LESSON ONE WEEK FOUR

TOPIC: FRACTIONS
SUB TOPIC: USE OF BODMAS TO SIMPLIFY MIXED FRACTION

CONTENT: Combined operations
Brackets
Of
Division
Multiplication
Addition
Subtraction

Examples:
1. Simplify

$$\frac{2}{3} \text{ of } \frac{3}{4} - \frac{1}{3}$$

$$\frac{\cancel{2}^{1}}{\cancel{3}_{1}} \times \frac{\cancel{3}^{1}}{\cancel{4}_{2}} - \frac{1}{3}$$

$$\frac{1}{2} - \frac{1}{3}$$

$$\frac{3 - 2}{6}$$

$$= \mathbf{\frac{1}{6}}$$

2. $\quad \frac{5}{6} - \frac{3}{4} \div 1\frac{1}{2}$

$$\frac{5}{6} - \frac{3}{4} \div \frac{3}{2}$$

$$\frac{5}{6} - \frac{\cancel{3}^{1}}{\cancel{4}_{2}} \times \frac{\cancel{2}^{1}}{\cancel{3}_{1}}$$

$$\frac{5}{6} - \frac{1}{2} = \frac{5 - 3}{6}$$

$$= \frac{\cancel{2}}{\cancel{6}} = \mathbf{\frac{1}{3}}$$

ACTIVITY.
Workout the following

1. $\frac{1}{2} \times \frac{1}{4} + \frac{1}{3}$

2. $\frac{4}{7} \text{ of } \frac{1}{2} + \frac{4}{9}$

3. $\frac{9}{5} + \frac{1}{3} - \frac{1}{2} \times \frac{3}{5}$

4. $\frac{2}{5} - \frac{1}{4} + \frac{6}{9}$

5. $\quad \frac{4}{10} - \frac{1}{2} + \frac{1}{2}$

LESSON TWO
SUB TOPIC: CHANGING FRACTIONS TO DECIMALS

Examples:
Changing the following fractions to decimals:

1. $\dfrac{5}{8}$ =

$$8\overline{\smash{\big)}5.000}\ \ 0.625$$

```
        0.625
  8 √ 5
      - 0
       50
      -48
        20
       -16
         40-
        -40
         00
```

∴ **$\dfrac{5}{8}$ = 0.625**

2. $\dfrac{1}{3}$ =

```
        0.3333
  3 √ 1
      - 0
       10
      - 9
        10
        -9
         10
        - 9
          1
```

∴ **$\dfrac{1}{3}$ = 0.333....**

ACTIVITY:
Change the following fractions to decimals.

1. $^1/_4$

2. $^1/_8$

3. $^3/_4$

4. $^2/_3$

5. $^2/_9$

6. $^4/_6$

LESSON THREE
SUB TOPIC: CHANGING DECIMALS TO FRACTIONS
Examples:
Change the following decimals to common fractions

1. $0.25 = \dfrac{\cancel{25}\ \ 1}{\cancel{100}\ \ 4}$

   $0.25 = ¼$

2. $0.125 = \dfrac{\cancel{125}\ \ 1}{\cancel{1000}\ \ 8}$

   $0.125 = {}^1/_8$

Changing recurring decimals to rational numbers

Examples: Changing the following decimals to rational numbers:

1. 0.333......   - Represent the fraction with a letter.
    Let the fraction be y
        Y = 0.333......(i)   - This is equation one
    10 x y = 0.333... x 10   - Multiply both sides by 10 because one digit is repeated
     10y = 3.333... (ii)   - This is equation two

        10y = 3.333....   - Subtract equation one from equation two
        - y = 0.333...
         9y = 3

        ^{1}9y = $\frac{3}{9}$ ^{1} - Divide both sides by 9 and reduce the fraction by 3
        9 $_1$ 9 $_3$

        Y = $^1/_3$

2. 0.4545.....   - Represent the fraction with a letter.
    Let the fraction be m
        m = 0.4545..... (i)   - This is equation one
    100 x m = 0.4545... x 100   - Multiply both sides by 100 because two digits are
                                         repeated
     100m = 45.45...... (ii)   - This is equation two

    100m = 45.45...   - Subtract equation one from equation two
     - m =   0.4545...
     99m = 45

    $\frac{99m}{99}$ = $\frac{45}{99}$ - Divide both sides by 99 and reduce the fraction
                                         by 9

    m   = $^5/_{11}$

3. 0.1666.....   - Represent the fraction with a letter.

Let the fraction be a

$$a = 0.1666\ldots \text{ (i)}$$ - This is equation one

$$10 \times a = 0.1666\ldots \times 10$$ - Multiply both sides by 10 because one digit is repeated

$$10a = 1.666\ldots \text{(ii)}$$ - This is equation two

$$10a = 1.6666\ldots$$ - Subtract equation one from equation two
$$\underline{-a = -0.1666\ldots}$$
$$9a = 1.5$$
$$\frac{\cancel{9}a}{\cancel{9}} = \frac{1.5}{9}$$ - Change this expression and work out

$$a = {}^{15}/_{10} \div {}^{9}/_{1}$$

$$a = {}^{15}/_{10} \times {}^{1}/_{9}$$

$$a = \frac{15}{90}$$ - Reduce the fraction by 15

$$\mathbf{a = {}^{1}/_{6}}$$

ACTIVITY:
Change the following decimals to common fractions

1. 0.12   4. 0.666……
2. 0.25   5. 0.2121…..
3. 0.36   6. 0.1444…..

LESSON FOUR

SUB TOPIC: **APPLICATION OF FRACTIONS IN REAL LIFE SITUATION**

CONTENT: **Word problems**

Examples:

1. Tap A can fill the tank in 6 minutes and tap B can fill the same tank in 3 minutes. How long will both taps take to fill the tank if they are opened at the same time?

Method 1:
NOTE: **Taps A and B can fill these fractions in one minute**

Tap A	Tap B
$^1/_6$	$^1/_3$

Tap A and B **when combined** = $\dfrac{1}{6} + \dfrac{1}{3} = \dfrac{1 + 2}{6} = \dfrac{3}{6} = \dfrac{1}{2}$

This means, ½ tank = 1 minute

$$1 \text{ tank} = (1 \div {}^1/_2) \text{ minutes}$$
$$= 1 \times \dfrac{2}{1}$$
$$\textbf{= 2 minutes.}$$

Method 2:

$\underline{\text{Product of the time taken}}$
Sum of the time taken

$= \dfrac{\text{Tap A x tap B}}{\text{Tap A + tap B}}$

$= \dfrac{6 \times 3}{6 + 3}$

$= \dfrac{\cancel{18}^2}{\cancel{9}}$

$= \textbf{2 minutes}$

2. Tap A can fill the tank in 6 minutes and tap B can empty the same tank in 8 minutes. How long will it take to fill the tank if both taps are opened at the same time?

Method 1:
NOTE: Taps A and B can fill and empty these fractions in one minute respectively

Tap A	Tap B
$^1/_6$	$^1/_8$

Tap A and B **when combined** = $\dfrac{1}{6} - \dfrac{1}{8} = \dfrac{4 - 3}{24} = \dfrac{1}{24}$

This means, $^1/_{24}$ tank = 1 minute

$$1 \text{ tank} = (1 \div {}^1/_{24}) \text{ minutes}$$
$$= 1 \times \dfrac{24}{1}$$
$$\textbf{= 24 minutes.}$$

Method 2:

$$\frac{\text{Product of the time taken}}{\text{Difference of the time taken}}$$

$$= \frac{\text{Tap A x tap B}}{\text{Tap B - tap A}}$$

$$= \frac{6 \times 8}{8 - 6}$$

$$= \frac{\cancel{48}^{24}}{\cancel{2}}$$

$$= \textbf{24 minutes}$$

ACTIVITY:

1. Tap A can fill the tank in 8 minutes and tap B can fill the same tank in 6 minutes. How long will both taps take to fill the tank if they are opened at the same time?

2. Tap A can fill the tank in 9 minutes and tap B can fill the same tank in 3 minutes. How long will both taps take to fill the tank if they are opened at the same time?

3. Tap A can fill the tank in 6 minutes and tap B can fill the same tank in 4 minutes. How long will both taps take to fill the tank if they are opened at the same time?

4. Tap A can fill the tank in 5 minutes and tap B can empty the same tank in 10 minutes. How long will it take to fill the tank if both taps are opened at the same time?

5. Tap A can fill the tank in 4 minutes and tap B can empty the same tank in 6 minutes. How long will it take to fill the tank if both taps are opened at the same time?

6. Tap A can fill the tank in 8 minutes and tap B can empty the same tank in 10 minutes. How long will it take to fill the tank if both taps are opened at the same time?

LESSON FIVE

SUB TOPIC: **MORE APPLICATION OF FRACTIONS IN REAL LIFE**

SITUATION

CONTENT: **Word problems**

Examples:

1.   Twaha spent $^1/_3$ of his money on books and $^1/_6$ of the remainder on transport.

      (i)   What fraction of his money was left?

- Fraction spent on books $^1/_3$
- Remained fraction: $1 - {}^1/_3 = \dfrac{3}{3} - \dfrac{1}{3} = \dfrac{2}{3}$
- Fraction spent on transport: $\dfrac{1}{6}$ of $\dfrac{2}{3} = \dfrac{1}{6} \times \dfrac{2}{3}$ **reduce**

$$= \dfrac{1}{9}$$

Total fraction spent on transport and books: $\dfrac{1}{3} + \dfrac{1}{9}$

$$\dfrac{3 + 1}{9} = \dfrac{4}{9}$$

Remained fraction $= 1 - \dfrac{4}{9} = \dfrac{9}{9} - \dfrac{4}{9} = \dfrac{5}{9}$

      (ii)   If he was left with shs 15,000= how much did he have at first?

Let the total amount be y.

$\dfrac{5}{9}$ of y = sh. 15,000

$\dfrac{5}{9} \times y$ = sh. 15,000

$\dfrac{5y}{9}$ = sh. 15,000

$^1 9 \times \dfrac{5y}{9_1}$ = 15000 × 9

$\dfrac{^1 5y}{5_1} = \dfrac{\overset{3000}{\cancel{15000}} \times 9}{5_1}$

Y = 3,000 × 9

Y = shs 27,000=

∴ **He had sh 27,000 at first**

ACTIVITY:

1. In a class, $^3/_8$ of pupils eat matooke, $^4/_{15}$ of the remaining pupils eat posho and the rest of the pupils eat rice. If 55 pupils eat rice, how many pupils are in the class?

2. In a class of 48 pupils, ¾ like Maths, $^2/_3$ of the remainder like English and the rest like SST. How many pupils like SST?

3. Mrs. Okello used her salary as follows: $^2/_5$ on food, $^5/_9$ of the remainder on fees, and saved the rest. If she saved sh.240,000;

   (a) Find the fraction of her salary saved.
   (b) What is her salary?

4. Musana spent ½ of his money on books and $^1/_5$ of the remainder on transport.

   (a) What fraction of his money was left?
   (b) If he was left with sh.15,000, how much money did he have at first?