we estimate how much the groceries in our grocery cart will cost, we may want to round each item to the nearest dollar first and then find the sum.

Rules for Rounding

- Rounding involves place value. Use the following steps to round numbers.
  - *(i). Go to the column immediately to the right of the digit corresponding to the place value asked for.*
  - *(ii). Round up if that digit is 5 or greater (5 to 9) or leave it the same if it is less than 5 (0 to 4).*
  - *(iii). Replace digits to the right of the place value asked for with zero*

e.g. Round 234.637 to

	Process	*Answer*
a. the nearest ten	▪ *Go to the ones column.* ▪ *It is 4, so leave the tens digit the same and replace digits to the right with zero.*	*230.000 or 230*
b. the nearest one	▪ *Go to the tenths column.* ▪ *It is 6, so round the units digit up to 5 and replace digits to the right with zero.*	*235.000 or 235*
c. the nearest 10^{th}	▪ *Go to the hundredths column.* ▪ *It is 3, so leave the 10ths digit the same and replace digits to the right with zero.*	*234.600 or 234.6*
d. the nearest 100^{th}	▪ *Go to the thousandths column.* ▪ *It is 7, so round the 100ths column up to 4 and replace digits to the right with zero.*	*234.640 or 234.64*

Examples with Solutions

	Solution
1. Round 353.681 as follows:	
a. to the nearest one	▪ *Go to the <u>tenths</u> column. It is 6.* ▪ *Round the ones column up to 4.* ▪ *The answer becomes 354.*
b. to the nearest tenth	▪ *Go to the <u>hundredths</u> column. It is 8.* ▪ *Round the tenths column up to 7.* ▪ *The answer becomes 353.7.*
c. to the nearest hundredth	▪ *Go to the <u>thousandths</u> column. It is 1.* ▪ *Leave the hundredths the same and replace Digits to the right with zero.* ▪ *The answer becomes 353.680 or 353.68.*
2. Round 709.163 as follows:	
a. to the nearest one	▪ *Go to the <u>tenths</u> column. It is 1.* ▪ *Leave the ones the same and replace digits to the right with zero.* ▪ *The answer becomes 709.000 or 709.*
b. to the nearest tenth	▪ *Go to the <u>hundredths</u> column. It is 6.* ▪ *Round the tenths column up to 2.* ▪ *The answer becomes 709.2.*
c. to the nearest hundredth	▪ *Go to the <u>thousandths</u> column. It is 3.* ▪ *Leave the hundredths the same and replace digits to the right with zero.* ▪ *The answer becomes 709.160 or 709.16.*

Exercises 1.2

1. Round 53.458 as follows
   a. to the nearest one
   b. to the nearest tenth
   c. to the nearest hundredth

2. Round 607.053 as follows
   a. to the nearest hundred
   b. to the nearest ten
   c. to the nearest one
   d. to the nearest tenth
   e. to the nearest hundredth

3. Rick estimated that there would be 127 people at the fall fair. If he were to round this number to the nearest ten, how many people should he plan for?

4. A total of 1872 people signed up to attend the Fall Fair. If the planners rounded this number to the nearest hundred, how many people would they plan for?

5. Mrs. Jenkins spent $123.27 on groceries. Rounded to the nearest ten cents (or tenth of a dollar), how much did she spend?

6. Ralph used a calculator to determine that he would need 35.807 wheelbarrows of dirt for his garden. How many wheelbarrows of dirt did he need, rounded to the nearest hundredth?

Extra for Experts

7. If the number 6**?** .23, were rounded to the nearest ten, the number would be 70. What digit(s) could go in place of the unknown?

8. If a number were rounded down to 280, what number(s) could have been in the tenths place?

9. If a number were rounded up to 54 what digit(s) could have been in the tenths place?

10. If a number were rounded down to 87.2 what digit(s) could have been in the hundredths place?

1.3 Solving Problems with Large Numbers

25 000 500

44 333 509

132 250 320

5 445 300 221

Problems with Large Numbers

- When we solve problems involving large numbers, we often use rounding to estimate the solution. We may wish to use a calculator to help us.

<u>Example</u>

The population of a country increased, over a 10-year period, from 5
858 800 to 9 108 300. Estimate how much the increase was by rounding each number: a. first to the nearest million and b. then the nearest 1000.

Answer

a. *Round each number to the nearest 1 000 000*
Rounded to the nearest million: 9 000 000 – 6 000 000 = 3 000 000
The population, to the nearest million, increased by 3 000 000.

b. *Round each number to the nearest 1000*
Rounded to the nearest thousand: 9 108 000 – 5 859 000 = 3 249 000
The population, to the nearest thousand, increased by 3 249 000.

Steps to the Solution of a Problem

- The following steps are suggested for use when solving word problems involving more than one step.

1. List the information that is important for the problem and re-state the question that is being asked.
2. Draw a picture or diagram if one applies.
3. Write a number sentence that uses the important information and identifies the question to solve.
4. Solve the number sentence.
5. Make a concluding statement that answers the question.
6. Check your work.

Approaches to Solving a Problem

- Some of the methods that can be used with a word problem involving several steps include the following.
  - Look for a pattern.
  - Draw a diagram.
  - Work backwards.
  - Break the problem into simpler parts.
  - Guess and check.

Examples with Solutions

1. A company budgeted \$2 130 890 for annual expenses. By the end of the year, it had spent \$2 225 724.	Restate the Question *Expenses actually cost \$2 225 724 and only \$2 130 890 was budgeted. We want to find the difference, first, to the nearest 1000 dollars and then to the nearest 100 dollars.*
a. Round each figure to the nearest thousand dollars. Then estimate how much more was spent than budgeted for.	a. Rounding to the nearest 1000 Write a Number Sentence and Solve *2 226 000 - 2 131 000 = 95 000* Concluding Statement *The company overspent by approximately \$95 000.*
b. Round each figure to the nearest hundred dollars. Then estimate how much more was spent than budgeted for.	b. Rounding to the nearest 100 Write a Number Sentence and Solve *2 225 700 - 2 130 900 = 94 800* Concluding Statement *The company overspent by approximaely \$94 800.*

2. Over a period of 5 years, the population of a large city tripled. The population was 2 313 022 at the beginning of the 5-year period. Round to the nearest 100 000 first and than estimate the population after 5 years.	<u>Restate the Question</u> *A population of 2 313 022 tripled over 5 years. Find the new population to the nearest hundred thousand.* <u>Write a Number Sentence and Solve</u> *2 300 000 x 3 = 6 900 000* <u>Concluding Statement</u> *The population increased to approximately 6 900 000 after 5 years.*

Exercises 1.3

1. The population of the United States was about 286 035 600 in the year 2000. In 2006 it increased to about 300 050 700. To the nearest one million, how much did the population grow?

2. A paint company had sales of about $21 550 800 in 2006. It expects to sell $25 600 200 worth of paint in 2007. To the nearest thousand, how many more dollars in sales does it expect to make?

3. The number of copies of DVD games sold by a large company decreased from 2 430 253 last year to 2 340 823 this year. Round to the nearest thousand and then estimate how many fewer games were sold.

4. The population of a city increased by a multiple of 4 between 1990 and 2000. If the population was 238 322 in 1990, round to the nearest ten thousand and then estimate its population in 2000.

5. According to the most recent census, the population of Canada is over 32 000 000. This is an increase of about 1 280 155 over the previous census. What was the population, to the nearest thousand, at that time?

Extra for Experts

6. Sales of TVs in a large department store doubled between the 2005 sales year and the 2006 sales year. If sales for 2006 were $1 451 750, how much, to the nearest $1000, were they for 2005?

7. One megabyte is 1 000 000 bytes of information. If a computer diskette holds 1 440 000 bytes of information, how many more bytes than 1 megabyte does it hold?

8. A computer diskette holds 1 440 000 bytes of information. Three files on the diskette each take up 150 250, 210 100 and 65 900 bytes respectively. Round to the nearest 1000 and determine approximately how many bytes of memory are left on the diskette.

1.4 Factors and Multiples

- You might recall that when we multiply two numbers together, each of the numbers is called a **factor** and the answer is called the **product**. On the other hand, when we divide one number by another, the number we divide into is called the **dividend**, the number we divide by is the **divisor,** and the answer is the **quotient**.

  e.g. *1.* $\underset{\textbf{factor}}{\mathbf{25}} \times \underset{\textbf{factor}}{\mathbf{150}} = \underset{\textbf{product}}{\mathbf{3750}}$ *2.* $\underset{\textbf{dividend}}{\mathbf{400}} \div \underset{\textbf{divisor}}{\mathbf{25}} = \underset{\textbf{quotient}}{\mathbf{16}}$

- Each time we multiply a whole number greater than zero by another, the product is called a **multiple** of that number.

  e.g. 8 x 2 = 16 (a multiple of 8), 8 x 3 = 24 (also a multiple of 8)

Factor

- A **factor** of a number is also a <u>divisor</u> of that number (a number that divides evenly into it).

  e.g. 1. Factors of 15 are 1, 3, 5, and 15 because they all divide evenly into 15.
  2. Factors of 6 are 1, 2, 3, and 6 because the all divide evenly into 6.
  3. Factors of 12 are 1, 2, 3, 4, 6, and 12.

Prime Number

- **Prime numbers** are numbers which have **only** two <u>different</u> factors (themselves and 1)

  e.g. 1. 2 is a prime number because 2 and 1 are its only factors
  2. 43 is a prime number because 43 and 1 are its only factors
  *3. 10 is **not** prime because it has factors of 5 and 2, as well as 10 and 1*
  *4. 1 is **not** prime because 1 and 1 are not <u>different</u> factors*

- Factor each number into prime factors

  20 = 2 x 2 x 5 *(Note: 1, 4, 10 and 20 are also factors but not prime)*
  110 = 2 x 5 x 11 *(Note: 10, 22, 55 and 110 are also factors but not prime)*

Multiples

- A **multiple** of a number is the product of that number times another non-zero whole number.

  e.g. Multiples of 7 are
  (7 x 1) = 7 ; (7 x 2) = 14 ; (7 x 3) = 21 ; (7 x 4) = 28 ; etc.

- A **composite number** is a non-zero whole number that is not a prime number and can be factored in more than one way. All numbers which are not prime are composite (with the exception of 1 and 0).

Note: 1 and 0 are not prime and they are also not composite

- *They are not prime because: they cannot be shown as the product of only two* ***different*** *factors (e.g. 1 can be shown as 1 x 1, but they are not different factors, and 0 can be shown as the product of different factors in more than one way 0 x 2, 0 x 3, 0 x 4, etc.)*

- *They are not composite because one cannot be factored in more than one way (e.g. one can only be factored as 1 x 1 with non-zero whole numbers) and zero times any whole number is zero, which is not a non-zero number.*

Examples with Solutions

1. Which of the following numbers are prime? 1, 7, 9, 11, 13, 29, 49	▪ *7, 11, 13, and 29 are prime since their only factors are themselves and 1.* ▪ *1 is <u>not</u> prime because it doesn't have two <u>different</u> factors.* ▪ *9 and 49 are <u>not</u> prime since 9 could be factored as either 1 x 9 or 3 x 3; and 49 could be factored as either 49 x 1 or 7 x 7.*
2. Which of the following numbers are factors of 15? 1, 3, 5, 10, 12, 15	▪ *1, 3, 5, and 15 are factors of 15 since each of them divide evenly into it.* ▪ *However, only 3 and 5 are <u>prime</u> factors of 15.*
3. Show each of the following numbers as products of prime factors. a. 126 b. 325 c. 500	 *a. 2 x 3 x 3 x 7* *b. 5 x 5 x 13* *c. 2 x 2 x 5 x 5 x 5*
4. Which of the following numbers are multiples of 7? 1, 7, 17, 27, 28, 32, 35	▪ *7, 28, and 35 are multiples of 7 since 7 x 1 = 7; 7 x 4 = 28, and 7 x 5 = 35*
5. List all multiples of each number that are less than 50. a. 4 b. 7 c. 11	 *a. 4,8,12 ,16,20, 24, 28, 32, 36, 40, 44, 48* *b. 7, 14, 21, 28, 35, 42, 49* *c. 11, 22, 33, 44*

Exercises 1.4

1. Which numbers in each set are prime?

a. 5, 9, 22, 68, 71

b. 7, 14, 21, 29

c. 3, 33, 63, 73

d. 11, 21, 22, 31, 52

e. 0, 13, 23, 33, 43, 53

f. 1, 5, 15, 25, 35, 45

2. List the set of all factors for each number and then list those which are prime factors.

Number	All Factors	Prime Factors
a. 40		
b. 55		
c. 70		
d. 100		
e. 75		

3. Which of the following numbers are <u>multiples</u> of each given number?

Number		***Multiples***
a. 3	1, 3, 6, 13, 9, 12, 13	________
b. 2	1, 2, 4, 6, 8, 20, 21	________
c. 6	2, 3, 6, 12, 16, 26, 72	________
d. 8	1, 2, 4, 8, 16, 18	________

4. Identify each of the following numbers as either prime or composite.

a. 13 b. 34

c. 29 d. 99

e. 102 f. 1005

5. List all multiples of each of the following numbers that are between each pair of given numbers.

   a. all multiples of 7 between 43 and 80

   Answer: ______________

   b. all multiples of 9 between 100 and 140

   Answer: ______________

   c. all multiples of 20 between 210 and 275

   Answer: ______________

6. List all prime numbers between 1 and 20.

Extra for Experts

7. List all factors which are common to each pair of numbers.

   a. 25 and 75 b. 15 and 36

8. List all multiples less than 100 which are common to each pair of numbers.

   a. 5 and 7 b. 3 and 8

9. List all factors that are common to both of the following numbers.

   20, 24

10. List all factors that are common to all of the following numbers.

30, 42, 48

11. Which of the following numbers are multiples of both 10 and 15?

2, 3, 5, 10, 15, 30, 45, 60, 90, 100

12. I am a prime number less than 25. The number which is one greater than me is also prime. Who am I?

13. I am all numbers greater than 60 and less than 100 that are multiples of 2 and 3. Who am I?

Who Am I?

I am a number who is a multiple of both 3 and 5

I am divisible by both 10 and 7

I am the smallest number which meets the above conditions

Answer ____________

APPENDIX

ANSWERS TO EXERCISES AND UNIT TESTS

UNIT 1 – ANSWERS

Page 4: Exercises 1.1a

1a) 600 b) 70 c) 9 000 000 d) 300 000 e) 80 000

2a) 310 030 b) 2 503 421 c) 7 070 070 d) 500 005 e) 6 006 006

2f) 40 015 g) 1 020 300 h) 100 101 3a) two million five hundred six thousand three hundred twenty b) one million thirty five thousand twenty eight

3c) 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

3h) 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

Page 10: Exercises 1.1 b

1a) 20 b) $\frac{4}{10}$ c) $\frac{6}{100}$ d) $\frac{8}{1000}$ e) 3

2a) 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

2f) 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

3a) 350.029 b) 45.045 c) 205.02 d) 7500.075 e) 100 010.1

3f) 600 006.06 g) 100 101.01 4a) 1.248 b) 7.707 c) 643.21

Page 14: Exercises 1.2

1a) 53 b) 53.5 c) 53.46 2a) 600 b) 610

2c) 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

Page 18: Exercises 1.3

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

Page 23: Exercises 1.4

1a) 5, 71 b) 7, 29 c) 3, 73 d) 11, 31 e) 13, 43, 53

1f) 5 2a) 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

2e) 1, 3, 5, 15, 25, 75; 3, 5 3a) 3, 6, 9, 12 b) 2, 4, 6, 8, 20 c) 6, 12, 72 d) 8, 16

4a) Prime b) Composite c) Prime d) Composite e) Composite

4f) Composite 5a) 49, 56, 63, 70, 77 b) 108, 117, 126, 135 c) 220, 240, 260 6. 2, 3, 5, 7, 11, 13, 17, 19

7a) 1, 5, 25 b) 1, 3 8a) 35, 70 b) 24, 48, 72, 96 9. 1, 2, 4

10. 1, 2, 3, 6 11. 30, 60, 90 12. 2 13. 66, 72, 78, 84, 90, 96 Who am I? 210

Page 29: Exercises 1.5

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 13a) 9:00 am b) Bus A will have completed 3 trips c) Bus B will have completed 2 trips

Page 35: Exercises 1.6

1a) Proper b) Improper c) Proper d) Improper e) Improper