JSS2 Mathematics Lesson Note (First Term) [year]

MATHEMATICS

SCHEME OF WORKS FOR FIRST TERM

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

- Factors of 18 are 1, 2, 3, 6, 9, and 18
- The even numbers are 2, 6, and 18
- 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:

$56 = 2 \times 2 \times 2 \times 7 = 2^3 \times 7$

$108 = 2 \times 2 \times 3 \times 3 \times 3 = 2^2 \times 3^3$

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 = N^2

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 ₦3000 and sold it for ₦3300. Find the percentage profit.

Solution:

SP = ₦3300, CP = ₦3000,

P = SP – CP = ₦3300 – ₦3000 = 300

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

= 10%

Example 2: a market woman bought 50 oranges at a total cost of ₦2000. She sold each one at ₦45. Find the percentage profit?

Solution:

CP = ₦2000, SP = ₦ 45* 500 = ₦2250,

P = SP – CP = ₦2250 – ₦2000 = ₦250

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

Ezample 3: A dealer bought an item for ₦6000 after three months he sold it at a price of ₦55000. What is the percentage loss?

Solution:

CP = ₦60000, SP = 55000,

LOSS = CP – SP = ₦60000 – ₦55000 = ₦5000

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

= 8.3%

Example 3:A dealer bought an article for ₦65000. Find the price he will sell it in order to make a profit of 20%

Solution :

CP = ₦65000, SP = ?, %P =20%

STEP 1: Find the % of the cost price

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

P = SP – CP = ₦ 13 000 = SP – CP = SP = ₦ 65000 + ₦ 13000 = ₦ 78000

SIMPLE INTEREST

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

Example 1: Mr Smith saves ₦ 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 = ₦ 7000, R = 5%, T = 3

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

(b). S I = ₦70000 * 5 * 7/100 = ₦ 700 * 35 = ₦ 24 500

(C). ₦70000 * 5 * 5/100 = 700 * ₦ 17500

Amount = P + S I = ₦ 70000 + 17500 = ₦ 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 ₦5000 per month plus a commission of 15% of all the sales above ₦100000. Calculate his gross earning in a month if he sells good to the value of ₦1 200,000.

Solution:

Basis salary = ₦15000, commission = 15% 0f ₦100000

But he sold 1200000, therefore ₦ 1200000 - ₦100000 = ₦1100000

15% of 1100000 = ₦165000

Basic salary + commission = ₦5000 + ₦165000 = ₦180000

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 ₦84500. How much does he pay?

Solution:

The item cost ₦84500,12% of 584500

12% of 84500 – ₦10140

He pays ₦84500 – ₦10140 = ₦74360.

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 ₦650000

(b). a Volvo car priced at ₦450000

(c). a Peugeot car priced at ₦360000

Solution:

(a). Toyota car = 12.5% of ₦650000 = ₦81250

Therefore ₦650000 – ₦81250 = ₦568750

(b). Volvo car = 12.5% of ₦450000 = ₦56250

Therefore ₦450000 – ₦56250 = ₦393750

(c).Peugeot car = ₦12.5% of ₦360000 = ₦313500

₦360000 – ₦46500 = ₦313500

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:

- **+ * - = - OR - * + = - (If different signs are multiplied the answer is NEGATIVE).**
- **+ * + = + 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:

- (+80) ÷ (-10) = - 8 (because the signs are different)
- (-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

= Y^2 + 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 3^{X2} + X

Solution:

X is common to the expression

Therefore = X(3X + 1)

Example 2: Factorize $6y^3 – 4y^2 – 4y$

Solution:

2y is common in the expression

Therefore 2y($3y^2$ -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 $10x^2y$

Solution:

2	4xy	8xy	$10x^2y$
2	2xy	4xy	$5x^2y$
2	xy	2xy	$5x^2y$
5	xy	xy	x^2y
X	xy	x y	x^2y
X	y	y	xy
Y	y	y	y
1	1	1	

L C M = 2 * 2 * 2 * 2 * 5 * X * X * Y = $40X^2Y$

Example 2: find the H C F of 4xy, 8xy and $10x^2y$

Solution;

4xy = 2 * 2 * x * y

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

$10x^2y$ = 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 $25X^4Y^3/35X^3y^3$

solution

Divide through by $5X^3Y^3$(the common factor)

= 5x/7

Example 2: Reduce $8X^3Y^2/6X^3Z$

Solution:

Divide through by $2X^3$(the common factor)

$4Y^2/3Z$

<u>MULTIPLICATION AND DIVISION OF ALGEBRAIC FRACTION</u>

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 $6X^2/11y \div 18X/33Y^2$

Solution

$6X^2/11y * 33Y^2/18X$ (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