**MATHEMATICS**

# **SCHEME OF WORKS FOR ALPHA TERM 2017/2018**

WEEK 1 REVISION OF JSS 1 EXAMINATION QUESTION

WEEK 2 WHOLE NUMBER AND DECIMALS NUMBERS

WEEK 3 H C F AND L C M , SQUARE AND SQUARE ROOT

WEEK 4 FRACTIONS

WEEK 5 HOUSEHOLD ARITHMETIC

WEEK 6 APPROXIMATION OF NUMBER

WEEK 7 REVIEWS OF HALF LESSON AND PERIODIC TEST

WEEK 8 MULTIPLICATION AND DIVISION OF DIRECTED NUMBERS

WEEK 9 ALGEBRAIC EXPRESSION

WEEK 10 ALGEBRAIC FRACTION

WEEK11 REVISION AND EXAMINATION

**WEEK 1 & 2 WHOLE NUMBER AND DECIMALS NUMBERS**

**COMMON MULTIPLES AND FACTOR**

**Factors:** The factor of a number is the whole number that divides the number exactly. For example the factors of 18 may be found as follows;

18 = 1 x 18

= 2 x 9

= 3 x 6

**Multiples:** A multiple of a number is obtained by multiplying it by any whole number. Example the multiple of 4 are 4, 8, 12, 16, 20 , 24 etc.

A prime number is a number that can only divide itself. It has only two factor which is 1 and itself. Examples of prime numbers are: 2, 3, 5, 7, 11, 13, 17, 19 etc.

**Example:** (a) find all the factors of 18

(b) State which of these factors are even

( c) state which of these factors are prime numbers

(d) Write the first three multiple of 18

**Solution**

1. Factors of 18 are 1, 2, 3, 6, 9, and 18
2. The even numbers are 2, 6, and 18
3. The prime numbers are 2 and 3

**Example 1:** Find the factor of 56

**Solution:**

1 × 56

2 × 28

4 × 14

7 × 8

Therefore 56= 1, 2, 4, 7, 8, 14, 28, and 56.

**Product of Prime Factors.**

**Example 2:** Express 56 and 108 as the product of prime factors in index notation.

**Solution:**

56 = 2 × 2 × 2 × 7 = 23 x 7

108 = 2 × 2 × 3 × 3 × 3 = 22 x 33

*Note that the numbers must be a prime numbers*

**ASSIGNMENT**

**EXERCISE 1.1; NO 3, 5 & 9. PAGE 2**

**EXERCISE 1.2; NO 8, 9 & 12. PAGE 3**

***WEEK 3 HIGHEST COMMON FACTOR AND LOWEST COMMON FACTOR***

**EXAMPLE 1:** Find the L C M of 18 and 24

**Solution:**

METHOD 1 METHOD 2

2 18 24 18 = 2 ×3 ×3

2 9 12 24 = 2 ×2 ×2 ×3

2 9 6 L C M = 2 ×2 ×2 ×3 ×3

3 9 3 = 72

3 3 1

1 1

L C M = 2 × 2 × 2 × 3 × 3 = 72

**Example 2**: Find the L C M of 72 and 90

**Solution:**

**METHOD 1 METHOD 2**

2 72 90 72 = 2 X 2X 2 X 3 X 3

2 36 45 90 = 2X 3 X3 X 5

2 18 45 L C M = 2 X 2 X 2 X 3 X 3 X 5

3 9 45 = 360

3 3 15

5 1 5

1 1

2 x 2 x 2 x3 x 3 x 5 = 360

**Example 3**: Find the H C F of 72 and 96

Solution: find the prime product of the number and pick the common ones

72 = 2 \* 2 \* 2 \* 3 \* 3

96 = 2 \* 2 \* 2 \* 2 \* 2 \* 3

H C F = 2 \* 2 \* 2 \* 3

= 24

**SQUARE AND SQUARE ROOT**

“Square” is the product of two equal terms example N \* N = N²

**Example 1**: Find the square of 14 and 21

**Solution:**

14 \* 14 = 196 (b) 21 \* 21 = 441.

Square Root: A number that when multiply by itself equals a given number.

**Example 2**: find the square root of 144

**Solution:**

Using a prime factor method (method 1) Factor pairs method (method 2)

2 144 144 = 1 \*144

2 72 = 2 \* 72

2 36 = 3 \* 48

2 18 = 4 \* 36

3 9 = 6 \* 24

3 3 = 8 \* 18

1 = 9 \* 16

Therefore (2 \* 2) \* (2 \* 2) \* (3 \* 3) = 2\* 2 \* 3 = 12 = 12 x 12

**ASSESEMENT**

1. Find the square of the following (a) 25, (b) 40 and (c) 132
2. Find the square root of the following (a) 6400 (b) 16900 (c) 1296

Assignment*: essential mathematics text book for J SS 2 PAGE 10 EXERCISE 1.6 NO 2 (e, f) , NO 6 (b, c)*

**WEEK 4 FRACTIONS (TYPES OF FRACTIONS), RATIO AND PERCENTAGES**

**Fraction** is a small part or item forming a piece of a whole. It is the quotient of the rational numbers.

**Types of Fractions**

EQUIVALENT FRACTIONS: Examples are 2/5 = 4/10 = 8/20 = 16/40

IMPROPER FRACTIONS: Examples are 13/2, 100/7, 67/5,102/5

MIXED FRACTIONS: 72/3, 91/8, 1421/2 etc.

**RATIOS, DECIMAL AND PERCENTAGE**

RATIO is the relative magnitudes of two quantities (usually expressed as a quotient).

Example 1: In a bus station, the ratio of men to women is 2:5 (a) what fraction of the people are men (b) what fraction of the people

Solution:

2:5 = 2+5 = 7

The fraction of men = 2/7 (i.e. the fraction of men over the total fraction)

The fraction of women = 5/7 (i.e. the fraction of women over the total fraction)

Example 2: The population of a country is estimated to be 12 million people. The last survey reveals that 40% were boys, 30% were girls, 10% were men and 20% were women. Express the composition in ratio and evaluate the estimate number of people in each categories.

Solution:

40% (boys) 30% (girls) 20% (women) 10% (men)

Step 1: eliminate the percentage first = 40 30 20 10

Step 2: divide through by to to reduce the value = 4 3 2 1

Therefore we have 4:3:2:1 = 4 + 3 + 2 + 1 = 10

Step 3: find the people for each categories.

MEN = 1/10 \* 12 000 000 = 1 200 000 (ZERO CANCEL ZERO)

WOMEN = 2/10 \* 12 000 000 = 2 400 000 (ZERO CANCEL ZERO)

GIRLS = 3/10\* 12 000 000 = 3 600 000 (ZERO CANCEL ZERO)

BOYS = 4/10 \* 12 000 000 = 4 800 000 (ZERO CANCEL ZERO)

THEREFORE: 4 800 000 + 3 600 000 + 2 400 000 + 1 200 000 = 12 000 000.

## FRACTION AND DECIMALS TO PERCENTAGES

Example 1: Express the following fraction to percentage (a) 5/12 (b) 120/500 (c) 0.009

Solution:

5/12 \* 100 = 500/ 12 = 412/3

120/500 \* 100 = 24%

0.009 = 9/1000 \* 100 = 0.9%

**ASSESSMENT**

ESSENTIAL MATHEMATICS BOOK 2

EXERCISE 4.1 NO 1 (I, J, K, L), NO 4 (A, B, F, G) PAGE 44

EXERCISE 4.3 NO 6 AND 7. PAGE 47

WEEK 5 HOUSEHOLD ARITHMETIC (SIMPLE INTEREST, PROFIT AND LOSS, DISCOUNT AND COMMISSION)

**PROFIT AND LOSS**

When a trader buys or sells goods, the price at which he /she sells is called *selling price* while the price at which he/she buys is called *cost price*.

When the good is sold at a price greater than the cost price, then the trader has made a ***gain*** or ***profit.*** On the other hand, when the good is sold at a price less than the cost price, then the trader has made a ***loss.***

S.P means selling price, C.P means cost price.

***Profit = SP – CP %P = P/CP \* 100 LOSS = CP –SP %L = L/CP \*100***

Example 1: a man buys a pair of shoe for Ħ3000 and sold it for Ħ3300. Find the percentage profit.

Solution:

SP = Ħ3300, CP = Ħ3000,

P = SP – CP = Ħ3300 – Ħ3000 = 300

%P = P/CP \* 100 = 300/3000 \* 100 = 30000/3000

= 10%

Example 2: a market woman bought 50 oranges at a total cost of Ħ2000. She sold each one at Ħ45. Find the percentage profit?

Solution:

CP = Ħ2000, SP = Ħ 45\* 500 = Ħ2250,

P = SP – CP = Ħ2250 – Ħ2000 = Ħ250

SP = P/CP \* 100 = 250/2000 \* 100 = 25000/2000 = 12.5%

Ezample 3: A dealer bought an item for Ħ6000 after three months he sold it at a price of Ħ55000. What is the percentage loss?

Solution:

CP = Ħ60000, SP = 55000,

LOSS = CP – SP = Ħ60000 – Ħ55000 = Ħ5000

%LOSS = L/CP \* 100 = 5000/60000 \* 100 = 500000/60000

= 8.3%

Example 3:A dealer bought an article for Ħ65000. Find the price he will sell it in order to make a profit of 20%

Solution :

CP = Ħ65000, SP = ?, %P =20%

STEP 1: Find the % of the cost price

P = 20/100 \* 65000 = 130000/100 = 13000

**P = SP – CP = Ħ 13 000 = SP – CP = SP = Ħ 65000 + Ħ 13000 = Ħ 78000**

**SIMPLE INTEREST**

SI = P \* R \* T/100 where P principal, R = rate, T = time and SI = simple interest

Example 1: Mr Smith saves Ħ 70000 with a bank for 3 years at the rate of 5%.

(a). calculate the interest he will receive at the end of the years

(b). calculate the simple interest for 7 years

(c). what is the total amount he will save at the end of 5 years?

Solution:

P = Ħ 7000, R = 5%, T = 3

(a). S I = P \* R \* T/100 = 7000 \* 5 \* 3/100 – 700 \* 15 = Ħ 10000

(b). S I = Ħ70000 \* 5 \* 7/100 = Ħ 700 \* 35 = Ħ 24 500

(C). Ħ70000 \* 5 \* 5/100 = 700 \* Ħ 17500

Amount = P + S I = Ħ 70000 + 17500 = Ħ 87500

**COMMISSION AND DISCOUNT**

**Commission** is simply a payment received for selling a good.

Example 1: An insurance company pays an agent a basis salary of Ħ5000 per month plus a commission of 15% of all the sales above Ħ100000. Calculate his gross earning in a month if he sells good to the value of Ħ1 200,000.

Solution:

Basis salary = Ħ15000, commission = 15% 0f Ħ100000

But he sold 1200000, therefore Ħ 1200000 - Ħ100000 = Ħ1100000

15% of 1100000 = Ħ165000

Basic salary + commission = Ħ5000 + Ħ165000 = Ħ180000

**DISCOUNT** is the amount of money taken of a price of a good in order to promote the sale.

Example: Mr adeoye, a regular customer is given a discount of 12% on an item that cost Ħ84500. How much does he pay?

Solution:

The item cost Ħ84500,12% of 584500

12% of 84500 – Ħ10140

He pays Ħ84500 – Ħ10140 = Ħ74360.

Example 2: A car company advertises a discount of 12.5% of all their vehicles. How much would it cost to purchase.

(a). a Toyota car priced at Ħ650000

(b). a Volvo car priced at Ħ450000

(c). a Peugeot car priced at Ħ360000

Solution:

(a). Toyota car = 12.5% of Ħ650000 = Ħ81250

Therefore Ħ650000 – Ħ81250 = Ħ568750

(b). Volvo car = 12.5% of Ħ450000 = Ħ56250

Therefore Ħ450000 – Ħ56250 = Ħ393750

(c).Peugeot car = Ħ12.5% of Ħ360000 = Ħ313500

Ħ360000 – Ħ46500 = Ħ313500

**ASSESEMENT: ESSENTIAL MATHEMATICS BOOK FOR JSS 2**

**EXERCISE 6.7 NO 2(A, B, C), 3, 8, 12 AND 14. PAGE 76**

**EXERCISE 6.8 NO 6, 14, 16 & 19. PAGE 75**

**EXERCISE 6.10 NO 3, 4 AND 5. PAGE 77**

**WEEK 6 APPROXIMATION AND ESTIMATION (SIGNIFCANT AND DECIMAL PLACES)**

***SIGNIFICANT: TO ROUNDOFF A NUMBER CHANGE 0,1,2,3,4 TO 0 WHILE 5,6,7,8,9 TO 1 AND ADD IT TO THE NEXT NUMBER***

Example 1: round off 492.763 to (a) 3 s.f (b) 3 s.f (c) 2 d.p (d) 4 d.p

Solution:

(a). 492.763 = 49 (since the third number is 2 it has change to zero)

(b). 492.763 = 493 (the 2 as change to 3 because 7 as change to 1 and been added to 2 to become 3)

(c).492.763 = 492.76 (in decimal point we count after the point).

(d). 492.763 = 492.7630(since the number is not upto 4d.p we add zero to it.)

Example 2: calculate the following and round your answer to the given degree of a accuracy

(a). 576.175 + 20.82 (2 d.p)

(b). 8.52 x 0.0651 (3 s.f)

Solution:

(a). 576.173 + 20.82 = 596.99

596.99 = 596.99 (2 d.p)

(b). 8.52 \* 0.0651 = 0.554652

0.554652 = 0.555(3s.f)

**ASSESEMENT:** **ESSENTIAL MATHEMATICS BOOK FOR JSS 2**

**EXERCISE 7.1 NO 9 (A – K). PAGE 85**

**EXERCISE 7.3 NO 1 (A-- R). PAGE 86**

WEEK 7 MID TERM EXAMINATION

**WEEK 8 MULTIPLICATION AND DIVISION OF DIRECTED NUMBERS**

**Revision on addition and subtraction of directed numbers**

**Note that:**

**(a). + + = + OR - - = + (Replacing the same signs that apprear together by a positive sign**

**(b). + - = - OR - + = - (Replacing two different signs that appear together by a negative sign**

Example 1: Find the values of the following:

(a). + 7 + (+8) (b) +13 – (+6)

Solution:

(a). + 7 + (+8) = 7 + 8 = 15

(b). + 13 – (+6) = 13 – 6 = 7

Example 2 : Calculate the following (a) 25 – (+3) (b) 12 – (-9)

Solution

(a). 25 - (+3) = 25 – 3 = 22

(b). 12 - (-9) = 12 + 9 = 21

**MULTIPLICATION OF DIRECTED NUMBERS**

**RULES:**

1. **+ \* - = - OR - \* + = - (If different signs are multiplied the answer is NEGATIVE).**
2. **+ \* + = + OR - \* - = + ( If the same signs are multiplied the answer is positive).**

Example1: Simplify the following (a) (+12) \* (+5) (b) (-3) \* (-8)

Solution:

(a). 12 \* 5 = 60

(b). -3 \* -8 = + 24

Example 2: Find the values of the following (a) -4 \* -2 \* -2 \* -2 \* -2 (b) 7 \* (-3) \* (-1) \* (-1) \* 20

Solution:

( a). -4 \* -2 \* -2 \* -2 \* -2 = - 64 ( rules, we have equal signs to give positive while different sign gives negative)

(b). 7 \* (-3) \* (-1) \* (-1) \* 20 = 7\*-3 = -21 \*-1 \* -1 = -21\*20 = - 420

**DIVISION OF DIRECTED NUMBERS**

RULES:

+ ÷ + = + OR - ÷ - = + ( If the sign are divided the answer is positive)

+ ÷ + = - OR - ÷ + = =- (Ie the sign are different theanswer is negative).

Eample 1: work out the following (a) (+80) ÷ (-10) (b) (-25) ÷ (-5)

Solution:

1. (+80) ÷ (-10) = - 8 (because the signs are different)
2. (-25) ÷ (-5) = + 5(because the signs are the same)

**DO THESE:**

**Simplify the following**

**(b) (-25) ÷ (-5)**

**(a). 3 x 5 x 2 x 15 (-9) (b). -8 x (-11) x 9 x (-5)**

**-5 x 25 x 3 2 x (-33) x (-3)**

**ASSESEMENT: ESSENTIAL BOOK FOR JSS 2**

**EXERCISE 10.3 N0 1, 2, 3 (ATO E). PAGE121 TO 123**

**WEEK 9 ALGEBRAIC EXPRESSION**

To expand algebraic expression, those expression will have to be in bracket. When the bracket ever moved, then any factor outside the bracket must be multiplied by each term inside bracket.

Example 1: Expand d(a + c)

Solution: d \* a + d \* c = da + dc

Example 2: Expand (y + 3)( y + 4)

Solution:

= Y \* Y + Y \* 4 + 3 \* Y + 3 \* 4

= Y2 + 4y + 3y + 12

FACTORIZATION OF SIMPLE ALGEBRAIC EXPRESSION

Factorization is the reverse of expanding brackets. The first step in factorization is to take any commom factor which the term are:

Example 1 :Factorise 3X2 + X

Solution:

X is common to the expression

Therefore = X(3X + 1)

Example 2: Factorize 6y3 – 4y2 – 4y

Solution:

2y is common in the expression

Therefore 2y(3y2 -2y -2

**ALGERAIC EXPRESSION WITH FRACTIONS**

Example 1: Solve X/3 + X- 2/5 = 6

Solution:

Find the L C M = 15

5x + 3X – 6 /15 = 6

Cross multiply

= 5X + 3X – 6 = 6\*15

8X – 6 = 90

Add 6 to both sides = 8X – 6 + 6 = 90 + 6

8X = 96 (Divide both sides by 8)

X = 12.

**FINDING LOWEST COMMON FACTOR AND HIGHEST COMMON FACTOR IN ALGEBRAIC FORM**

Example 1: Find the L C M of 4xy,8xv and 10x2y

Solution:

2 4xy 8xy 10x2y

2 2xy 4xy 5x2y

2 xy 2xy 5x2y

5 xy xy x2y

X xy x y x2y

X y y xy

Y y y y

1 1 1

L C M = 2 \* 2 \* 2 \* 2 \* 5 \* X \* X \* Y = 40X2Y

Example 2: find the H C F of 4xy, 8xy and 10x2y

Solution;

4xy = 2 \* 2 \* x \* y

8xy = 2 \* 2 \* 2 \* x \* y

10x2y = 2 \* 5 \* x \* x \* y

H C F = 2 \* X \* Y = 2XY

**ASSESEMENT: ESSENTIAL BOOK FOR JSS 2**

**EXERCISE 11.4 NO 25 – 35. PAGE 138.**

**EXERCISE 11.8 NO 2 (F, G & H), NO 4(E&F), NO 11(A, B, C & D). PAGE 143**

**WEEK10 ALGERAIC FRACTIONS**

To add or subtract fractions with different denominators, first change them to equivalent fractions. This is done by finding the L C M of the denominators

**Example1**: Simplify 2a/5 + 4a/3

**Solution:**

The L C M is 15

6a + 20a/ 15 = 26a/15

**Example 2**: Simplify 3/5x + 1/2x – 1/4x

**Solution:**

Find the L C M of the expression = 20X

12 + 10 – 5 = 17/20X

SIMPLIFYING FRACTION

**Example 1**: Reduce 25X4Y3/35X3y3

**solution**

Divide through by 5X3Y3(the common factor )

= 5x/7

Example 2: Reduce 8X3Y2/6X3Z

Solution:

Divide through by 2X 3(the common factor)

4Y2/3Z

**MULTIPLICATION AND DIVISION OF ALGEBRAIC FRACTION**

Example 1: Simplfy (X-2)/7 \* 4/(X-2)

Solution : X – 2/7 \* 4/ X -2 (X-2) divides themselves

= 4/7

Example 2: Simplify 6X2/11y ÷ 18X/33Y2

Solution

6X2/11y \* 33Y2/18X (division sign change to multiplication)

= XY

**FRACTIONS WITH BRACKETS**

Example1: simplify the following (a) 2x + 5/4 + 2X – 3 /4 (b) 7X – 2 /4 + X – 4 /6

Solution:

(a). The L C M is 4

(2X + 5) + ( 2X – 3)/4

4x + 2/4 = 2(2X + 1)/4

= 2X + 1/2

(b). 7X – 2 /4 + X – 4 /6

Solution:

The L C M = 12

21x – 6 + 2X – 6 – 8 / 12

= 23X – 14/ 12

**ASSESEMENT: ESSENTIAL BOOK FOR JSS 2**

**EXERCISE 12.4 NO 7, 13, 19 & 20. PAGE 149**

**EXERCISE 12.6 NO 1, 2, 3 & 4. PAGE 151**