PlusOne

MATHEMATICS

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Mathematics

Grade 7
Learner's Book

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CONTENTS

Unit 1

WHOLE NUMBERS

Unit Objectives

At the end of this unit, you should be able to:

(a) identify, read and write numbers in numerals and words.
(b) give the value of a digit in a number.
(c) write numbers in index notation.
(d) arrange numbers in order of magnitude.
(e) compare numbers using comparison signs.
(f) identify prime numbers in the range 0 to 100.
(g) find prime factors of numbers in the range 0 to 100.
(h) round off numbers to the nearest ten, hundred, thousand, ten thousand, hundred thousand and million.

Looking Back

In the previous grade, you learnt how to identify, read and write numbers in the range 0 – 1 000 000 in words and numerals. In this unit, you will learn how to identify, read and write numbers in numerals and words. You will also learn to give the value of digits in a number and write numbers in index notation.

Key Words

Numerals	– writing numbers using digits 0 1 2 3 4 5 6 7 8 9 10.
Index notation	– writing numbers to the power of other numbers, for example, 5^2.
Magnitude	– order of numbers from smallest to biggest.
Comparing	– stating which number is smaller or bigger than the other.
Prime number	– it is a number that can only be divided by 1 and itself.
Rounding off	– finding the nearest point of a number.

Writing numbers in numerals and words

The topic of number is very important to you learners. All the other topics use numbers. You need to know your numbers. Know that the numbers that are multiples of 2 like 2; 4; 6; 8; 10; 12 14 are called **even numbers**. Know that the numbers 1; 3; 5; 7; 9; 11; 13 are **odd numbers**. A number that is only divisible by 1 and itself like 1; 2; 3; 5; 7; 11; 13; 17; 19 are called **prime numbers**.

You need to know how to write numbers in numeric or in words. For you to write numbers in words you need to know also that numbers have values. For example, look at this number;
8 236 791

The number can be written as shown below;

M	HTh	TTh	Th	H	T	U
8	2	3	6	7	9	1

The number is eight million, two hundred and thirty six thousand, seven hundred and ninety one. The number can be shown again as shown below;

Millions	Thousands			Hundreds	Tens	Units
8	2	3	6	7	9	1

Under millions there is 8, under thousands there is 236, under hundreds there is 7, under Tens there is 9 and under units there is 1. We can therefore write the number in words and say **Eight** million, **two hundred and thirty-six** thousands, **seven** hundred and **ninety one**.

Example 1

Write the numbers shown in the table below in words as done above.

	Millions	Thousands			Hundreds	Tens	Units
(i)	1	3	2	5	4	9	7
(ii)	6	8	1	2	9	7	4
(iii)	9	1	2	2	8	4	2

Solution

(i) One million, three hundred and twenty-five thousand, four hundred and ninety-seven.
(ii) Six million, eight hundred and twelve thousand, nine hundred and seventy-four.
(iii) Nine million, one hundred and twenty-two thousand, eight hundred and forty-two.

Example 2

Write these numbers in numerals in the table as shown in example 1.

(i) Four million, three hundred and seventy-four thousand, three hundred and ninety-two.
(ii) Eight million, sixty-three thousand, nine hundred and twenty-six.
(iii) Six million, two hundred and forty-seven thousand, two hundred and five.

Solution

	Millions	Thousands			Hundreds	Tens	Units
(i)	4	3	7	4	3	9	2
(ii)	8	0	6	3	9	2	6
(iii)	6	2	4	7	2	0	5

Exercise 1

1. 487 written in words is _____.
2. Write 23 980 in words.
3. What is 213 978 written in words?
4. Write 904 142 in words.
5. What is 8 164 927 written in words?
6. Three thousand and seventy-nine written in numerals is _____.
7. What is sixty-three thousand, four hundred and nineteen written in numerals?
8. Write seven million, four hundred and eighty-one written in numerals.
9. The number four million and sixty-two written in numerals is _____.
10. Write five million, six hundred and twenty-two thousand and fifteen in numerals.

Place value

Each digit in a number has a value. A number can have the value of Millions (M), Hundred Thousand (HTh), Ten Thousand (TTh), Thousand (T), Hundred (H), Tens (T) and Units (U). Knowing the value of each digit helps you know how to read the number accurately. For example, look at the numbers in the table below and observe the position of 5 in each number.

Row number		Thousands						Number in words
	M	HTh	TTh	Th	H	T	U	
(i)						4	5	5 has the value of 5 units (5)
(ii)					4	5	0	5 has the value of 5 Tens (50)
(iii)			3	4	5	0	0	5 has the value of 5 Hundreds (500)
(iv)	2	3	4	5	0	0	0	5 has the value of 5 Thousand (5 000)
(v)	3	4	5	0	0	0	0	5 has the value of 5 Ten Thousand (50 000)

Example 3

Find the value of 4 in each of the rows in the table above.

Solution

(i) 4 has the value of 4 Tens or 40.
(ii) 4 has the value of 4 Hundred or 400.
(iii) 4 has the value of 4 Thousand or 4 000.
(iv) 4 has the value of 4 Ten Thousands or 40 000.
(v) 4 has the value of 4 Hundred Thousands or 400 000.

Exercise 2

Find the value of the underlined digit in these numbers.

1. 6 9̲78
2. 92 1̲25
3. 85 15̲4
4. 789 4̲35
5. 989 1̲22
6. 1̲23 089
7. 2 546 12̲3
8. 9 3̲40 111
9. 3 3̲75 445
10. 1̲0 000 000

Writing numbers in index notation

You need to know what an index is. Look at these numbers below;

(i) 2^3 we say 2 to the power of 3. The raised digit 3 is called an index. The word index means one. It is a singular. When they are two or many, they are called indices.

(ii) 4^2 This is 4 to the power of 2. The raised digit 2 is an index.

(iii) 2^5 This is 2 to the power of 5. The raised digit 5 is an index.

Note this;

(i) $2^3 = 2 \times 2 \times 2 = 8$

(ii) $4^2 = 4 \times 4 = 16$

(iii) $2^5 = 2 \times 2 \times 2 \times 2 \times 2 = 32$

Know this;

- Any number to the power of 1 is that number, for example, $2^1 = 2$; $3^1 = 3$; $6^1 = 6$; $5^1 = 5$.
- Any number to the power of 0 is 1, for example, $2^0 = 1$; $3^0 = 1$; $6^0 = 1$; $5^0 = 1$

Example 4

Complete these with correct missing numbers.

(i) $10^0 = $ ____
(ii) $10^1 = $ ____
(iii) $10^2 = 10 \times $ ____
(iv) $10^3 = 10 \times $ ____ $\times$ ____ $=$ ____
(v) $10^4 = 10 \times $ ____ $\times$ ____ $\times$ ____ $=$
(vi) $10^5 = 10 \times $ ____ $\times$ ____ $\times$ ____ $\times$ ____ $=$

Solution

(i) $10^0 = 1$
(ii) $10^1 = 10$
(iii) $10^2 = 10 \times 10 = 100$
(iv) $10^3 = 10 \times 10 \times 10 = 1\ 000$
(v) $10^4 = 10 \times 10 \times 10 \times 10 = 10\ 000$
(vi) $10^5 = 10 \times 10 \times 10 \times 10 \times 10 = 100\ 000$

Solve the following problems. Ask your facilitator to help you where you have difficulties.

1. $2^3 = 2 \times 2 \times 2 = $ ____
2. $5^3 = $ ____ $\times$ ____ $\times$ ____ $= $ ____
3. $10^2 = $
4. $10^4 = $
5. $10^3 = $
6. $(10^5 \times 3) + (10^4 \times 5) + (10^3 \times 7) + 10^2 \times 6) + (10^1 \times 3) + (10^0 \times 4) = $
7. $(10^5 \times 2) + (10^0 \times 6) + (10^4 \times 3) + (10^2 \times 7) + (10^1 \times 8) = $
8. $(10^5 \times 3) + (10^4 \times 5) + (10^3 \times 7) + (10^2 \times 6) + (10^1 \times 3) + (10^0 \times 4) = $
9. $(10^5 \times 3) + (10^4 \times 5) + (10^3 \times 7) + (10^2 \times 6) = $
10. $(10^5 \times 6) + (10^4 \times 6) + (10^3 \times 2) + (10^2 \times 4) + (10^1 \times 2) + (10^0 \times 2) = $

Rounding off numbers

Numbers can be rounded off to the nearest 10; 100; 1 000; 10 000; 100 000; 1 000 000.

- Tens are 10; 20; 30; 40; 50; 60; 70; 80; 90; 100; 110; 120; 130; 140
- Hundreds are 100; 200; 300; 400; 500; 600; 700; 800; 900; 1 000; 1 100; 1 200
- Thousands are 1 000; 2 000; 3 000; 4 000; 5 000; 6 000; 7 000; 8 000
- Ten Thousand are 10 000; 20 000; 30 000; 40 000; 50 000; 60 000
- Hundred Thousand are 100 000; 200 000; 300 000; 400 000; 500 000
- Millions are 1 000 000; 2 000 000; 3 000 000; 4 000 000; 5 000 000

Examples

(i) Round off 27 to the nearest 10.
(ii) Round off 324 to the nearest 10.
(iii) Round off 35 to the nearest 10.

Solution

(i) Round off 27 to the nearest 10.

Step 1: Identify the position of 27 in a number line of Tens. 27 must be between the two Tens (20 and 30). Look at the number line below;

A Ten that is closer to 27 is 30. Therefore, 27 rounded off to the nearest 10 is 30.

(ii) Round off 324 to the nearest 10.
324 is between 320 and 330 on the number line.

324 is closer to 320. Therefore, 324 rounded off to the nearest 10 is 320.

(iii) Round off 35 to the nearest 10.

$$\underset{}{\underset{10\qquad 20\qquad 30\qquad\overset{\displaystyle 35}{\downarrow}\ \ 40\qquad 50}{\rule{0pt}{0pt}}}$$

35 stands at the centre of the two Tens, 30 and 40. The distance to 30 and to 40 is equal. We will then round off 35 to the next bigger Ten. Therefore 35 rounded off to the nearest 10 is 40. It means that 25 rounded off to the nearest 10 is 30 and 175 rounded off to the nearest 10 is 180.

Rounding off numbers to the nearest 100; 1 000; 10 000; 100 000 and 1 000 000 is also easy. All that you need to do is identify the position of a number to be rounded off in an imaginary number line then you round off the number.

Examples

(i) Round off 62 to the nearest 10.
(ii) Round off 4 289 to the nearest 10.
(iii) Round off 87 153 to the nearest 100.
(iv) Round off 87 899 to the nearest 1 000.
(v) Round off 855 423 to the nearest hundred thousand.

Solution

(i) 62 rounded off to the nearest 10 is 60.
(ii) 4 289 rounded off to the nearest 10 is 4 290.
(iii) 87 153 rounded off to the nearest 100 is 87 200.
(iv) 87 899 rounded off to the nearest 1 000 is 88 000.
(v) 855 423 rounded off to the nearest hundred thousand 900 000.

Exercise 4

Round off the following numbers as instructed.

1. 84 to the nearest 10.
2. 376 to the nearest 10.
3. 782 to the nearest 100.
4. 76 197 to the nearest 100.
5. 98 163 to the nearest 1000.
6. 78 648 to the nearest 10 000.
7. 546 879 to the nearest 100 000.
8. 4 312 967 to the nearest 1 000 000.
9. 7 612 924 to the nearest 1 000 000.
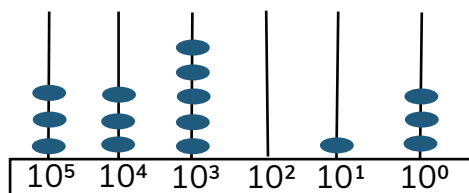10. Which thousand is nearer to 6 298?

Unit Revision Exercises

Multiple Choice Questions

1. 6 253 written in words is_____.
    A. six two five three **B.** six thousand two hundred and fifty-three
    C. sixty-two thousand and fifty-three **D.** six million two thousand and fifty-three

2. Seven million and eighty-nine written in numerals is _____.
    A. 7 000 89 **B.** 7 000 890 **C.** 7 000 089 **D.** 7 890 000

3. What is the value of 8 in 543 867?
    A. 8 Units **B.** 80 **C.** 800 **D.** 8 000

4. $(10^3 \times 5) + (10^6 \times 2) + (10^2 \times 3) =$
    A. 1 100 000 **B.** 1 200 000 **C.** 1 540 000 **D.** 2 005 300

5. Which set of numbers is arranged in the correct order of magnitude?
    A. 213   645   867   1923   **B.** 645   213   867   1923
    C. 213   645   1923   867   **D.** 213   1923   867   645

6. 989 213 ☐ 99 898. The ☐ stands for?
    A. < **B.** + **C.** = **D.** >

7. All the following are prime numbers except_____.
    A. 39 **B.** 19 **C.** 7 **D.** 5

8. Which of the following is a prime factor of 100?
    A. 2 **B.** 20 **C.** 25 **D.** 50

9. $100 = 2 \times 5 \times$ _____.
    A. 90 **B.** 50 **C.** 20 **D.** 10

10. 345 000 is 344 879 rounded off to the nearest ___.
    A. 10 000 **B.** 1 000 **C.** 100 **D.** 10

Structured Questions

1. What number is shown by the following abacus?

10^5 10^4 10^3 10^2 10^1 10^0

2. Use <; > or = in place of ☐
    (a) 10^6 ☐ 3 000 000
    (b) $(10^3 + 10^4)$ ☐ 10 000

3. Write these numbers in words.
    (a) 23 806
    (b) 8 263 109

4. Re-write the following numbers in the correct ascending order.
    12   86   9   188   9 026   4 102   987

NUMERATION SYSTEMS

Unit Objectives

At the end of this unit, you should be able to:

(a) convert roman numerals to arabic numerals and vice versa.

Looking Back

In the previous grade, you learnt how to identify, read and write Roman numerals. You also learnt to convert Roman to Arabic numerals and vice versa. In this unit, you will learn further how to convert Roman to Arabic numerals and back. You will learn to solve problems involving Roman numerals.

Key Words

Roman numerals	– these are number systems used originally in Rome.
Arabic numerals	– this is a number system used in countries like Zimbabwe originating from the Arabs. Examples of Arabic numerals are 1; 2; 3; 4; 5; 6.
Symbols	– marks drawn to represent a number or word commonly known among a group of people.

Roman numerals – Converting to Arabic numerals

Each group of people has a way of expressing itself. People can use language, numbers a symbol to represent their speech. Roman numerals are numbers that are used in Mathematics that originated in Rome. For example, the number **one** can be written as '**i**' and two can be written as **'ii'**. Three is written as **'iii'**.

Example

Look at the following pictures and count the number of elements in each set;

✳ = i meaning 1

✳✳ = ii meaning 2

✳✳✳ = iii meaning 3

✳✳✳✳ = iv meaning 4

✳✳✳✳✳ = v meaning 5

3. What number is pointed by an hour hand in this clock face?

    A. 12   **B.** 10   **C.** 9   **D.** 8

4. Find the missing number in the sequence below;
   V   X   XV   XX   XXV   _____.
   A. XXVI   **B.** XXVIII   **C.** XXX   **D.** XXXV

5. All the following are multiples of 10 except _____.
   A. L   **B.** C   **C.** CL   **D.** LV

6. The missing sign in CXXI _____ LXXXI.
   A. >   **B.** <   **C.** +   **D.** =

7. Three hundred and seventy written in Arabic numerals is_____.
   A. 270   **B.** 370   **C.** CCCLXX   **D.** XXLI

8. The number XLV comes after_____.
   A. 42   **B.** 43   **C.** 44   **D.** 45

9. Mr Moyo is LXXX years old and his wife is LXX. What is the difference between their numbers of years of age?
   A. 20 years   **B.** 15 years   **C.** 10 years   **D.** 4 years

10. DCLXVI written in Arabic numerals is_____.
    A. 466   **B.** 666   **C.** 766   **D.** 866

Structured Questions

1. Put >, < or = in place of ☐ to make these statements true.
   (a) 468 ☐ CXXV
   (b) LXV ☐ 65

2. Convert these to Roman numerals.
   (a) CXVII
   (b) DCXI

3. Complete the number sequence.
   X   XX   XXX   ☐   L   LX   LXX

4. When 72 is written in Roman numerals it is_____.

Unit 3

PROPER FRACTIONS

Unit Objectives

At the end of this unit, you should be able to:

(a) identify, read and write proper fractions.
(b) interpret diagrams representing proper fractions.
(c) compare proper fractions.
(d) arrange fractions in order of size.
(e) convert proper fractions to decimals.
(f) simplify proper fractions to their lowest terms.

Looking Back

In previous grades, you learnt how to identify, read and write fractions with denominators 2 to 10 and multiples of 5 up to 100. You also learnt how to give equivalent fractions. In this unit, you will learn to identify, read and write proper fractions. You will also learn to interpret diagrams representing proper fractions and you will learn to compare proper fractions. You will further learn to arrange fractions in order of size and to convert proper fractions to decimals and vice versa. You will simplify proper fractions to their lowest terms.

Key Words

Proper fraction	– it is a fraction that has a numerator that is smaller than the denominator. $\frac{2}{7}$ is an example of a proper fraction.
Decimals	– it is a number with a comma. 0.32 is an example of a decimal.
Lowest terms	– reducing a fraction to the smallest equivalent fraction that cannot be reduced further.
Denominator	– the bottom number in a fraction. 5 is a denominator in $\frac{2}{5}$.
Numerator	– the top number in a fraction. 2 is a numerator in $\frac{2}{5}$.
Equivalent fractions	– fractions with the same value. $\frac{1}{2}$ and $\frac{2}{4}$ are equivalent fractions.

Identifying, reading and writing proper fractions

We need to first explain what a fraction is. Look at this diagram; the shape has four equal parts. 1 part is shaded and 3 parts are not shaded. 1 out of 4 parts is shaded. We write this as $\frac{1}{4}$ is shaded. $\frac{1}{4}$ is called a proper fraction.

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Reduce the following fractions to their lowest terms.

1. $\dfrac{4}{6}$

2. $\dfrac{5}{10}$

3. $\dfrac{4}{8}$

4. $\dfrac{3}{9}$

5. $\dfrac{10}{30}$

6. $\dfrac{40}{50}$

7. $\dfrac{20}{100}$

8. $\dfrac{25}{75}$

9. $\dfrac{26}{52}$

10. $\dfrac{35}{70}$

Unit Revision Exercises

Multiple Choice Questions Questions

1. A shape with 8 parts has 3 shaded parts. What fraction of the shape is shaded?

   A. $\dfrac{3}{8}$ **B.** $\dfrac{8}{3}$ **C.** $\dfrac{5}{8}$ **D.** $\dfrac{4}{8}$

2. What is 3 in $2\dfrac{3}{5}$ called?

   A. Whole number   **B.** Numerator   **C.** Denominator   **D.** Decimal

3. What fraction of the following shape is the shaded part?

   A. $\dfrac{4}{5}$ **B.** $\dfrac{1}{5}$ **C.** $\dfrac{4}{6}$ **D.** $\dfrac{1}{6}$

4. $\dfrac{3}{10} \square \dfrac{2}{5}$. The $\square$ stands for ____.

   A. =   **B.** >   **C.** <   **D.** +

5. Which of the following set of fractions is arranged in order from the smallest to the biggest?

   A. $\dfrac{1}{2}$ $\dfrac{1}{3}$ $\dfrac{1}{4}$ $\dfrac{1}{5}$ $\dfrac{1}{6}$ $\dfrac{1}{7}$

   B. $\dfrac{1}{3}$ $\dfrac{1}{5}$ $\dfrac{1}{2}$ $\dfrac{1}{7}$ $\dfrac{1}{4}$ $\dfrac{1}{6}$

   C. $\dfrac{1}{7}$ $\dfrac{1}{6}$ $\dfrac{1}{5}$ $\dfrac{1}{4}$ $\dfrac{1}{3}$ $\dfrac{1}{2}$

   D. $\dfrac{1}{7}$ $\dfrac{1}{4}$ $\dfrac{1}{2}$ $\dfrac{1}{3}$ $\dfrac{1}{6}$ $\dfrac{1}{5}$

6. What is $\dfrac{4}{10}$ converted to decimal?

   A. 0.4   **B.** 0.10   **C.** 10.4   **D.** 4.10

MIXED NUMBERS

Unit Objectives

At the end of this unit, you should be able to:

(a) identify, read and write mixed numbers.
(b) represent mixed numbers on diagrams and vice versa.
(c) identify whole numbers and fraction parts of a mixed number.
(d) write mixed numbers as improper fractions.
(e) write improper fractions as decimals.

Looking Back

In the previous grade, you learnt how to identify, read and write mixed numbers and you learnt to compare mixed numbers. You also learnt to convert mixed numbers to improper fractions and vice versa. You further learnt to write mixed numbers as decimals. In this unit, you will learn to identify, read and write mixed numbers. You will represent mixed numbers on diagrams and vice versa.

Key Words

Mixed number	– it is a fraction that has a whole number and a proper fraction.
Improper fractions	– it is a fraction that has a numerator that is bigger than the denominator.

Identifying, reading and writing mixed numbers

Look at the picture below;

The diagram shows two full cylinders of water and a half. We say 2 and a half cylinders of water and we write that as $2\frac{1}{2}$ cylinders of water. A full cylinder is called a whole and a half is called a fraction. In $2\frac{1}{2}$ there is a whole number, a numerator and a denominator as shown below;

Solution

(i) $\frac{5}{3}$ (ii) $\frac{5}{2}$ (iii) $\frac{17}{5}$

To convert improper fractions back to mixed numbers you divide the numerator by the denominator. For example;

Convert these improper fractions to mixed numbers;

(i) $\frac{9}{2}$ (ii) $\frac{10}{4}$ (iii) $\frac{7}{5}$

Solution

(i) $9 \div 2 = 4$ remainder 1 out of 2 = $4\frac{1}{2}$

(ii) $10 \div 4 = 2$ remainder 2 out of 4 = $2\frac{2}{4} = 2\frac{1}{2}$

(iii) $7 \div 5 = 1$ remainder 2 out of 7 = $1\frac{2}{7}$

Exercise 3

Convert the following mixed numbers to improper fractions.

1. $1\frac{1}{2}$ 2. $2\frac{1}{3}$ 3. $1\frac{4}{5}$

4. $2\frac{3}{7}$ 5. $5\frac{2}{5}$ 6. $3\frac{3}{4}$

7. $2\frac{1}{8}$

Convert these improper fractions to mixed numbers.

8. $\frac{30}{7}$ 9. $\frac{19}{5}$ 10. $\frac{23}{5}$

Converting mixed numbers to decimals

A decimal is a number with a comma. A decimal is a form of a fraction. 0.3 is an example of a decimal number. 0.3 is the same as $\frac{3}{10}$ hence 0.3 and $\frac{3}{10}$ are all fractions.

There are many ways of converting mixed numbers to decimals. You can first convert the mixed number to an improper fraction then divide the numerator by the denominator. For example; Convert $2\frac{1}{2}$ to a decimal;

Step 1: Convert $2\frac{1}{2}$ to an improper fraction. It will be $\frac{5}{2}$.

Step 2: Divide the numerator by the denominator. Say $5 \div 2 =$ which is 2 remainder 1. Write 2 Comma (unknown number to be sought in step 3 below).

Step 3: Add zero to the remainder of 1 to make it 10. Divide 10 by 2 to get 5. The final answer is 2.5; therefore $2\frac{1}{2} = \frac{5}{2}$. It means that $2\frac{1}{2}$ is the same as 2.5.

Try to convert these mixed numbers to decimal with your colleagues.

(i) $2\frac{2}{5}$ (ii) $1\frac{1}{2}$ (iii) $3\frac{3}{6}$

Solution

(i) 2.4   (ii) 1.5   (iii) 3.5

Decimals can also be converted to mixed numbers. For example,

(i) $3.5 = 3\frac{5}{10} = 3\frac{1}{2}$

(ii) $2.4 = 2\frac{4}{10} = 2\frac{2}{5}$

(iii) $1.5 = 1\frac{5}{10} = 1\frac{1}{2}$

Exercise 4

Convert these mixed numbers to a decimal.

1. $2\frac{2}{8}$
2. $6\frac{1}{2}$
3. $3\frac{3}{5}$
4. $2\frac{2}{10}$
5. $3\frac{1}{2}$

Convert these decimal fractions to mixed numbers. Reduce the fractions to their lowest terms.

6. 2.5
7. 1.5
8. 3.4
9. 2.6
10. 3.75

Unit Revision Exercises

Multiple Choice Questions

Answer the following questions by choosing the correct answer from A, B, C or D.

1. What name is given to the digit 2 in $2\frac{1}{3}$?
   A. Whole number   **B.** Numerator   **C.** Denominator   **D.** Decimal number

2. What fraction of the shape below is the shaded part?

   A. $\frac{9}{12}$ **B.** $\frac{9}{16}$ **C.** $2\frac{1}{4}$ **D.** $2\frac{3}{4}$

3. Which of the following statements is true about mixed numbers?
   A. Mixed numbers have a whole number only.
   B. Mixed numbers have a numerator only.
   C. Mixed numbers have a whole number, numerator and denominator.
   D. Mixed numbers have numerator, denominator and hundreds.

4. $2\frac{1}{3}$ as an improper fraction is _____.
   A. $\frac{21}{3}$ **B.** $\frac{7}{3}$ **C.** $\frac{6}{3}$ **D.** $\frac{4}{3}$

Unit 5

DECIMAL NUMBERS

Unit Objectives

At the end of this unit, you should be able to:

(a) identify, read and write decimal numbers with three decimal places.
(b) find place value of digits in decimal numbers.
(c) write decimal numbers in expanded notation.
(d) compare decimal fractions.
(e) round off decimal numbers to the nearest unit, tenth and hundredth.

Looking Back

In the previous grade, you learnt how to identify, read and write decimal numbers. You also learnt to find the value of digits in decimal numbers. You further learnt to compare decimal numbers and arranged decimals in order of size. You finally rounded off decimals to a degree of accuracy. In this unit, you will go through all the concepts once again and you will go further and write decimal numbers in expanded notation. You will also compare decimal numbers and round them off to the nearest unit, tenth and hundredth.

Key Words

Place value	– the degree of importance of each digit in a number.
Expanded notation	– a way of writing numbers in which each digit is broken down according to its value.
Estimation	– to assess the similarities and differences in two or more numbers in terms of size.
Decimal	– number with a comma.

Identifying, reading and writing decimal numbers

A decimal number is any number that has a comma. For example, 2.146 is a decimal number. Like in the case of mixed numbers, decimals have a whole number and a fraction.

Example 1

The decimal number 2.146 has two parts. There is a digit before the comma and digits after the comma. Look at the number below;

(iii) 10.461 ☐ 9.899
(iv) 7.049 ☐ 11.002
(v) 12.131 ☐ 12.131

Solution

(i) <
(ii) <
(iii) >
(iv) <
(v) =

Exercise 3

Choose a sign among >, < and = to replace ☐ to make these statements true.

1. 3.046 ☐ 2.986
2. 0.099 ☐ 1.002
3. 2.048 ☐ 1.899
4. 4.044 ☐ 4.043 + 1
5. 0.49 ☐ 1.02

6. 0.45 + 11.03 ☐ 9.98
7. 32.146 ☐ 9.789
8. 0.586 + 13 ☐ 13.586
9. 3.422 + 1 ☐ 4.422
10. 1.009 ☐ 0.999

Rounding off decimals

Decimals can be rounded off to the nearest whole number, unit, tenth and hundredth. For example, 0.78 is nearer to 0.8 than to 0.7. You did this concept of rounding off in Unit 1 when you were looking at whole numbers.

Example

Round off 1.78 to the nearest unit.

The decimal number 1.78 lies between the units 1 and 2. To get the answer try to locate the position of 1.78 on the number line. Check whether 1.78 is nearer to 1 or 2. We agree that 1.78 is nearer to 2 units hence we will write as follows;

1.78 rounded off to the nearest unit is 2.

Try these in pairs.

(i) 0.468 rounded off to the nearest hundredth is _____.
(ii) 2.47 rounded off to the nearest whole number is _____.
(iii) Round off 6.45 to the nearest unit.
(iv) What is 24.085 rounded off to the nearest tenth?

Solution

(i) 0.47
(ii) 2
(iii) 6.00
(iv) 24.1

PERCENTAGES

Unit Objectives

At the end of this unit, you should be able to:

(a) identify, read and write percentages.
(b) express fractions as percentages and vice versa.

Looking Back

In the previous grade, you learnt to express fractions as percentages and vice versa. You also represented percentages on diagrams. In this unit, you are going to learn to identify, read and write percentages. You will also express fractions as percentages and vice versa.

Key Words

Percentage – the amount, number or rate of something regarded as part of a total of 100. It means out of 100.
Fraction – it means part of a whole.
Decimals – numbers with commas.

Identifying, reading and writing percentages

Tom wrote a Mathematics test and got 85%. It means that the test was marked out of 100 and Tom got 85 marks out of 100. Percentage means out of 100. In the previous period of three weeks you learnt about proper fractions, mixed numbers and decimals. All those are types of fractions. Percentage is another form of fractions. Percentage is a fraction that is out of 100. For example, $\frac{20}{100}$ = 20%; $\frac{30}{100}$ = 30%; $\frac{1}{2}$ = $\frac{50}{100}$ = 50%. Percentages can be represented in diagrams. Look at this diagram below;

$\frac{80}{100}$ is shaded

80% is shaded

Work out;

6. 20% of $400.
7. 30% of 630kg.
8. 70% of 200km.
9. 80% of 1 000km.
10. 65% of 4 500g.

Unit Revision Exercises

Multiple Choice Questions

1. Express $\frac{27}{50}$ as a percentage.
    A. 27%   **B.** 54%   **C.** 77%   **D.** 80%
2. $\frac{13}{20}$ as a percentage is_____.
    A. 65%   **B.** 60%   **C.** 44%   **D.** 33%
3. What is $2\frac{3}{10}$ as a percentage?
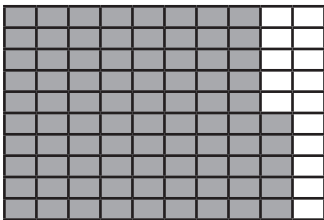   **A.** 23%   **B.** 78%   **C.** 130%   **D.** 230%
4. Express 0.7 as a percentage.
    A. 7%   **B.** 17%   **C.** 70%   **D.** 80%
5. 49% is the same as_____.
    A. 0.49   **B.** 4.9   **C.** 0.049   **D.** 49.00
6. What percentage is the shaded part?

    A. 45%   **B.** 65%   **C.** 85%   **D.** 90%
7. Express the number shown by the abacus below as a percentage.

    A. 2.34%   **B.** 254%   **C.** 25.4%   **D.** 34%

    Read the following statement and answer questions 8 – 10.
    Sam got 66% in an English test, $\frac{17}{25}$ in General Paper, $\frac{16}{20}$ in Mathematics and 45% in Shona.
8. What was Sam's percentage mark in General Paper?
    A. 17%   **B.** 42%   **C.** 58%   **D.** 68%
9. In which learning area did Sam get the highest mark?
    A. General Paper   **B.** Mathematics   **C.** English   **D.** Shona
10. What was Sam's total percentage marks for the four learning areas?
    A. 144   **B.** 168   **C.** 204   **D.** 259

ADDITION OF WHOLE NUMBERS

Unit Objectives

At the end of this unit, you should be able to:

(a) add whole numbers less than or equal to 10 000 000.
(b) use the associative and commutative law with whole numbers.

Looking Back

In the previous grade, you learnt how to add whole numbers whose sum is less than or equal to 1 000 000. You also learnt to apply associative and commutative laws to whole numbers. In this unit, you will learn to add whole numbers less than or equal to 10 000 000 and to use the associative and commutative law with whole numbers.

Key Words

Plus	– to add.
Sum	– the result of an addition process.
Increase	– to add.
Addends	– two or more numbers that are added.

Adding whole numbers

You need to know mental work in order to excel in this unit. Find answers here as quickly as you can without using a calculator or counters.

Monday	Tuesday	Wednesday	Thursday	Friday
3 + 6 =	7 + 7 =	3 + 7 =	6 + 7 =	6 + 6 =
5 + 9 =	9 + 8 =	5 + 3 =	9 + 8 =	9 + 7 =
2 + 7 =	8 + 5 =	2 + 8 =	7 + 8 =	5 + 9 =
6 + 8 =	4 + 9 =	6 + 4 =	6 + 1 =	7 + 8 =
2 + 5 =	6 + 7 =	2 + 3 =	5 + 7 =	3 + 3 =
8 + 6 =	2 + 6 =	8 + 2 =	7 + 9 =	4 + 2 =
7 + 7 =	1 + 9 =	7 + 1 =	7 + 3 =	9 + 1 =
9 + 9 =	5 + 9 =	9 + 3 =	6+ 5 =	7 + 5 =
4 + 8 =	5 + 8 =	4 + 5 =	2 + 5 =	4 + 8 =
8 + 8 =	2 + 8 =	8 + 6 =	8 + 3 =	3 + 6 =

Solution

Total mass = 16kg + 20kg + 20kg.

= 20kg
20kg
+ 16kg
_____
56kg

Exercise 4

Solve the following problems in your exercise book.

1. A farmer has 3 464m² of land. She is given another 2 460m² of land by the AREX office. How much land has the farmer have now?
2. Bread costs $10.00 and salt costs $6.00. How much should a customer pay to buy one loaf of bread and salt?
3. A triangular garden has sides of 30m, 45m and 54m. Find the distance around the garden.
4. It took Tsitsi 4 hours to read a book and it took Ben 3 hours to read the same book. Fin the total time taken by the two to read the book.
5. The area of Mr Moyo's field is 10 000m². Mr Gatsheni's field is 6 000m². Find the total area of the two fields.
6. A printer processed 3 400 papers on Monday and 6 430 papers on Tuesday. What is the total number of papers processed in two days?
7. A bus carries 30 women, 27 men and 16 children. Find the total number of passengers on the bus.
8. What is the total number of sides of one triangle, one rectangle and one pentagon?
9. A bag of maize costs $175.00. The price is increased by $76.00. What is the new price of a bag of maize?
10. If 26 people died in a road accident in Gweru and 17 people drowned to death in Mutare then find the total number of people who died in two places.

Unit Revision Exercises

Multiple Choice Questions

Answer all the questions by choosing the correct answer from A, B, C or D.

1. Find the sum of 315 and 2416.
   A. 3 400   **B.** 2 731   **C.** 2 631   **D.** 2503
2. When 6 405 392 is increased by 3 408 618 we get _____.
   A. 7 816 318   **B.** 8 817 318   **C.** 9 814 010   **D.** 9 907 308
3. When 3 408 618 is added to 813 914 the result is _____.
   A. 4 222 532   **B.** 222 532   **C.** 202 532   **D.** 200 532
4. (14 604 + 23 192) + 3 141 = ☐
   A. 14 604 + (23 192 + 3 141)   **B.** (14 604 + 23 192) + 3 140
   C. 14 604 + (23 190 + 3 141)   **D.** 14 604 +(2 190 + 3 142)

SUBTRACTION OF WHOLE NUMBERS

Unit Objectives

At the end of this unit, you should be able to:

(a)   subtract whole numbers.

Looking Back

In the previous grade, you learnt how to subtract whole numbers within the range 0 – 1 000 000. In this unit, you will learn to subtract numbers in the range 0 – 10 000 000.

Key Words

Subtract   – take away.
Reduce   – subtract.
Difference – result after subtracting two or more numbers.

Subtraction of whole numbers without equal addition

To subtract numbers, you need to know your mental work. Here is mental work to practice.

Monday	Tuesday	Wednesday	Thursday	Friday
9 − 6 =	13 − 4 =	14 − 6 =	18 − 9 =	15 − 5 =
5 − 2 =	9 − 6 =	10 − 9 =	13 − 10 =	12 − 8 =
7 − 3 =	15 − 8 =	10 − 8 =	12 − 9 =	10 − 6 =
9 − 4 =	26 − 20 =	12 − 9 =	15 − 9 =	10 − 7 =
12 − 9 =	14 − 9 =	10 − 7 =	14 − 11 =	12 − 5 =
13 − 8 =	13 − 12 =	16 − 13 =	10 − 4 =	14 − 3 =
10 − 6 =	12 − 10 =	15 − 9 =	16 − 6 =	10 − 4 =
12 − 6 =	10 − 8 =	15 − 8 =	14 − 4 =	10 − 6 =
14 − 7 =	13 − 6 =	16 − 12 =	13 − 5 =	12 − 4 =
10 − 5 =	8 − 5 =	13 − 10 =	10 − 3 =	10 − 3 =

7. 8 468 931 – ☐ = 5 831 904. Find the missing number.
8. The difference between 8 379 and the other number is 2 984. What is the other number?
9. John and Jimmy shared $3 460. Jimmy got $1 500. How much did John get?
10. In January 3 468mm of rain was received in Mutare. In February 5 437mm was received. How much more rain was received in February than in January?

Unit Revision Exercises

Multiple Choice Questions

Answer all the questions by choosing the correct answer from A, B, C or D.

1. Find the difference between 700 and 800.
   A. 400   **B.** 300   **C.** 100   **D.** 50
2. Reduce 9 683 by 468.
   A. 9 215   **B.** 9 016   **C.** 8 215   **D.** 7 214
3. Subtract 699 from 1 000.
   A. 401   **B.** 301   **C.** 298   **D.** 250
4. 9 346 – 1 498 = ☐
   A. 5 416   **B.** 6 848   **C.** 7 458   **D.** 7 848
5. When $800 is reduced by $320 the result is _____.
   A. 480   **B.** 380   **C.** 320   **D.** 280
6. A tank holding is 400 litres of water. 285 litres is used. How much water is left?
   A. 95 litres   **B.** 115 litres   **C.** 215 litres   **D.** 115 litres
7. There are 9 486 394 people in Zimbabwe. 3 461 459 people left the country. How many people remained?
   A. 8 146 935   **B.** 8 024 935   **C.** 6 024 935   **D.** 24 935
8. A farmer planted 3 450 trees in his orchard. 1 246 trees were destroyed by the termites. How many trees remained?
   A. 2 304   **B.** 2 204   **C.** 2 104   **D.** 2 004
9. 4 688 – 1 789 = ☐
   A. 2 899   **B.** 2 844   **C.** 2 799   **D.** 2 648
10. 46 382 – 14 995 = ☐
    A. 39 512   **B.** 39 416   **C.** 31 387   **D.** 30 346

Structured Questions

1. Work out these problems;
   (a) 300 – 216 = ☐
   (b) 14 246 – 9 487 = ☐
2. What is the result of reducing $3 400 by 20%?
3. The difference between two numbers is 4 680. The bigger number is 8 734. What is the smaller number?
4. Mrs Gadzirai bought a car and its odometer read 3 461. Today the odometer is reading 5821. How much distance has she travelled with the car?
5. Find the difference between 837 and 209?

TEST 1

Paper 1: Multiple Choice Questions

Answer all the questions with either A, B, C or D.

1. Seven million and eighty-nine written in numerals is_____.
   A. 7 000 89   B. 7 000 890   C. 7 000 089   D. 7 890 000

2. What is the value of 8 in 543 867?
   A. 8 Units   B. 80   C. 800   D. 8 000

3. $(10^3 \times 5) + (10^6 \times 2) + (10^2 \times 3) = \square$
   A. 1 100 000   B. 1 200 000   C. 1 540 000   D. 2 005 300

4. Which set of numbers is arranged in the correct order of magnitude?
   A. 213   645   867   1923
   B. 645   213   867   1923
   C. 213   645   1923   867
   D. 213   1923   867   645

5. 989 213 $\square$ 99 898; The $\square$ stands for___.
   A. <   B. +   C. =   D. >

6. All the following are prime numbers except _____.
   A. 39   B. 19   C. 7   D. 5

7. 345 000 is 344 879 rounded off to the nearest _____.
   A. 10 000   B. 1 000   C. 100   D. 10

8. What number is pointed by an hour hand in this clock face?

   A. 12   B. 10   C. 2   D. 8

9. Find the missing number in the sequence.
   V   X   XV   XX   XXV $\square$
   A. XXVI   B. XXVIII   C. XXX   D. XXXV

10. All the following are multiples of 10 except _____.
    A. L   B. C   C. CL   D. LV

11. The missing sign in CXXI $\square$ LXXXI.
    A. >   B. <   C. +   D. =

12. Three hundred and seventy written in Arabic numerals is _____.
    A. 270   B. 370   C. CCCLXX   D. XXLI

13. The number XLV comes after _____.
    A. 42   B. 43   C. 44   D. 45

14. Mr Moyo is LXXX years old and his wife is LXX. What is the difference between their numbers of years of age?
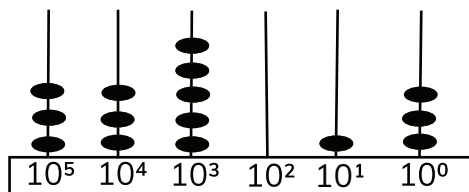   A. 20 years   B. 15 years   C. 10 years   D. 4 years

Paper 2: Structured Questions

Section A (25 Marks)

There are five questions in this section. Answer all the questions. Marks allocated to each question are shown in brackets.

1. Solve the following problems.
   (a) What number is shown by the following abacus?

10^5	10^4	10^3	10^2	10^1	10^0

   [1]

   Use <; > or = in place of □

   (b) 10^6 □ 3 000 000 [1]
   (d) $(10^3 + 10^4)$ □ 10 000 [1]
   (e) Write 23 806 in words [1]
   (f) Re-write the following numbers in the correct ascending order; 869   188   9 026
      4 102   987 [1]

2. Simplify these;
   (a) Put >, < or = in place of □ to make these statements true.
      (i) 468 □ CXXV [1]
      (ii) LXV □ 65 [1]

   (b) Convert CXVII to Roman numerals.
   (c) Complete the number sequence;
      X   XX   XXX   □   L   LX   LXX [1]
   (d) When 72 is written in Roman numerals it is [1]

3. Solve the given problems below.
   (a) Which number is a numerator in $\frac{3}{7}$? [1]

   (b) Re-arrange these fractions in order beginning with the biggest.
      $\frac{1}{2}$ $\frac{1}{5}$ $\frac{1}{9}$ $\frac{1}{7}$ [1]

4. Convert $\frac{3}{100}$ to decimal. [1]

5. Reduce $\frac{28}{100}$ to its lowest terms. [1]

6. Work out the following.
   (a) What is 0.7 as a proper fraction? [1]

   (b) Sam ate 3 oranges on Monday and ate $\frac{3}{4}$ of another orange on Tuesday. How many oranges did Sam eat as a mixed fraction? [1]

   (c) $2\frac{1}{2}$ expressed as a decimal is _____. [1]
   (d) What is 2.25 as a mixed number in its lowest terms? [1]

Unit Objectives

At the end of this unit, you should be able to;

(a) add and subtract proper fractions.
(b) use the associative and commutative laws to add proper fractions.

Looking Back

In the previous grade, you learnt to apply associative and commutative laws to add and subtract proper fractions. You also learnt to add and subtract proper fractions. In this unit, you will further learn to add and subtract proper fractions. In this unit, you will also learn to apply associative and commutative laws in addition of fractions.

Key Words

Fraction	– means part of the whole.
Proper fractions	– fraction with a numerator that is smaller than the denominator.
Numerator	– the top number in a fraction.
Denominator	– bottom number in a fraction.
Common denominator	– the lowest common multiple of different denominators.

Addition and subtraction of proper fractions (same denominator)

In the previous unit, you learnt that a proper fraction has a numerator (top number) that is smaller than a denominator. When we are adding or subtracting proper fractions, we deal with the numerator only. Denominators do not change. A denominator can only change when we are reducing the answer to its lowest terms.

Example 1

Add these fractions;

(i) $\frac{3}{8} + \frac{2}{8} = \square$ (ii) $\frac{1}{10} + \frac{3}{10} = \square$ (iii) $\frac{4}{8} - \frac{1}{8} = \square$ (iv) $\frac{9}{10} - \frac{4}{10} = \square$

Again, the order of the fractions on the question did not change the answers. We can then conclude that $\frac{3}{7} + \frac{1}{7} = \frac{1}{7} + \frac{3}{7}$ and $\frac{3}{9} + \frac{1}{9} = \frac{1}{9} + \frac{3}{9}$.

Exercise 3

Copy and complete these in your exercise book.

1. $\frac{2}{9} + (\frac{2}{9} + \frac{3}{9}) = (\frac{2}{9} + \frac{2}{9}) + \square$

2. $(\frac{5}{10} + \frac{1}{10}) + \frac{2}{10} = \frac{5}{10} + (\square + \frac{2}{10})$

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

4. $\frac{4}{20} + (\frac{3}{20} + \frac{1}{20}) = (\frac{4}{20} + \square) + \frac{1}{20}$

5. $\frac{8}{35} + (\frac{2}{35} + \frac{6}{35}) = (\square + \square) + \square$

6. $\frac{4}{8} + \frac{1}{8} = \frac{1}{8} + \square$

7. $\frac{9}{45} + \frac{3}{45} = \frac{3}{45} + \square$

8. $\frac{17}{50} + \frac{3}{50} = \frac{3}{50} + \square$

9. $\frac{19}{30} + \frac{3}{30} = \square + \frac{19}{30}$

10. $\frac{16}{40} + \frac{7}{40} = \square + \frac{16}{40}$

Application of addition and subtraction of proper fractions in life situations

In life situation, you will find yourself having to add and subtract fractions. You will need to remember all the concepts you learnt in order to solve life problems.

Exercise 3

1. Praise was given $\frac{2}{8}$ of a cake. His sister gave him another $\frac{3}{8}$ of the cake. What fraction of a cake has he now?

2. Monalisa ate $\frac{3}{10}$ of sweets on Monday and ate $\frac{1}{10}$ of them on Tuesday. What is the total fraction of the sweets eaten?

3. Mr Phiri used $\frac{1}{2}$ tank of petrol going to Plumtree and used $\frac{1}{4}$ tank going to Samahuru. Find the total fraction of the fuel he used.

4. Casim bought $\frac{1}{2}$ kg of meat on Monday and $\frac{2}{8}$ kg of meat on Friday. Find the total fraction of meat bought.

5. Mr Daniel bought 50kg of mealie-meal. He used $\frac{2}{10}$ of it and later used $\frac{6}{10}$ of it. Find the total fraction of the mealie-meal used in its lowest terms.

6. The Moyo family had $\frac{7}{8}$ kg of meat and ate $\frac{3}{8}$ kg of it. What fraction of the meat was left?

ADDITION AND SUBTRACTION OF MIXED NUMBERS

Unit Objectives

At the end of this unit, you should be able to:

(a) add and subtract mixed numbers.
(b) apply addition and subtraction of mixed numbers to measures.

Looking Back

In the previous grade, you learnt to add and subtract mixed numbers. In this unit, you will learn to add and subtract mixed numbers and further learn to apply addition and subtraction of mixed numbers to measures.

Key Words

Mixed numbers	– fractions with whole number and proper fraction.
Reduce	– to subtract.
Difference	– result after subtracting.
Numerator	– the top number in a fraction.
Denominator	– bottom number in a fraction.
Common denominator	– the lowest common multiple of different denominators.

Addition of mixed numbers (same denominators)

The addition of mixed numbers is similar to the addition of proper fractions you did in the previous unit. The only difference is that mixed numbers have three parts (whole number, numerator and denominator). Let us look at an example.

Example 1

Solve these;

(i) $2\frac{1}{7} + 1\frac{4}{7} = \boxed{}$

(ii) $1\frac{1}{8} + 1\frac{2}{8} = \boxed{}$

Unit Revision Exercises

Multiple Choice Questions

1. $1\frac{3}{8} + 1\frac{2}{8} =$

   A. $2\frac{5}{8}$ **B.** $1\frac{5}{8}$ **C.** $3\frac{2}{8}$ **D.** $1\frac{2}{8}$

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

   A. $1\frac{1}{3}$ **B.** $2\frac{1}{3}$ **C.** $3\frac{1}{3}$ **D.** $4\frac{1}{3}$

3. $3\frac{1}{8} - 1\frac{2}{8} =$

   A. $2\frac{7}{8}$ **B.** $1\frac{7}{8}$ **C.** $1\frac{5}{8}$ **D.** $1\frac{3}{8}$

4. $4\frac{1}{3} - 2\frac{1}{2} =$

   A. $2\frac{1}{2}$ **B.** $2\frac{1}{3}$ **C.** $1\frac{5}{6}$ **D.** $1\frac{1}{6}$

5. $2\frac{1}{2}kg + 1\frac{1}{5}kg =$

   A. $3\frac{2}{5}kg$ **B.** $2\frac{2}{10}kg$ **C.** $2\frac{1}{3}kg$ **D.** $3\frac{7}{10}kg$

6. In a store, $3\frac{1}{2}$ kg of meat was stolen and $5\frac{1}{3}$ was bought. Find the total fraction of the meat that was stolen and bought.

   A. $8\frac{5}{6}$ **B.** $8\frac{2}{5}$ **C.** $8\frac{2}{12}$ **D.** $8\frac{3}{12}$

7. $5\frac{3}{4}$ litres $- 3\frac{1}{2}$ litres $=$ ___litres

   A. $1\frac{3}{4}$ **B.** $2\frac{2}{4}$ **C.** $2\frac{1}{4}$ **D.** $1\frac{3}{4}$

8. $10\frac{1}{2}$ degrees $- 8\frac{3}{4}$ degrees equals to_____.

   A. $1\frac{1}{3}$ **B.** $2\frac{1}{3}$ **C.** $2\frac{2}{4}$ **D.** $1\frac{3}{4}$

9. $2\frac{1}{2}$ hours $- 1\frac{1}{3}$ hours $=$

   A. $2\frac{1}{6}$ **B.** $2\frac{1}{5}$ **C.** $1\frac{1}{6}$ **D.** $1\frac{5}{6}$

10. $10\frac{1}{2}$ m $- 7\frac{1}{8}$ m $=$

   A. $3\frac{1}{8}$ **B.** $3\frac{3}{8}$ **C.** $2\frac{1}{8}$ **D.** $3\frac{2}{8}$

Structured Questions

1. Add $1\frac{1}{4}$ and $1\frac{1}{4}$.
2. Find the sum of $2\frac{1}{3}$ and $4\frac{1}{5}$.
3. $2\frac{1}{2}$ kg $- 1\frac{1}{2}$ kg $=$
4. $2m - 1\frac{3}{4}m =$
5. Reduce $2\frac{3}{7}$ by $1\frac{1}{7}$.
6. $3\frac{5}{8} - 1\frac{1}{8} =$

ADDITION AND SUBTRACTION OF DECIMALS

Unit Objectives

At the end of this unit, you should be able to:

(a) add and subtract decimals in the range.
(b) consolidate addition and subtraction of decimals by use of calculators.

Looking Back

In the previous grade, you learnt to add and subtract decimals. You also learnt to add and subtract measures using calculators. In this unit, you will further learn to add and subtract decimals in the range. You will also learn to consolidate addition and subtraction of decimals by use of calculators.

Key Words

Decimal – a number with a comma.
Calculator – a mechanical or electronical device that performs mathematical calculations.

Addition of decimals

A decimal number has a whole number and a fraction. For example, the number 2.4 is the same as $2\frac{4}{10}$. 2 is a whole number and 4 is a fraction. To add decimals, you need to know the value of digits in numbers. All the digits should be laid down according to their value.

Example 1

(i)   0.2 + 0.03 =
(ii) 1.003 + 1.3 =
(iii) 2 + 0.03 =

Solution

(i)
$$\begin{array}{r} 0.2\mathbf{0} \\ +0.03 \\ \hline 0.23 \\ \hline \end{array}$$

1. Lay down digits according to their values.
2. Place **0** which is a place holder where necessary.
3. Commas should be in a straight vertical line.
4. Add from the right hand side going to the left.
5. Your final answer is 0.23

Exercise 4

Work out the following using calculators. Ask your facilitator to help you to use a computer if you have one.

1. 0.5m + 0.75m.
2. Add 3.46kg to 3.587kg.
3. 0.5 hours and 0.25 hours add up to _____.
4. A rectangle has a length of 7.4cm and a width of 5.3cm. Find its perimeter.
5. Themba is 1.78m and Makhetho is 1.64m. By how much height is Makhetho shorter than Themba?
6. The distance from Tshabanda to Dugwi is 9.5km and the distance from Tshabanda to Phambuka is 3.5km. Find the difference between the two distances.
7. Mutare's temperature for Monday was 18.4^0C and that of Siphepha was 23.2^0C. Find the difference in temperature for the two places.
8. Susan got 16.8 marks for an esay and Betty got 18.3. Calculate the difference in their marks.
9. Bread costs $2.38 per loaf. The price is reduced by $0.97. What is the new price of bread?
10. Sisa had 2.5 litres of cooking oil. She used 1.25 litres of it. How much cooking oil is she left with?

Unit Revision Exercises

Multiple Choice Questions

1. Simplify 0.092 + 1.2 + 12.04.
   A. 13.332   **B.** 12.332   **C.** 10.089   **D.** 9.46
2. The difference between 2.050 and 4.07 is_____.
   A. 3.866   **B.** 5.466   **C.** 2.02   **D.** 7.576
3. The difference between two numbers is 0.875. The other number is 8.46. Find the other number.
   A. 8.36   **B.** 9.335   **C.** 9.476   **D.** 10.78
4. 0.08 – 0.009 =
   A. 0.014   **B.** 0.015   **C.** 0.017   **D.** 0.071
5. 13.046 reduced by 0.9 results in _____.
   A. 12.146   **B.** 13.06   **C.** 13.123   **D.** 14.102
6. The distance from Nhlangano to Mvundlana is 11.5km and the distance from Nhlangano to Muntu is 5.7km. Find the total distance between the three places.
   A. 13.055   **B.** 13.080   **C.** 13.126   **D.** 17.2
7. A teacher earns $5 000.37 and the salary is increased by $3 460.46. Calculate the new salary.
   A. $7 460.83   **B.** $8 460.83   **C.** $8 560.91   **D.** $8 671.91
8. The area of two rectangles is $12.46m^2$ and $14.28m^2$ respectively. Find the total area of the two shapes.
   A. $25.75m^2$ **B.** $26.70m^2$ **C.** $26.74m^2$ **D.** $27.74m^2$

Unit Objectives

At the end of this unit, you should be able to:

(a) multiply numbers by 3-digit numbers.
(b) multiply whole numbers in the range using calculators.
(c) solve problems involving HCF and LCM.

Looking Back

In the previous grade you learnt to demonstrate an understanding of multiplication facts and you learnt to find the HCF and LCM. You also learnt to multiply using long methods. You further learnt to multiply decimals by decimals. You also learnt to multiply proper fractions by whole numbers and vice versa. You finally learnt to multiply proper fractions, mixed numbers and decimals. In this unit you will learn to multiply numbers by 3-digit numbers and multiply whole numbers in the range using calculators. You will also solve problems involving HCF and LCM.

Key Words

Multiply	– to add repeatedly.
Factor	– any number multiplied by another to get a whole.
Multiple	– a number that may be divided by another with no remainder.
Product	– a quantity obtained by multiplying two or more numbers.

Multiplication by three-digit numbers

Multiplication means repeated addition. For example, the equation $2 + 2 + 2 + 2 + 2 + 2$ is the same as $2 \times 6 = 12$. For you to excel in multiplication you need to understand your times table. You need to practice it well. Besides, is your mental work for the week.

Monday	Tuesday	Wednesday	Thursday	Friday
$3 \times 2 =$	$6 \times 7 =$	$9 \times 1 =$	$5 \times 8 =$	$6 \times 3 =$
$2 \times 3 =$	$4 \times 8 =$	$7 \times 2 =$	$7 \times 6 =$	$4 \times 2 =$
$4 \times 4 =$	$5 \times 9 =$	$8 \times 6 =$	$8 \times 2 =$	$5 \times 4 =$
$5 \times 3 =$	$3 \times 2 =$	$5 \times 4 =$	$3 \times 2 =$	$3 \times 5 =$
$3 \times 3 =$	$2 \times 9 =$	$2 \times 6 =$	$9 \times 4 =$	$2 \times 3 =$
$2 \times 5 =$	$8 \times 7 =$	$7 \times 4 =$	$1 \times 8 =$	$8 \times 2 =$
$3 \times 7 =$	$7 \times 4 =$	$3 \times 8 =$	$8 \times 6 =$	$7 \times 3 =$
$6 \times 9 =$	$4 \times 3 =$	$9 \times 9 =$	$4 \times 8=$	$4 \times 6 =$
$4 \times 7 =$	$9 \times 8 =$	$8 \times 5 =$	$7 \times 2 =$	$9 \times 4 =$
$5 \times 5 =$	$7 \times 6 =$	$9 \times 6 =$	$4 \times 3 =$	$7 \times 5 =$

- Type the multiplication sign on your calculator.
- Type 312 and type the equal sign. Your calculator will automatically display 1 106 352 on its screen as the answer.

Multiply 8 324 by 272 in same way as in number (i) above. You will get your answer as 2 264 128

Activity 3

In your groups, practice multiply different numbers and then check with calculators that your calculations were correct.

Exercise 3

Read the following questions and solve the problems using calculators.

1. $23 \times 17 =$
2. $412 \times 26 =$
3. $836 \times 132 =$
4. $290 \times 102 =$
5. A grade 7 class has 45 learners. Each one of them has 13 exercise books. Find the total number of the exercise books for the class.
6. When 43 123 is multiplied by 12 the result is _____.
7. Find the product of 3 109 and 310.
8. A farmer planted 122 rows of trees. Each row had 2 016 trees. Find the total number of planted trees.
9. A truck has 22 wheels. How many wheels will 136 trucks have in total?
10. John sold 3 153 newspapers in year one. How many newspapers will he sell in 212 years if he sells the same number yearly?

Highest Common Factor (HCF) and the Lowest Common Multiple (LCM)

A factor is any number multiplied by another to get a whole. For example; to get 20 one can multiply 1 and 20; 2 and 10; 4 and 5. Therefore, the factors of 20 are 1; 2; 4; 5; 10 and 20. Factors of a number can divide into that number without giving a remainder.

What is a common factor?

Example 1

Two or three numbers can share factors at times. For example, let us look at the factors of 20 and 50. Here are they below;

20-   1;   2;   4;   5;   10;   20
50-   1;   2;   5;   10;   25;   50

All the circled factors are found both for 20 and for 50. 1; 2; 5 and 10 therefore called common factors because they are found in two places. 1 is the smallest or lowest of them and 10 is the highest or biggest of them. The factor 10 is therefore called the Highest Common Factor

MULTIPLICATION AND DIVISION OF DECIMALS

Unit Objectives

At the end of this unit, you should be able to:

(a) multiply and divide decimal numbers up to 3 places.
(b) multiply and divide decimal numbers using calculators.

Looking Back

In the previous grade, you learnt to multiply decimals by decimals. In this unit, you will learn to multiply and divide decimal numbers up to 3 places and further learn to multiply and divide decimal numbers using calculators.

Key Words

Multiply	– add repeatedly.
Product	– answer after multiplying.
Decimal	– number with a comma.

Multiplying decimals

Multiplication of decimals is not very much different from the multiplication of whole numbers that you learnt in the previous unit. The difference is that decimal numbers have commas. Let us look at these demonstrations;

Example

Solve these problems;

(i) $0.2 \times 0.3 =$
(ii) $1.2 \times 0.04 =$

Solution

Remove all the commas and multiply without commas. You will remain with 2×3. When these two numbers are multiplied the answer is 6. Go back to the question and count the number of digits that are after the comma. There is 2 and 3 after the comma meaning that there are two digits after the comma. Add two digits after the comma. 0.2×0.3; the answer will be 0.06

Unit Revision Exercises

Multiple Choice Questions

Answer the following questions by choosing the correct answer from A, B, C or D.

1. Simplify 0.02×0.5.
    A. 1.100   **B.** 0.1   **C.** 0.01   **D.** 0.001

2. Mr Nyarai sold three rolls of fencing wire each measuring 98.6m in length. Find the total length of the sold wire.
    A. 2.958m   **B.** 29.58m   **C.** 295.8m   **D.** 2958m

3. The dividend is 2 and the divisor is 8. Find the quotient.
    A. 10   **B.** 4   **C.** 0.5   **D.** 0.25

4. Divide 0.2 by 0.04 =
    A. 2   **B.** 5   **C.** 5.2   **D.** 5.5

5. Sam bought 67 exercise books at $4.91 each. How much did he pay for all the books?
    A. $328.97   **B.** $329.97   **C.** $329.87   **D.** $330.87

6. A square garden has a perimeter of 30m. Find its area.
    A. 450.25m^2 **B.** 210.25m^2 **C.** 85.25m^2 **D.** 56.25m^2

7. $2 \div 0.002 =$
    A. 1   **B.** 1 000   **C.** 150   **D.** 200

8. $1 \div 0.02 =$
    A. 2   **B.** 20   **C.** 50   **D.** 100

9. The product of two numbers is 2.08. The other number is 0.2. Find the other number.
    A. 10.4   **B.** 1.04   **C.** 0.40   **D.** 0.04

10. The quotient is 0.09 and the dividend is 0.45. What is the divisor?
    A. 0.3   **B.** 0.2   **C.** 0.1   **D.** 0.01

Structured Questions

Work out these problems. Show how you arrive to the answer.

1. $0.3 \times 0.3 \times 0.2 =$
2. $0.04 \times 0.5 =$
3. $3.9 \div 0.03 =$
4. What is the product of 0.3 and 0.02?
5. Find the area of a rectangle with a length of 6.5cm and a width 4.7cm.
6. It took a grade 7 class 6.5 hours to cover this unit. How long will it take the class to cover 4 units of the same size and level of difficulty?

MULTIPLICATION AND DIVISION OF PROPER FRACTIONS AND MIXED NUMBERS

Unit Objectives

At the end of this unit, you should be able to:

(a) multiply and divide proper fractions and mixed numbers.

Looking Back

In the previous grade, you learnt to multiply and divide proper fractions, mixed numbers and decimals. In this unit, you will further learn to multiply and divide proper fractions and mixed numbers.

Key Words

Multiply	– add repeatedly.
Product	– answer after multiplying.
Decimal	– number with a comma.
Mixed numbers	– fractions with whole numbers.
Proper fraction	– a fraction with a numerator that is smaller than the denominator.

Multiplying proper fractions

A proper fraction has a numerator that is smaller than its denominator. An example of a proper fraction is $\frac{2}{7}$. To multiply proper fractions is a bit different from addition of fractions. For example, you will remember that in addition $\frac{2}{7} + \frac{1}{7} = \frac{3}{7}$ and $\frac{2}{5} + \frac{1}{5} = \frac{3}{5}$. Only the numerators were dealt with when the denominators were the same. It is different in multiplication of fractions. Study the following examples;

(i) $\frac{2}{7} \times \frac{1}{7} = \square$ (ii) $\frac{2}{5} \times \frac{1}{3} = \square$

Solution

(i) $\frac{2}{7} \times \frac{1}{7} = \frac{2}{49}$ (numerator × numerator) / (denominator × denominator)

(ii) $\frac{2}{5} \times \frac{1}{3} = \frac{2}{15}$ (numerator × numerator) / (denominator × denominator)

In multiplication both the numerator and denominator are affected.

$$= \frac{3}{2}$$ **Step 4:** Reduce to lower terms if necessary.

$$= 1\frac{1}{2}$$ **Step 5:** Convert improper fraction to mixed number.

You can also use the method of cross cancelling; $\frac{3}{\cancel{6}_1} \times \frac{\cancel{1}^1}{2} = \frac{3 \times 1}{1 \times 2} = \frac{3}{2} = 1\frac{1}{2}$

(ii) $\frac{3}{7} \div \frac{2}{5}$

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

$= \frac{15}{14}$

$= 1\frac{1}{14}$

(iii) $\frac{5}{20} \div \frac{3}{9}$

$= \frac{5}{20} \times \frac{9}{3}$

$= \frac{45}{60}$

$= \frac{3}{4}$ or $\frac{\cancel{5}^1}{\cancel{20}_4} \times \frac{\cancel{9}^3}{\cancel{3}_1} = \frac{1 \times 3}{4 \times 1} = \frac{3}{4}$

Activity 2

In your pairs copy these into your note books. Solve numbers 1-5 as pairs. Go and solve numbers 6-10 at home. Ask for help where you have challenges

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

(ii) $\frac{3}{5} \div \frac{1}{7} =$

(iii) $\frac{2}{5} \div \frac{3}{6} =$

(iv) $\frac{5}{6} \div \frac{2}{4} =$

(v) $\frac{3}{5} \div \frac{3}{7} =$

(vi) $\frac{2}{10} \div \frac{1}{9} =$

(vii) $\frac{2}{5} \div \frac{2}{8} =$

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

(ix) $\frac{3}{8} \div \frac{5}{8} =$

(x) $\frac{6}{7} \div \frac{1}{3} =$

Exercise 2

Write the following in your exercise book.

1. $\frac{5}{6} \div \frac{1}{5} =$

2. $\frac{3}{5} \div \frac{2}{3} =$

3. $\frac{6}{10} \div \frac{2}{5} =$

4. $\frac{5}{7} \div \frac{2}{6} =$

5. $\frac{3}{7} \div \frac{1}{5} =$

6. $\frac{7}{10} \div \frac{4}{9} =$

7. $\frac{4}{5} \div \frac{1}{3} =$

8. $\frac{9}{10} \div \frac{4}{10} =$

9. $\frac{3}{8} \div \frac{2}{5} =$

10. $\frac{5}{6} \div \frac{1}{4} =$

Multiplication of mixed numbers

Mixed numbers are fractions that involve a whole number, numerator and a denominator.

$3\frac{1}{2}$ is an example of a mixed number. Let us look at the multiplication of mixed numbers.

Example

(i) $3\frac{1}{2} \times 1\frac{1}{4} =$

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

TEST 2

Paper 1: Multiple Choice Questions (50 Marks)

This paper has 50 questions that are weighted at 40%. Answer all the questions by choosing the correct answer from A, B, C or D. There is only one correct answer for each question.

1. What is the value of 8 in 543 867?
   A. 8 Units   B. 80   C. 800   D. 8 000

2. $(10^3 \times 5) + (10^6 \times 2) + (10^2 \times 3) = \square$
   A. 1 100 000   B. 1 200 000   C. 1 540 000   D. 2 005 300

3. Which set of numbers is arranged in the correct order of magnitude?
   A. 213   645   867   1 923   B. 645   213   867   1 923
   C. 213   645   1 923   867   D. 213   1 923   867   645

4. All the following are prime numbers except _____.
   A. 39   B. 19   C. 7   D. 5

5. 345 000 is 344 879 rounded off to the nearest $= \square$
   A. 10 000   B. 1 000   C. 100   D. 10

6. Find the missing number in the sequence.
   V   X   XV   XX   XXV $\square$
   A. XXVI   B. XXVIII   C. XXX   D. XXXV

7. The number XLV comes after _____.
   A. 42   B. 43   C. 44   D. 45

8. What is 4 in $2\frac{4}{5}$ called?
   A. Whole number   B. Numerator   C. Denominator   D. Decimal

9. Which of the following set of fractions is arranged in order from the smallest to the biggest?
   A. $\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{4}$ $\frac{1}{5}$ $\frac{1}{6}$ $\frac{1}{7}$ B. $\frac{1}{3}$ $\frac{1}{5}$ $\frac{1}{2}$ $\frac{1}{7}$ $\frac{1}{4}$ $\frac{1}{6}$
   C. $\frac{1}{7}$ $\frac{1}{6}$ $\frac{1}{5}$ $\frac{1}{4}$ $\frac{1}{3}$ $\frac{1}{2}$ D. $\frac{1}{7}$ $\frac{1}{4}$ $\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{6}$ $\frac{1}{5}$

10. What is $\frac{4}{10}$ converted to decimal?
    A. 0.4   B. 0.10   C. 10.4   D. 4.10

11. When $\frac{50}{100}$ is reduced to its lowest terms it becomes _____.
    A. $\frac{5}{10}$ B. $\frac{5}{100}$ C. $\frac{1}{100}$ D. $\frac{1}{2}$

12. What is the decimal fraction of the shaded part of the shape below?
    A. 0.312   B. 0.832   C. 0.512   D. 0.625

13. $2\frac{1}{3}$ as an improper fraction is _____.
    A. $\frac{21}{3}$ B. $\frac{7}{3}$ C. $\frac{6}{3}$ D. $\frac{4}{3}$

Unit 17

FINANCIAL TRANSACTIONS

Unit Objectives

At the end of this unit, you should be able to:

(a) calculate selling and cost price using calculators.
(b) compute profit, loss as well as percentage profit and loss.
(c) calculate hire purchase sales, tax and value added tax.
(d) calculate discount, commission and simple interest.

Looking Back

In the previous grade, you learnt to financial transactions under the topic of money. In this unit, you will learn to calculate selling and cost price using calculators. You will also learn to compute profit, loss as well as percentage profit and loss. You will further calculate hire purchase sales, tax and value added tax. In addition to that, you will learn to calculate discount, commission and simple interest.

Key Words

Profit	– it means total cash received less the expenditure.
Loss	– money lost.
Hire purchase	– method of buying in which one collects goods before paying for the goods.
Tax	– money charged by the government on sales. Value added tax – money charged on goods calculated on the value of purchased goods.
Discount	– to leave out of account.

Calculating selling and cost price using calculators

In business people buy goods and sell them again to their customers. To buy goods you need to know the price and to have money to buy. For example, if you buy 20 pens at $2.00 each and resell them for $2.50 each your buying price or cost price will be $2.00 and your selling price will be $2.50. Let us look at a problem on selling and cost price.

Example 1

(i) A vendor bought vegetables at $298 and later sold them making a profit of $75. How much were the vegetables sold for?

Solution

Profit is $\dfrac{\$500 - \$400}{\$400} \times \dfrac{100}{1}$

$= \dfrac{100}{400} \times \dfrac{100}{1}$

$= 25\%$

Percentage loss is calculated using the same formula used for profit. You only replace he word profit with the word loss to calculate loss.

Exercise 2

1. **Calculate the following the profit in these transactions.**
   (a) Buying price is $360.00 and selling price is $520.00.
   (b) Buying price is $300.00 and selling price is $390.00.
   (c) Buying price is $213.00 and selling price is $280.00.

2. **Calculate loss in the following transactions.**
   (a) Buying price is $200.00 and selling price is $195.00.
   (b) Buying price is $389.00 and selling price is $320.00.

3. **Complete this table for percentage profit.**

	Buying price	Selling price	Profit	Percentage profit
(a)	$800.00	$1 000.00	$_____	_____%
(b)	$250.00	$300.00	$_____	_____%
(c)	$400.00	$500.00	$_____	_____%
	Buying price	**Selling price**	**Loss**	**Percentage loss**
(d)	$800.00	$700.00	$_____	_____%
(e)	$250.00	$200.00	$_____	_____%

Calculating hire purchase sales, tax and value added tax

Hire purchase is when a customer buys commodity on credit terms. For example, when buying a car or a house one may pay monthly what we call installments. The customer is also charged tax and value added tax. Let us look at these examples below;

Example 4

(i) A farmer bought a tractor on hire purchase. He paid a deposit of $2 000.00 and monthly installments of $300.00 for 24 months. How much did he pay in total for the tractor.

(ii) Susan bought groceries for $500.00 and was charged 20% tax upon payment. How much did she pay in total for the purchased groceries?

(iii) A family bought property worth $3 000.00 at a supermarket and was charged 15% as value added tax. How much did the family pay for the property?

Unit Revision Exercises

Multiple Choice Questions

Answer the following questions by choosing the correct answer A, B, C or D.

1. When the buying price is greater than the selling price it is called a_____.
   A. commission   **B.** loss   **C.** profit   **D.** discount

2. Buying price is $600 and selling price is $800. This is_____.
   A. $150 loss   **B.** $200 loss   **C.** $200 profit   **D.** $1 400 profit

3. Find the percentage profit of a business that orders goods at $3 200 and resell them for $4 480.
   A. 40%   **B.** 45%   **C.** 50%   **D.** 55%

4. A farmer bought a tractor on hire purchase. He paid a deposit of $3 000.00 and monthly installments of $700.00 for 24 months. How much did he pay in total for the tractor?
   A. $19 800   **B.** $16 800   **C.** $12 000   **D.** $3 700

5. A blanket has a marked price of $400. A man buys two blankets and is given a 20% discount. How much did he pay for the two blankets?
   A. $360   **B.** $380   **C.** $440   **D.** $640

6. A drum of oil is bought for $440 and sold making a profit of $180. Find the selling price.
   A. $260   **B.** $240   **C.** $620   **D.** $740

7. A young man borrows money from a bank and is given $5 000 at an interest of 23% per month. How much interest did he pay in the first 12 months?
   A. $12 000   **B.** $13 800   **C.** $23 900   **D.** $24 120

8. A bottle store bought beer for $23 000. Beer worth $5 000 was destroyed in a road accident. The remainder of beer was sold at $23 090. How much profit was made from the sales?
   A. $123.00   **B.** $192.00   **C.** $104.00   **D.** $90.00

9. All business exist in order to make _____.
   A. loss   **B.** sales tax   **C.** profit   **D.** value added tax

10. Buying goods on hire purchase attracts _____ for the customer.
    A. interests   **B.** commission   **C.** sales   **D.** profit

Structured Questions

1. A vendor bought vegetables at $200 and later sold them making a profit of $75. How much were the vegetables sold for?
2. Buying price is $460.00 and selling price is $520.00. Find the profit.
3. A family bought property worth $5 000.00 at a supermarket and was charged 16% as value added tax. How much did the family pay for the property?
4. A book sales person receives 20% of the sales as his wages. How much will he be paid if he sales books for $2 800.00?
5. A lady bought cabbages at $500 and sold them making a profit of $70. How much were the cabbages sold for?
6. A shop keeper bought three boxes of pens and sold them for a total of $600 making a total profit of $100. How much had the pens been bought for?

MONEY

Unit Objectives

At the end of this unit, you should be able to:

(a) prepare and interpret invoices.
(b) complete deposit and withdrawal slips.
(c) analyse financial transactions.
(d) calculate postal rates.
(e) prepare simple personal and household budget.

Looking Back

In the previous grade, you learnt how to prepare invoices correctly. You learnt to work out change and you learnt to calculate profit or loss. In this unit, you will learn to prepare and interpret invoices. You will also learn to complete deposit and withdrawal slips. You will analyse financial transactions and calculate postal rates. You will finally prepare simple personal and household budget.

Key Words

Invoices	– a bill or a commercial document given to a customer or client by the seller indicating purchased goods and money to be paid.
Deposit slip	– a document filled in by a bank client when banking money.
Withdrawal slip	– a document filled in by a bank client when applying to get money from a bank.
Postal rates	– charges for sending money or documents using the post office.
Household budget	– a family plan of how to spend money.

Preparing and interpreting invoices

When schools close at the end of term there are documents written by your school informing your parent about school levies and fees owed to the school and fees to be paid on the next term. The invoice is used to remind your parents about their debts and credits. An invoice can also be written by a shop

Let us look at an example of an invoice;

Example 2: Invoice from a shop

Nkunzi Trading Store   Invoice
No. 10534
Mbamba Business Centre
Ward 15: Tsholotsho   Date: 3 January 2020

Mrs S. Nkadlama   Phambuka Village; Ward 15; Tsholotsho

Quantity	Items bought	$	C
2	5kg sugar	40	50
1	500g salt	9	30
3	2kg washing powder	90	00
1	Bathing soap	13	50
Total		153	30

The invoice above shows the name of the shop where goods were bought. It also shows the address of the shop, invoice number, date of transactions, name of customer or client, address of the customer, quantity of purchased goods, items purchased and the total price of each items and the total of the invoice.

The above invoice shows that 2 × 5kg sugar costs $40.50; 1 × 500g salt cost $9.30 and 3 × 2kg washing powder cost $90.00. What is the cost of one packet of sugar?

Solution

Two packets of sugar cost $40.50. One packet of sugar will therefore cost $40.50 divided by two. Divide the price by 2, that is, $40.50 ÷ 2 = $20.25.

Hence, a 5kg packet of sugar costs $20.25

Activity 1

In your pairs, prepare school and shop invoices showing school fees owed to the school and fees for the coming term. Prepare a shop invoices showing the bill for a named customer of your choice. Remember to show the total amount for the invoice.

Exercise 1

Study the invoice below and answer the questions that follow.

Chauke Trading Store   Invoice No. 10112
No. 10534
Chiweshe Business Center
Ward 14: Chiredzi   Date: 15 February 2020

Chenjerai Hove   Chibila Village; Ward 18; Dzimidza

Quantity	Items bought	$	C
3	2kg flour	60	00
2	1kg salt	14	30
2	2kg washing powder	36	60
3	Bathing soap	22	50
3	2kg Chunks	14	45
Total			

(i) How much will it cost to post an 8kg bag from Gweru to Harare?

(ii) How much will be the cost of sending a 35kg box of fruits from Gweru to Harare?

Solution

(i) $8.35

(ii) $15.67

Household budgets

A budget is a plan of how one is going to spend one's money. For example, suppose you have been given $300.00 and you have been asked to write down how you will spend it. You can come up with this draft;

Example of a budget

Mealie-meal	$30.00
Meat	$45.00
Airtime	$15.00
Taxi	$10.00
Electricity	$20.00
Water	$20.00
Sugar	$35.00
Savings	$125.00
Total	**$300.00**

Activity 3

You have been given an amount of $500.00 to buy household groceries. Draft your budget with your colleague. Make sure all the money is accounted for in your budget.

Exercise 4

The Minister of Finance and Economic Development presented his annual budget in parliament in November 2019. The graph below shows the amount of money allocated to each ministry. Study the graph and answer questions 1-10 that follow.

LENGTH

Unit Objectives

At the end of this unit, you should be able to:

(a) measure length and distance using spans and paces.
(b) find length and distance in metres and kilometres.
(c) calculate perimeter of figures.
(d) draw lines and simple plans to scale.

Looking Back

In the previous grade, you learnt to measure length using standard and non-standard units. You also learnt to find the perimeter of shapes and you drew lines to scale. In this unit, you will learn to measure length and distance using spans and paces and find length and distance in metres and kilometres. You will also calculate perimeter of figures and draw lines and simple plans to scale.

Key Words

Length	- it is the measurement of distance along the longest dimension of an object.
Distance	– it is the amount of space between two points.
Perimeter	– it is the distance around a shape.
Span	– the space from a thumb to end of a little finger.
Pace	– it means a step.
Scale	– the ratio of represented distance to the actual distance.

Measuring length and distance using spans and paces

Length can be measured using different instruments. Some of the instruments used are rulers, tape measure, click wheel and odometer. We can also use non-standard instruments such as spans and paces. Let us look at measurement of length using spans and paces.

Span

A
B

Point **A** to **B** is what we call a span. It can be used for measuring length

Pace

Point **A** to **B** is a space. It is nearly 1 metre long It can be used to measure length

A ← → B

TIME

Unit Objectives

At the end of this unit, you should be able to:

(a) express and write time in 12- and 24-hour notation.
(b) add and subtract time units.
(c) write dates in notation.
(d) solve problems involving time.

Looking Back

In the previous grade, you learnt to tell and convert time. You also estimated and calculated time taken. You further learnt to tell and write time in 12- and 24-hour notation. In this unit, you will learn to express and write time in 12- and 24-hour notation. You will also learn to add and subtract time units. You will further learn to write dates in SI notation and to solve problems involving time.

Key Words

Time	– measurement of moment.
a.m.	– morning.
p.m.	– afternoon.
Standard International Notation	– an internationally recognised way of writing the date.

Expressing and writing time in 12 and 24 hour notation

One day has 24 hours. Clock faces usually have hours 1-12 twice a day. The time from 12.00 midnight up to 12.00 noon is called morning and is indicated a.m. The time as from 12.00 noon up to before midnight is called p.m. Check this time chart;

12 hour notation   **24 hour notation**

12.00am ←————→ 0000 hours
 1.00am ←————→ 0100 hours
 2.00am ←————→ 0200 hours
 3.00am ←————→ 0300 hours
 4.00am ←————→ 0400 hours
 5.00am ←————→ 0500 hours

Exercise 2

Solve the following problems in your exercise book.

1. 1 hours 23 minutes + 3 hours 23 minutes.
2. 3 hours 20 minutes – 1 hour 10 minutes.
3. 2 hours 17 minutes + 1 hours 34 minutes.
4. 3 hours 16 minutes – 1 hour 48 minutes.
5. 2 hours 04 minutes + 2 hours 59 minutes.
6. 2 hours 15 minutes – 1 hour 44 minutes.
7. 8 hours 34 minutes 23 seconds + 2 hours 13 minutes 10 seconds.
8. 2 hours 15 minutes 15 seconds – 1 hour 44 minutes 25 seconds.
9. A grade 7 student spent 2 hours 35 minutes writing an English test and another 2 hours 45 minutes writing a Science test. How much time did she spend altogether in tests?
10. Find the difference between 2 hours 10 minutes and 1 hour 46 minutes.

Writing dates in Standard International Notation

There are many ways of writing dates. 1 January 2020 can be written as 01.01.20. This is the usual way of writing the date in Zimbabwe. In some countries such a date cannot be understood. There is an international standard used to write the date. For example, check these dates below;

Example 3

Date	Standard International Notation
01 January 2020	2020.01.01
26 January 2020	2020.01.26
15 January 2020	2020.01.15
30 June 2021	2021.06.30

Unit 23

RATE

Unit Objectives

At the end of this unit, you should be able to:

(a) relate distance, speed and time.
(b) calculate distance, speed and time.
(c) apply knowledge of rate in problem solving.

Looking Back

In the previous grade, you learnt how to link two measures as rate. You also learnt to calculate speed, distance and time. In this unit, you will learn to relate distance, speed and time. You will learn to calculate distance, speed and time. You will also learn to apply knowledge of rate in problem solving.

Key Words

Distance – space between two places.
Speed   – the rate of motion or action.
Time   – a measure of moment.
Rate   – the proportional relationship between one amount or value and another.

Relating distance, speed and time

Different people and vehicles have different speeds and take different time to cover certain distances. There is a great relationship between distance, speed and time. As one travels at a certain speed their speed will affect time taken. For example, let us look at these statements;

Example

(i) A cyclist takes 20 minutes to cover a distance of 15km. How long will the cyclist take to cover 60km?

(ii) An athlete covers a distance of 10km in 30 minutes. How much distance will the athlete cover in 2 hours?

Unit Revision Exercises

Multiple Choice Questions

Answer all the questions by choosing the correct answer from A, B, C or D.

1. A car travelling at an average speed of 120km/h will take ___ hours to cover a distance of 480km.
   A. 4   **B.** 6   **C.** 8   **D.** 12

2. A bus travels 160km in 2 hours. Find its average speed per hour?
   A. 60km/h   **B.** 70km/h   **C.** 80km/h   **D.** 90km/h

3. An 8kg of beans costs $80.00. What is the cost per kg?
   A. $8.00   **B.** $10.00   **C.** $15.00   **D.** $16.00

4. Petrol costs $120.00 for 5 litres. What is its price for a litre?
   A. $600.00   **B.** $430.00   **C.** $125.00   **D.** $24.00

Study the table below and answer questions 5 – 8.

Bulawayo

482	Chiredzi					
280	202	Masvingo				
298	520	318	Kadoma			
164	385	183	134	Gweru		
684	428	403	411	545	Inyanga	
805	860	658	507	641	636	Kariba

5. What is the distance from Kariba to Chiredzi?
   A. 860km   **B.** 636km   **C.** 520km   **D.** 202km

6. A motorist travelled from Chiredzi to Kadoma and took 5 hours. Calculate the motorist's average speed.
   A. 520km/h   **B.** 318km/h   **C.** 202km/h   **D.** 104km/h

7. Calculate the time that could be taken by a bus that is travelling at an average speed of 82km/h to get to Gweru from Bulawayo.
   A. 5 hours   **B.** 3 hours   **C.** 2 hours   **D.** 1 hour

8. Find the distance covered by a motorist who travels from Masvingo to Gweru and further to Inyanga.
   A. 183km   **B.** 545km   **C.** 728km   **D.** 800km

9. If 1 January 2020 was on Wednesday then 25 December 2019 was on _____.
   A. Tuesday   **B.** Wednesday   **C.** Friday   **D.** Saturday

10. All these years are leap years except _____.
    A. 2026   **B.** 2024   **C.** 2020   **D.** 2016

Unit 24
AREA

Unit Objectives

At the end of this unit, you should be able to:

(a) identify units of area.
(b) calculate area of a square and rectangle.
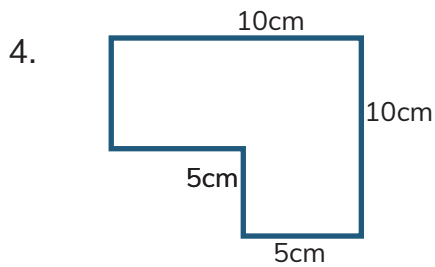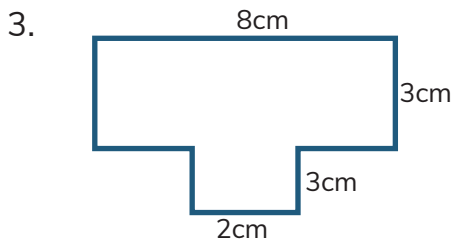(c) find area of triangles.
(d) calculate area of composite shapes.

Looking Back

In the previous grade, you learnt how to calculate the area of square and rectangle. You also learnt to find area of triangle and you computed the area of composite shapes. In this unit, you will learn to identify units of area and to calculate area of a square and rectangle. You will find area of triangles and calculate area of composite shapes.

Key Words

Rectangle	– a four-sided shape with right angles and two opposite sides that are equal.
Square	– any four-sided shape with four equal sides and right angles.
Triangle	– any shape with three sides.
Composite shape	– a shape that is a combination of two or more shapes.

Identifying units of area

You learnt about the units of length that include mm, cm, m and km. You also learnt about the units of mass that include g, kg and tonnes. Area also has its own units. Let us look at this square;
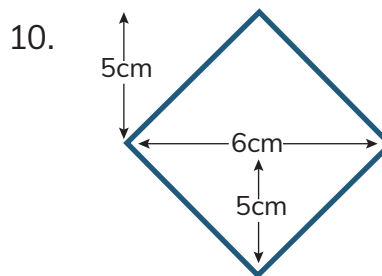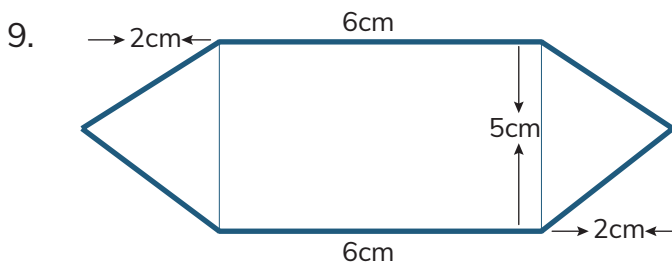
This square has sides that are 1 metre long. When we multiply its sides we get $1m^2$. It is a one square metre written as $1m^2$.

3.

8cm
3cm
3cm
2cm

4.

10cm
10cm
5cm
5cm

Calculate the area of the shaded part.

5.

6cm
6cm   4cm
10cm

6.

8cm
5cm

7.

10cm
6cm

8.

4cm
6cm
8cm

Calculate the area of the shapes below.

9.

2cm   6cm
5cm
2cm
6cm

10.

5cm
6cm
5cm

Unit Revision Exercises

Multiple Choice Questions

Answer all the following questions by choosing a correct answer from A, B, C and D.

1. All the following are units of area except_____.
   A. acres   **B.** kilometres   **C.** square metres   **D.** hectares

2. Three hectares is the same as_____.
   A. 300 acres   **B.** 300 hectares   **C.** 300m^2 **D.** 300cm^2

3. A square has a side of 9cm. Its area is_____.
   A. 9cm^2 **B.** 18cm^2 **C.** 36cm^2 **D.** 81cm^2

4. What is the area of a rectangle that measures 8cm by 6cm?
   A. 14cm^2 **B.** 28cm^2 **C.** 48cm^2 **D.** 54cm^2

Unit 26

DIRECTION, ANGLES AND LINES

Unit Objectives

At the end of this unit, you will be able to:

(a) show direction of points from a reference point.
(b) identify and name types of angles.
(c) calculate missing angles.
(d) illustrate and name lines of a circle.
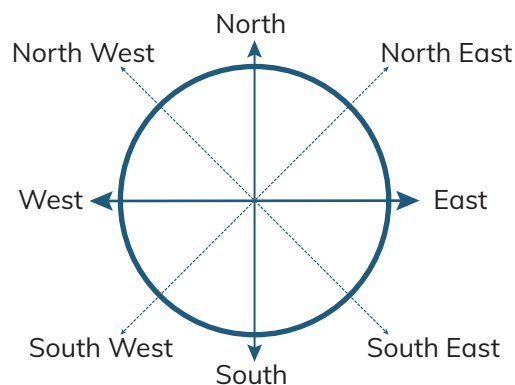(e) convert fractions by revolutions.

Looking Back

In the previous grade, you learnt how to identify the 8 cardinal points, identify the position of a point in relation to another point or lines. You also learnt to identify horizontal, vertical and perpendicular lines. In this unit, you will learn to show direction of points from a reference point. You will identify and name types of angles and calculate missing angles. You will further illustrate and name lines of a circle. You will finally convert fractions by revolutions.

Key Words

Angles	– space between two straight lines or surfaces that join each other measured in degrees.
Direction	– it means a way or route.
Line	–a long mark on a piece of paper or ground or another surface.

Showing direction of points from a reference point

Direction is a way. One can go to the west, north, south or east. These are all directions. When we draw the reference points on paper, we should always place North at the top, West on our left-hand side and East on our right-hand side and South at the bottom. You did this in grade 6. Let us look again at what you covered in grade 6. North is at the top of the map at all times. Let us look at how we show directions using these points of direction.

Example

(i) What is the direction of Westgate from Harare?
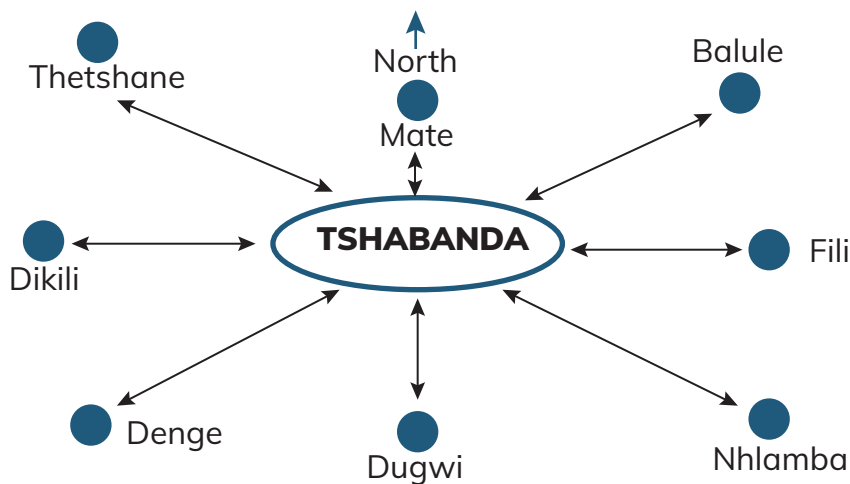(ii) What is the direction of Mt Pleasant from Westgate?
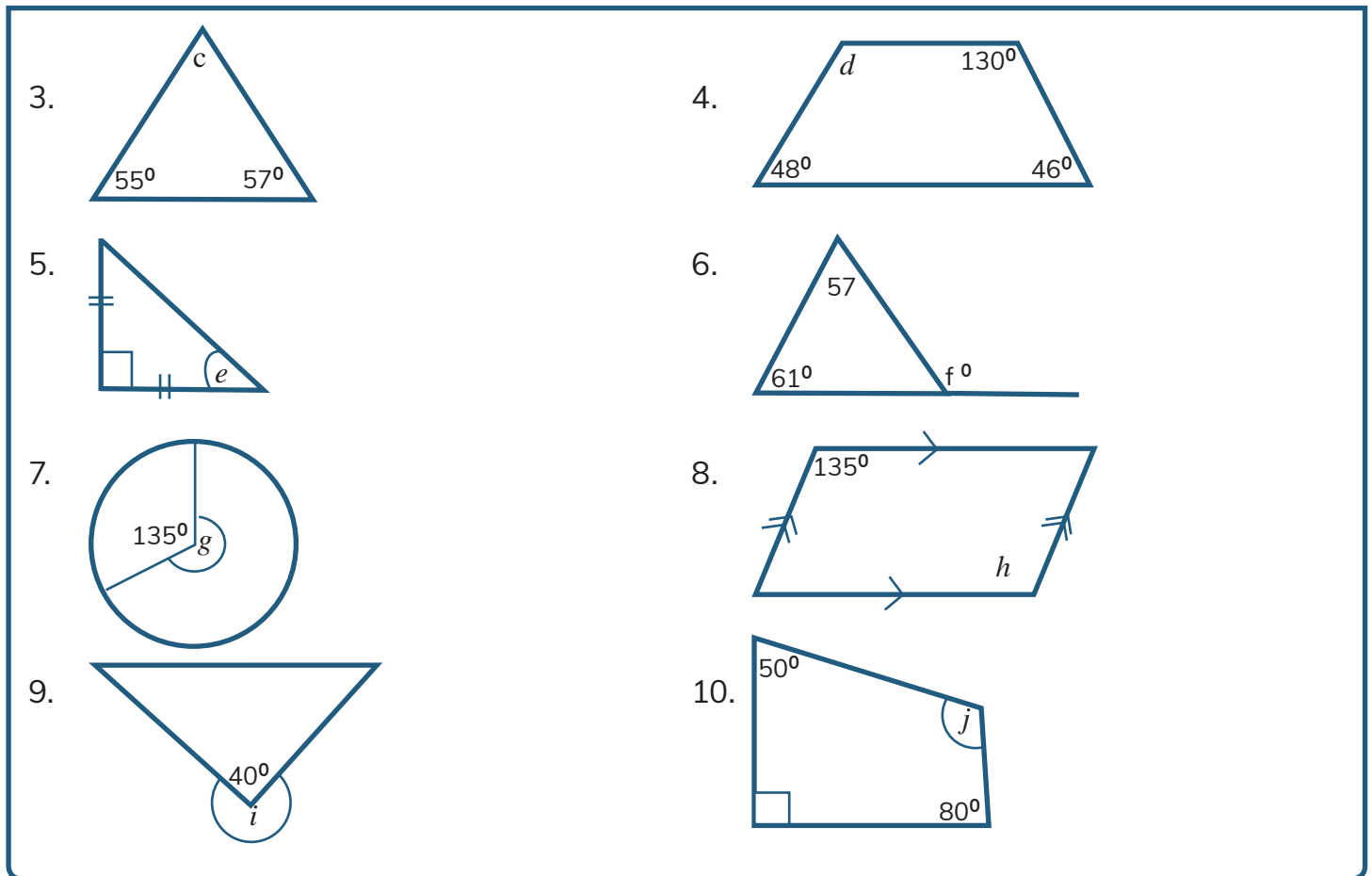
Solution

(i) North
(ii) South West

Activity 1

In your groups, discuss answering the following questions.

(i) Where do you stay?
(ii) What is the direction of your home from your school?
(iii) What is the direction of your school from your home?
(iv) What is the direction of your closest neighbouring school from your school?
(v) What is the direction of the main school gate from your school office?
(vi) What is the direction of your school toilets from your classroom?

Exercise 1

3.

4.

5.

6.

7.
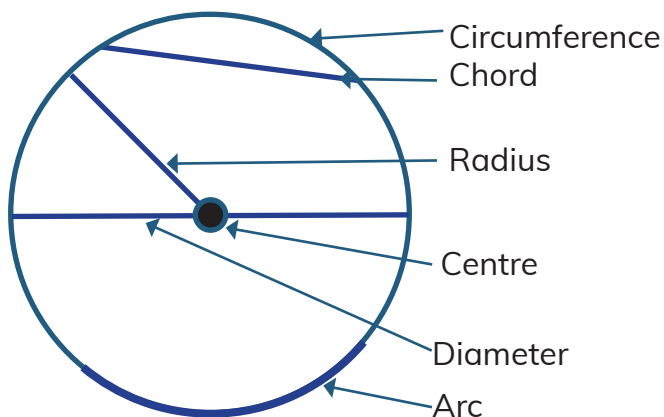
8.

9.

10.

Illustrating and naming lines of a circle

A circle is a plane shape that is round. It has interior angles that add up to 360^0. It is a full revolution. Here is an example of a circle;

A circle has some lines you need to know. Let us look at the lines.

Example

The line that runs around a circle is called a circumference. A radius stretches from the circumference to the centre and a diameter stretches from the circumference to the other side of the circumference through the centre. An arc is just a small part of the circumference.

DATA HANDLING

Unit Objectives

At the end of this unit, you will be able to:

(a) interpret data from tables.
(b) represent data on tables.
(c) read and extract information from graphs and pie charts.
(d) present data on graphs and pie charts.
(e) use statistical graphs in life situations.

Looking Back

In the previous grade, you learnt how to interpret information from tables. You read and extract information from bar graphs, column graphs, ready reckoners and pie charts. You also presented data on bar and column graphs, ready reckoners and pie charts. In this unit, you will learn to interpret data from tables and represent data on tables. You will read and extract information from graphs and pie charts. You will also learn to present data on graphs and pie charts and use statistical graphs in life situations.

Key Words

Data – pieces of useful knowledge before it is processed into information.
Graphs – a drawing that uses a line or lines to show the relationship of sets.
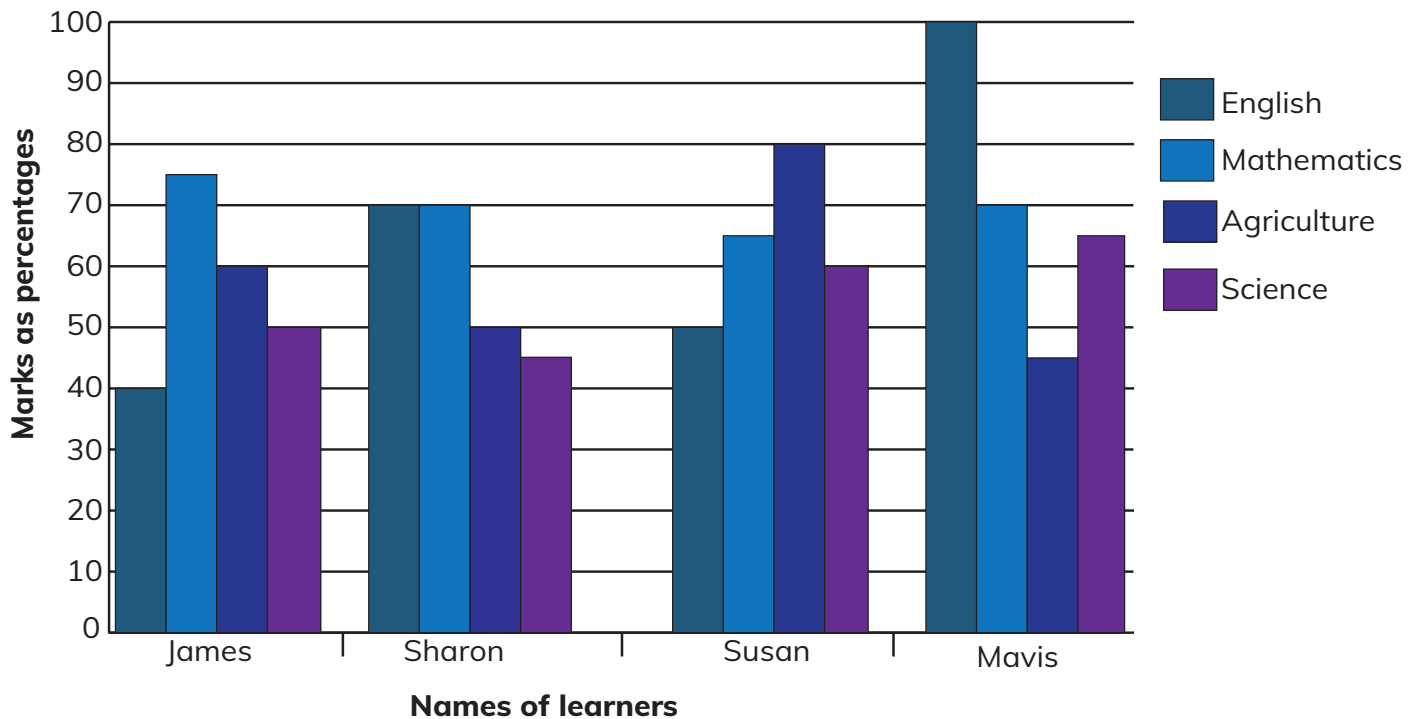
Interpreting data from tables

Tables can be used to present information. There are many different types of tables. Tables contain data which is later used to present in graphs. Let us look at some of the tables we can come across in life;

Representing data on tables

In the previous lesson we have been extracted data on tables. In this lesson we are going to look at the representation of data in tables. You may be given raw data verbally to present through a table, for example, you may be given learners' marks and be asked to prepare a table of marks. You may be given data on a graph and be asked to present it through a table. Let us look at an example;

Example

The table below shows the marks scored by four learners in the four learning areas. Study the graph below and show the information in a table.

Solution

Learners should extract data from the graph and represent it on a table like this;

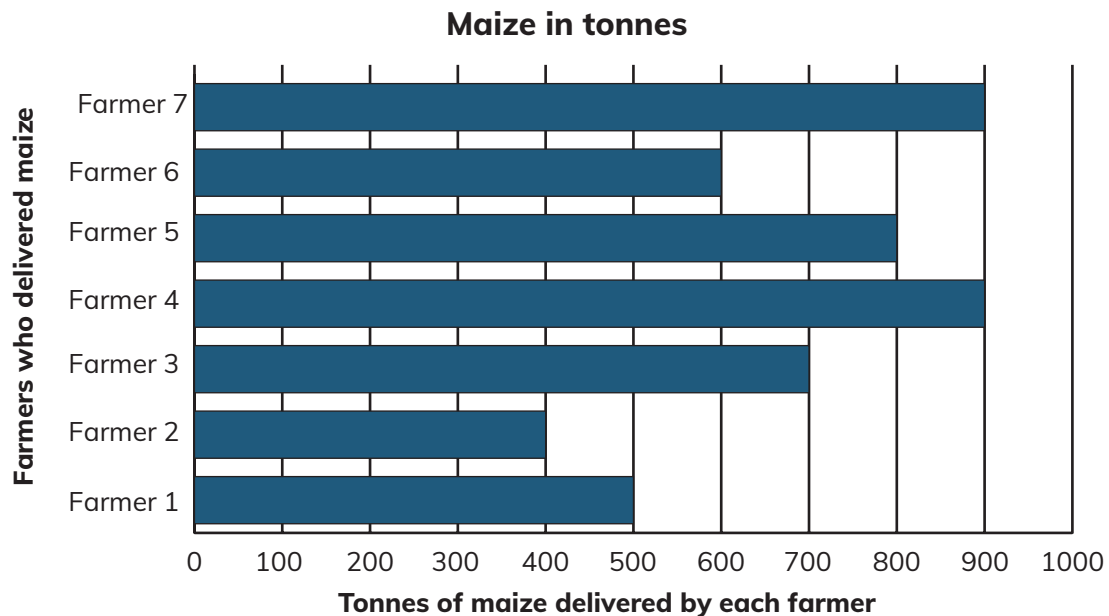| Names	English	Mathematics	Agriculture	Science
James	40	75	60	50
Sharon	70	70	50	45
Susan	50	65	80	60
Mavis	100	70	45	65

Activity 2

Look for different graphs in your book. Try to extract information on a graph and show it in tables.

Activity 3

In your groups, draw tables of data and draw pie charts to represent information. Compare your charts with your colleagues. Ask your facilitator for help where you have challenges.

Exercise 3

The graph below shows tonnes of maize delivered by 7 farmers to the Grain Marketing Board In the previous farming year. Study the graph and answer questions 1 – 10.

Maize in tonnes

1. Which farmer delivered the least amount of maize to the GMB?
2. How much maize was delivered by Farmer 3?
3. Which two farmers delivered the most maize?
4. Find the difference between the most delivered amount of maize and the least delivered amount of maize.
5. Find the total maize delivered by Farmer 1 and 2 altogether.
6. How much more maize was delivered by Farmer 4 than Farmer 5?
7. Which farmer delivered double what Farmer 2 delivered?
8. If maize delivered by Farmer 4 is shared equally to 9 families how much maize will each family get?
9. If a tonne of maize was sold for $500.00 then calculate the amount of money paid to Farmer 2.
10. Find the total mass of maize delivered by the 7 farmers to the GMB.

Using statistical data in life situations

Statistics is a set of equations that allows us to solve complex problems. These statistical problems in real life are usually based on facts and figures. Data is used by people in daily life situations. Below are some of the uses of statistics in people's lives on a daily basis.
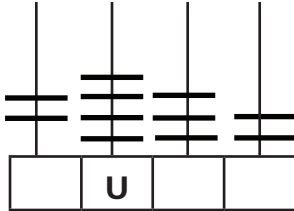
TEST 3

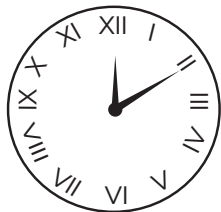## Paper 1: Multiple Choice Questions

Answer all questions by choosing the correct answer A, B, C or D.

1. Write 46 318 in words?
   A. Forty-six three hundred eighteen.
   B. Forty-six thousand, three hundred and eighteen.
   C. Forty thousand, six thousand and three hundred and one eight.
   D. Forty-six thousand and three one eighteen.

2. What number is shown by the abacus below?

   A. 4 432   B. 2 432   C. 24.32   D. 4.432

3. When 13.92 is rounded off to the nearest whole number it becomes _____.
   A. 13.91   B. 13.92   C. 14   D. 139.2

4. XLVII written in Arabic numerals is _____.
   A. 1056   B. 47   C. 38   D. 27

5. 33% as a decimal fraction is _____.
   A. 0.30   B. 0.31   C. 0.33   D. 33.00

6. What time does this clock face show?

   A. 12 O'clock   B. 2 O'clock
   C. 10 minutes past 12   D. 12 minutes past 2

7. The difference between two numbers is 280. The other number is 160. To get the other number one should _____.
   A. Multiply 280 by 160   B. Divide 280 by 160
   C. Add 280 to 160   D. Subtract 160 from 280

8. 35 minutes as a fraction of an hour is _____.
   A. $\frac{7}{12}$ B. $3\frac{1}{2}$ C. $\frac{4}{35}$ D. $\frac{35}{10}$

9. Find the product of 13 and 26.
   A. 13   B. 39   C. 310   D. 338

10. What is the average speed of a bus that covers 250km in $2\frac{1}{2}$ hours?
    A. 400km/h   B. 300km/h   C. 200km/h   D. 100km/h