SUBJECT:

**MATHEMATICS**

CLASS:

**JUNIOR SECONDARY SCHOOL 1**

SCHEME OF WORK

WEEK 1 REVISION OF LAST WORK

WEEK 2 APPROXIMATION

WEEK 3 APPROXIMATION

WEEK 4 NUMBER BASE

WEEK 5 NUMBER BASE

WEEK 6 BASIC OPERATION

WEEK 7 REVIEW OF FIRST TERM

WEEK 8 BASIC OPERATION

WEEK 9 ALGEBRAIC PROCESS

WEEK 10 ALGEBRAIC PROCESS

WEEK 11 REVISION

WEEK 12 EXAMINATION

**WEEK2: APPROXIMATION**

**2.0 Introduction:**

Approximation is the process of using rounded numbers, to estimate the outcome of calculations. Approximationcan help us decide whether an answer to a calculation is right or not. We can approximate numbers by rounding them up to decimal places, significant figures, nearest whole number, tens , hundreds etc.

**2.1 Decimal Place/Point:**

A number such as 197.7658 is an example of a decimal number. The whole number part is 197 and the decimal part is 7658. The point between them is called a **decimal point.**

**197.7658**

Whole number. Decimal

Decimal point

To find the number of decimal places (d.p) simply **count the number of figures after the decimal point.** Thus, the number above has **4 d.p**.

**197.7658**

4th decimal place

3rd decimal place

2nd decimal place

1st decimal place

**Guide to round off numbers:**

To round off numbers to a specific number of decimal places

1. Look for the last digit (i.e. the required decimal place you are rounding to)

2. Then look at the next digit to the right, i.e. the decider

3. If the decider is 5 or more round up (i.e. add 1 to the last digit) if it is less than 5, then add nothing.

**Examples2.1**: Give the number 78.05624 correct to (a) 1 d.p (b) 2 dp (c) 3 dp

**Solution:**

1. 78.1 (start counting from the number after the point. Note that zero is significant).
2. 78.06 (after counting the number check the next number, if the number is less than 5/<; it changes to zero but if it is 5 or > it changes to 1 and add to the next counted before it.)
3. 78.056 (since the number is less it turns to zero and it has no significance)

**Example 2.2:** Give 57.9945 correct to (a) 2dp (b) 4dp

**Solution:**

(a) 57.99 (2 d.p.)

(b) 57.9945 (4 d.p.)

**2.2 Significant Figure:**

The word **significant** means ‘**important or non zero digits**’ and it is another way of approximating numbers. We write significant figure as S F.

*Numbers greater than zero*

For example the number 865 034 has six figures or digits. The first figure from the left i.e. 8 is worth 800 000 (place value) and it is the most significant figure. It is therefore the first significant figure and 4 the leas or sixth significant figure.er

987654

1sts.f.2nds.f.3rds.f.4ths.f.5ths.f.6ths.f.

*Numbers less than zero*

For example 0.000007685 is given to 8 decimal places. The zero before the decimal number means that there are no units, and the 5 zeros after the decimal point mean that they are insignificant figures. Therefore the most significant number or first significant is 7 follow by 6 and 8.

**0. 0 0 0 0 0 7 6 8**

**1sf 2sf 3sf**

**Note: the first significant figure is always the first non-zero figure as you read a number from the left**

**Guide to round off numbers**

To correct a number to a specific number of significant figure

1. Look for the required significant figure
2. Look at the next significant figure to the right (i.e. the decider)
3. If the decider is 5 or more round up but if it is less than 5 add nothing

**Example 2.3**:Give 4540 correct to (a) 1 s.f (b) 2 sf (c) 3 s.f

**Solution:**

Note the figures above, it helps just follow the figure correctly.

1. 4540 = 5000 (the reason for getting 8000.after counting 7 the next number is 5 which will turn to 1 and add to the 7 counted and the other numbers turn to zeros).
2. 4540 = 4500 (after counting 2 s.f the next number is 6 which turn to 1 and add to 5 to be 6 and the rest turn to zeros.
3. 4540 = 4540 (after counting 3 s.f the next is 4 which turn to zero).

**Example 2.4:** Convert 0.00005791 to (a) 2 s.f (b) 3 s.f

**Solution:**

(a) 0.000058

(b) 0.0000579

**2.3 Rounding Decimals to the Nearest, Tenth, Hundredth, and Thousandths and Whole.**

**Example2.5**:Give474.4547correcttothenearest

a. Tenth

b. Hundredth

c. Thousandth

**Solution:**

Notethatthecountingstartsafterthepoint.

1. 474.4547=474.5(sincethenextnumberaftercountingis5/>itturnsto1andaddtothecounted4)
2. 474.4547=474.45
3. 474.4547=474.455

**Example 2.6:**Roundoff

(a)13.73

(b)34.245tothe nearest wholenumber.

**Solution:**

1. 13.73=14(sincethewholeis13thenextnumberisdecmalwhichis7,itwillbeturnto1andaddto13tomakeit14).
2. 34.245=34(sincethenextislessthan5thenitisinsignificant).

**ASSIGNMENT: ESSENTIAL MATHEMATICS BOOK 1**

**EXERCISE 8.5 page 89 NO 2(a,b,c,d), 5+ (a,b,c)**

**WEEK 3: ADDITION AND SUBTRACTION OF APPROXIMATIONS**

**Example 3.1:** approximate the following to it accuracy of degree

1. 674 + 975 (3 s.f)
2. 805 + 912 (4s.f)
3. 3076 – 621 (2 s.f)
4. 695.728 – 97.979 (4 s.f)

**Solutions:**

1. 674 + 975 = 1649 (165 to 3 s.f.) note that you must add the numbers before converting to the degree.
2. 805 + 912 = 1717 (1717 to 4s.f.)
3. 3076 – 621 = 2455 (250 to 2 s.f.)
4. 695.728 – 97.979 = 597.749 (597.7 to 4 s.f.)

**EVALUATION: Convert the following to their accuracy degree**

1. **42.4739 to 5 s.f**
2. **67.3258 to 3s.f**
3. **879.9087 to 4 s.f**
4. **304.385 to 5 s.f**

**ASSIGNMENT: ESSENTIAL MATHEMATICS BOOK 1**

**EXERCISE 8.7 NO 1 (g,h,I,j,k,l and m) PAGE 93**

**EXERCISE 8.8 NO 7,8 and 9 PAGE 95**

**EXERCISE 8.5 NO 1(D,E,F), NO 4 (B &C) N0 5 (A TO G) PAGE 89**

**WEEK 4: NUMBER BASE**

**4.0 Introduction:**

The usual system of counting in our days is called the decimal or denary system. The denary or decimal system is also called base ten. This system enables us to be able to write small or large numbers using the combination of the digits i.e. 0,1,2,3,4,5,6,7,8,9.

**4.1 Expansion and Conversion to Base Ten**

***Expanded Notation***

**Example 4.1:** Write the following in expanded nation form.

(a) 11011002

(b) 21356

(c) 45678

**Solution:**

1. 16150413120100= (1 x 26) + (1 x 25) + (0 x 24) + (1 x 23) + (1 x 22) + (0 x 21) + (0 x 20).

The base is used to expand it and the power for each expansion.

(b) 23123150 = (2 X 63) + (1 x 62) + (3 x 61) + (5 x 60)

(c) 43526170 = (4 x 83) + (5 x 82) + (6 x 81) + (7 x 80).

**4.2 Conversion to Base Ten**

**Example 4.2:** convert the numbers in example 1 to Base ten

**Solution:**

In other to do this we simply continue from the expanded notation, evaluate and get our answers.

1. 16150413120100=(1x26)+(1x25)+(0x24)+(1x23)+(1x22)+(0x21)+(0x20).

= (1 x 64) + (1 x 32) + (0 x 16) + (1 x 8) + (1x 4) + (0 x 2) + (0 x 1)

= 64+32+0+8+4+0+0 = 108

1. 23123150=(2X63)+(1x62)+(3x61)+(5x60)

= (2x 216) + (1x 36) + (3x 6) + (5 x 1)

= 432 + 36 + 18 + 5 = 491

1. 43526170=(4x83)+(5x82)+(6x81)+(7x80).

= (4 x 512) + (5 x 64) + (6 x 8) + (7x1)

= 2048+320+48+7=2423

**4.3 Binary System (Base two number system)**

In binary system, the greatest digit used is 1, so the two digits available in binary system are 0 and 1. Remember that each digit in a binary number has a place value.

*Converting Number in Base Ten To Numbers In Base 2*

**Examples4.3:**(a) Convert 2910 to base 2.

(b) Convert 7910 to base 2

(c) convert 14510 to base 2

**Solution:**

(a). 2 29 (b). 2 79 (c) 2 145

2 14 R 1 2 39 R 1 2 72 R 1

2 7 R 0 2 19 R 1 2 36 R 0

2 3 R 1 2 9 R 0 2 18 R 0

2 1 R 0 2 4 R 1 2 9 R 0

0 R 1 2 2 R 0 2 4 R 1

2 1 R 0 2 2 R 0

0 R 1 2 1 R 0

0 R 1

2910= 101012 7910= 10010112 15710 = 100100012

**EVALUATION:** (1) Expand the following with their bases.

(a) 35318

(b) 1010102

(c) 1110110242

**EVALUATION:** (2) Convert the following number to base 2

1. 35610

2. 4710

3. 21810

**ASSIGNMENT:** PAGE 105

EXERCISE 9.2 NO 3 (e,f,g,h) , NO 5 (a,b,d)

WEEK 5 NUMBER SYSTEM

**5.1 Converting Numbers Base From One Baseto Other Bases**

This is a 2-stage conversion process. The steps to do this are simple. First convert the given base to base ten and then convert the result to the required base.

**Example5.1:** Convert 21356 to a number in base two

**Solution:**

*Step one:* Converting to base ten

23123150 = (2X63) + (1x62) + (3x61) + (5x60)

= (2x 216) + (1x 36) + (3x 6) + (5 x 1)

= 432 + 36 + 18 + 5 = 491

*Step two:* Convert the answer in base ten to a number in base two

2 491

2 245 R 1

2 122 R 1

2 61 R 0

2 30 R 1

2 15 R 0

2 7 R 1

2 3 R 1

2 1 R 1

0 R 1

Therefore 21356 = 1111010112

**Examples 5.2**: Express 101112 to a number in base three

**Solution:**

1. 1403121110= (1 X 24) + (0 X 23) + (1 X 22) + (1 X 21) + (1 X 20)

= 1 X 16 + 0 X 8 + 1 X 4 + 1 X 2 + 1 X 1

= 16 + 0 + 4 + 2 + 1

= 2310

3 23

3 7 R 2

3 2 R 1

0 R 2

Therefore 101112 = 2123

**5.2 Addition and Subtraction of Number Base**

***Note the following STEPS in adding and subtracting.***

***To add in base two***

***0+0 = 0***

***1+ 0 = 1***

***1 + 1 = 10***

***1 + 1+ 1 = 11***

***To subtract in base two***

***0 – 0 =0***

***1 – 0 = 1***

***10 – 1 = 1***

***11 – 1 = 10***

**Example 5.3:** Add the following

1. 11012 and 11112

2. 110112, 101012, and 10012

**Solution:**

1. 1101 + 1111 = 1 1 0 1 [using the addition steps 1 + 1 = 10, write 0 down and move the 1 to the next number]

+ 1 1 1 1 [also take the 1 to next, and move them till you get to last one].

1 1 1 0 02

2. 11011 + 10101 + 1001 = 1 1 0 1 12

1 0 1 0 12

+ 1 0 0 12

1 1 1 0 0 12

**Example 5.4:** Subtract (a) 10112 from 101012 (b) 110112 from 1110102

**Solution:**

1. 1 0 1 0 1[using the subtraction steps 1- 1 = 0, write 0 down and move to the next number]

-1 0 1 12

1 0 1 02

2. 1 1 1 0 1 02

-1 1 0 1 12

1 1 1 1 12

**5.3 Multiplication of Binary**

**Example 5.5:** Find the product of 10112 and 1012

**Solution:**

1 0 1 12

x 1 0 12

1 0 1 1

0 0 0 0

1 0 1 1

1 1 0 1 1 12

**Example 5.6:** multiply 1111 by 110

**Solution:**

1 1 1 12

1 1 02

0 0 0 0

1 1 1 1

1 1 1 1

1 0 1 1 0 1 02

**EVALUATION:** DO THESE

1. Add the following (a) 10012 + 11112

(b) 1011102+100102

2. Subtract 10112 from 11011012

3. Multiply 1101012 by 10112

**4. find the value of the following binary numbers 1011­+10-111**

**ASSIGNMENT:**

EXERCISE 9.5 page 107 NO 1(B,C,D), NO 2 A and B, NO 3 (E,F,G,H)

EXERCISE 9.6 NO 2,5,8 and 11. PAGE 108

**WEEK 6 BASIC OPERATION**

**6.1 Adding and Subtraction**

When adding or subtracting numbers make sure you know the place values of the numbers. Then write each number underneath the other so that the units (U) figures are in line, all the tens (T), all the hundreds (H), and so on are in line.

**Examples 6.1:**

* 1. Add 1952 and 567
  2. Take away 936 from 7093
  3. Ade has 5673 marbles, Ola has 3426 marbles, Michael has 887 marbles. How many marbles do they have altogether?
  4. Find the total of 90156, 300673, and 65489.
  5. The difference between two numbers is 6032. If the larger number is 96005, what is the smaller number?

Note: remember to write the numbers underneath.

**Solution:**

1. 1 9 5 2 + 5 6 7 = TH H T U

1 9 5 2

+5 6 7

2 5 1 9

2. TH H T U

7 0 9 3

-9 3 6

6 1 5 7

3.

TH H T U

AdesMARBLES 5 6 7 3

OLU’s MARBLES 3 4 2 6

Michael’s MRABLES 8 8 7

ALTOGETHER 9 9 8 6

4. H.TH T.TH TH H T U

3 0 0 6 7 3

9 0 1 5 6

+ 6 5 4 8 9

1. 5 6 3 1 8

5.

T.TH TH H T U

9 6 0 0 5

6 0 3 2

8 9 9 7 3

**EVALUATION:** DO THESE:

1. Find the total of 453323, 642176, 99510

2. Take away 301653 from 887321

3. Find the sum of 666721, 55432, 29255, 387, 554 and 77

4. MICHEAL collected 1350 oranges from her sister Helen. He gave 546 to Mathew and 123 to Kenny. How many oranges left in Micheal hands?

**ASSIGNMENT:** PAGE 12

EXERCISE 2.2 NO 1 (A, D), N0 10, 12, AND 14.

**6.2 Multiplication and Division Of Numbers**

**Example 6.2:**

* + 1. Find the product of 8600 and 150
    2. A big company recently bought 78 new computer each costing #95 000. How much did the company spent?
    3. Divide 15648 by 12
    4. 5982 computers are to be shared among 40 schools. How many will each school get and how many will be left over?

**Solution:**

8 6 0 0

X 1 5 0

0 0 0 0

4 3 0 0 0

8 6 0 0 \_

1 2 9 0 0 0 0

2. 9 5 0 0 0

x 7 8

7 6 0 0 0 0

6 6 5 0 0 0 0

6 7 2 6 0 0 0 0

3. 1 3 0 4

12 1 5 6 4 8

1 2

36

36

48

4. 1 4 9

40 5 9 8 2

4 0

1 9 8

1 6 0

3 8 2

3 6 0

2 2

Note each school will collects 149 computers and the left over will be 22.

**DO THESE:**

* 1. Multiply the following (a) 6745 by 356 (b) 89760 by 120
  2. Find the product of 98700 and 4900
  3. Divide the following (a) 56748 by 24 (b) 640000 by 80
  4. 789 oranges are to be shared equally among 14 brothers. How many will each person get and how many will remain?

**ASSIGNMENT:**

PAGE 16 EXERCISE 2.6 N0 3 TO 5.

WEEK 7 MID TERM

PERIODIC TEST.

**WEEK 8** **ADDITION AND SUBTRACTION (DIRECTED NUMBERS**

**8.1 ADDITION AND SUBTRACTION OF DIRECTED NUMBERS.**

In a **horizontal number line:**

1. When **adding, start** from the first number, count right along the number line.
2. When **subtracting, start** from the first number, count left along the number line.

**NOTE: that in a horizontal number line, number to the right of zero are positive and to the left are negative.**

**Example 8.1:** use number line to find the value of the (a) 3 + 5, (b) -4 – 6, (c) -9 + 12

**Solution:**

**-2 -1 0 1 2 3 4 5 6 7 8 9 10 11 12**

3 + 5 = 8

(b)

-11 -10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3

(-4 )–(-6) = -10

-10 -9 -8 -7 -6 -5 -4 -3 -2 -1 0 1 2 3

-9 + 12 = 3

**DO THESE:**

1. Draw a suitable horizontal number line to answer the following
2. 5 – 8
3. 6 – 2
4. (-5) – (-8)
5. 7 + 2
6. 5 + 8

2. Use the rules to answer the following

1. +5 - (+6)
2. 25 + (-55)
3. +24 + (+28)
4. 18 – 68
5. -7 + 5 - 2 + 7 -10 -3

**8.2 RULES FOR ADDITION AND SUBTRACTION**

**NOTE:** You can carry out the addition and subtraction without drawing the number line using the rules below.

1. Replace **the same signs** that appear together by a positive sign. [+ + = +],[ - - = -].

Examples +7 + (+5) = 7+5 = 12 (same sign gives +)

+6 – (-8) = 6 + 8 = 14 (same sign gives +)

1. Replace **two different signs** that appear together by a negative sign. [+ - = -],[- + = -].

Examples +8 + (-5) = 8 – 5 = 3 [different sign gives negative]

+9 – (+4) = 9 – 4 = 5 [different sign gives negative sign].

**Note :**To subtract two numbers with different signs, subtract the smaller number from the larger number and then place the sign before the larger number in front of your answer.

**Example 8.2:** Find the value of the following

1. (+6) + (+9)
2. (+21) – (+9)
3. (+12) + (-5)
4. (+29) + (+13)

**Solution:**

**Note: You need to follow the rules.**

1. (+6) + (+9) = 6 + 9 = 15 (same sign gives +)
2. (+21) – (+9) = 21 – 9 = 12 [different sign gives negative sign]
3. (+12) + (-5) = 12 – 5 = 7 [different sign gives negative sign]
4. (+29) + (+13) = 29 + 13 = 42 (same sign gives +)

**ASSIGNMNET:**

EXERCISE 10.2 NO 3(A,C,E, M,O) PAGE 114

EXERCISE 10.3 NO 2( E,F,G,H), NO 5 ( A,B,C,D), PAGE 116 and 117

**WEEK 9 & 10 ALGEBRAIC PROCESS**

**USE OF SYMBOLS / SHAPES**

ALGEBRA is the branch of mathematics in which letters of the alphabets and symbols are used in place of numbers.

We can use any shape to represent our letter in other to interpret the sentence very well.

Examples of shapes includes

**Examples**: Find the missing numbers that make the following open sentence true:

1. + 7 = 14
2. + 8= 14
3. 12 ÷ = 3
4. 30 = - 9

**Solution:**

1. 14 – 7 = 7 [the statement is true] (7 moves to the right hand side and the sign changes to negative sign).
2. 14- 8 = 6 [the statement is true]( 8 moves to the right hand side and the sign changes to negative sign).
3. 12 x 3 = 36 [the statement is true] 12 moves to the right hand side and the sign changes to multiplication sign).
4. 30 + 9 = 40 [the statement is true]( 9 moves to the left hand side and the sign changes to positive sign).

**DO THESE:**

1. 8 X 7 =
2. 53 = 12 +
3. 121 ÷11 =
4. + 42 = 80

USING LETTER TO REPRESENT NUMBERS

It is more convenient to use a letter of the alphabets to represent an unknown number instead of shapes.

The statement ʠ + 7 = 12 is called an algebraic sentence or equation. It means ʠ plus seven equals twelve. Thus for the sentence to be true, we must add 5.

**Examples:** Find the value of each letter that will make the following sentences true.

1. B = 8 + 6
2. S x 3 = 18
3. F = 6 x 7
4. P = 25 + 37
5. 40 – x =X

**Solution:**

1. B = 8 + 6 = 14. Therefore B = 14
2. S x 3 = 18 , 18 / 3 = 6. Therefore 6 x 3 = 18
3. F = 6 x 7 = 42. Therefore F = 42
4. P = 25 + 37 = 62. Therefore P = 62
5. 40 – x = x , = 40 = x + x

= 40 = 2x [divide both side by 2]

40/2 = 2x/2

20 =x

Therefore x = 20.

SUBSTITUTING NMBERS

The value of an expression such as x+ 3 can be found by replacing x by a given number. This is called substitution.

EXAMPLES:

1. Find the value of x – 9 if (i) x = 23, (ii) x = 15
2. Find the value of y + 10 when y is 20
3. Find the value of t + 19 when t is 45.

**Solution:**

1. X – 9 = when x = 23; 23 – 9 = 12.
2. Y + 10 = when y is 20 ; 20 + 10 = 30
3. t + 19 = when 45 + 19 = 64

USING ALGEBRA FOR SOLVING WORD PROBLEMS

NOTE: Remember that you can use any letters of the alphabet to represent an unknown number.

**Examples:**

1. What number when added to 8 gives 20?

2. Think of a number subtract 5 from it and the result is 15. What is the number?

3. when a number is multiplied by 5 the result is 20. What is the number?

**Solution:**

1. let x be the number you add to 8 to give 20.

X + 8 = 20

Subtract 8 from both sides

X + 8 – 8 = 20 – 8

X = 12

2. Let the number be y

Y – 5 = 15

Add 5 to both side

Y – 5 + 5 = 15 + 5

Y = 20

3. Let Z be the number you multiply by 5 to get 20

Z X 5 = 20 [note that when multiplication sign moves other side it turn to division]

Z = 20/5

Z = 4 [this statement is true.

**EVALUTION:**

1. A boy has y number of pencils. He gave 3 to his brother and 2 to his sister. How many pencils has he left?

2. Mrs Elizabeth bought M exercise books yesterday, she bought 5 others today. If she has 20 books altogether, how many exercise books does she buys yesterday?

3. 169 / X = 13

4. Y – 42 + 2Y + 60

**ASSIGNMENT:**

EXERCISE 11.6 NO 1,2,5,8,14,15,22 and 23 PAGE 125

REVISION EXERCISE

PAGE 175 to 176 Revision tests for chapter 9 to 12