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P.4 MATHEMATICS SELF -STUDY LESSONS SET 2

TOPIC : FRACTIONS
SUB TOPIC : TYPES OF FRACTIONS

LEARNING OUTCOMES :
By the end of the lesson, you should be able to:

- Describe a different types of fractions
- Identify different the types of fractions
- Illustrate the types of fractions.

Introduction :

- Maria had an apple and cut into four parts in order to share it with her 3 friends.
- She gave away 3 parts and ate the remaining part of the apple she had.
- The small parts she obtained from the apple she had is what is termed as a **fraction.**

Fractions

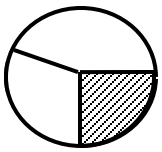
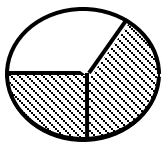
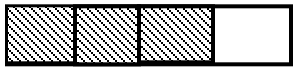
- A fraction is a part of a whole
- In a fraction like $^{3}/_{5}$,the upper number 3 is called the numerator and the lower number 5 is the denominator.

Types of fractions

a) **Proper fractions**

- A proper fraction is a fraction whose numerator is less than the denominator eg. $^{3}/_{4}$, $^{1}/_{3}$, $^{2}/_{3}$ etc.
- Proper fractions are also termed as simple fractions.

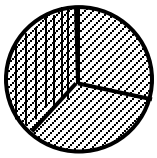
Examples

- $^{1}/_{3}$ = 
$^{2}/_{3}$ = 
$^{3}/_{4}$ = 

b) **Improper fraction** :

- An improper fraction is a fraction whose numerator is bigger than the denominator.
  e.g $\frac{4}{3}$, $\frac{3}{2}$, $\frac{7}{3}$, $\frac{9}{2}$ etc.

Example

$\frac{4}{3}$ = 

c**) Mixed numbers:**

Mixed numbers are numbers that have a whole and a proper fraction
e.g 1 $\frac{1}{2}$, 2 $\frac{1}{4}$, 3 $\frac{1}{3}$

- Mixed numbers – have a whole and a proper fraction e.g 1 $\frac{1}{2}$, 2 $\frac{1}{4}$,

1 $\frac{1}{2}$ =

Activity

1. Name any two types of fractions.
2. Write 3 examples of
   a. Proper fractions
   b. Improper fractions

3. Name the fractions below.
   a. $\frac{2}{5}$ b. $\frac{6}{5}$

4. Write proper or improper fraction besides each fraction
   a. $\frac{2}{3}$ b. $\frac{3}{4}$

   b. $\frac{1}{3}$ d. $\frac{4}{3}$

LESSON 2.

TOPIC : FRACTIONS
SUB TOPIC : CHANGING MIXED NUMBERS TO IMPROPER FRACTIONS

LEARNING OUTCOMES :
By the end of the lesson, you should be able to:

Subject :

- Changes mixed numbers to improper fractions.

Life skills

- Problem solving

Introduction

Mental work

1. 3 x 2 =
2. 4 x 3 =
3. 7 + 4 =
4. Name the type of fraction $\frac{2}{5}$
5. Find the product of 4 and 5

CONTENT

Converting mixed numbers to improper fractions

NOTE:

- To change mixed numbers to whole numbers, multiply the denominator by the whole number, add the numerator to the result and the divide by the denominator. ie,

$$\frac{(D \times W) + N}{D} =$$

W= Whole
D = Denominator
N = Numerator

Example 1

Change $3\frac{2}{5}$ to improper fraction

$3\frac{2}{5} = \frac{(D \times W) + N}{D}$

$= \frac{(3x5)+2}{5}$

$= \frac{15+2}{5}$

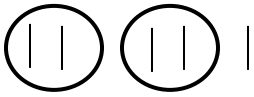
$= \frac{17}{5}$

Converting improper fractions to mixed numbers

Example II

Express $\frac{5}{2}$ as a mixed number.

Method 1

$\frac{5}{2}$ = 

= 2 r 1

= $2\frac{1}{2}$

Method 2

2 r 1

$\frac{5}{2}$ = 2 ⟌ 5

(2 x 2) = $\frac{4}{1}$

$\frac{5}{2} = 2\frac{1}{2}$

Note

- After dividing, the **quotient** is written as a whole number, the remainder is the numerator and the divisor is the denominator.
- Remember, quotient is the result got after dividing

Activity

1. Convert the following fractions to improper
   a. $3\frac{1}{5}$ b) $4\frac{1}{2}$ c) $9\frac{1}{4}$ d) $12\frac{1}{4}$

2. Change the following improper fractions to mixed numbers.

a. $\frac{4}{3}$ b) $\frac{9}{5}$ c) $\frac{13}{7}$ d) $\frac{21}{4}$

LESSON 3

TOPIC : FRACTIONS

SUB TOPIC : FINDING EQUIVALENT FRACTIONS

LEARNING OUTCOMES :

By the end of the lesson, you should be able to:

- Describes an equivalent fraction
- Identifies counting or natural numbers
- Finds equivalent fractions using counting numbers.

Life skills

- Critical thinking
- Effective communication

Introduction ;

- Let us review multiplication tables of table 3, 4, 5 and 6 in the mental work.

Mental work

-Let learners recite table 3, 4 and 6.

CONTENT :

Equivalent fractions

- Equivalent fractions are fractions which have the same value.
- Equivalent fractions are got by multiplying both the numerator and denominator by the same counting numbers beginning with 2, 3, 4, 5…… etc.
- Remember, counting numbers are numbers used In counting eg, 1, 2, 3, 4, 5…… etc.

- We don't multiply by the first counting number which is **one** because any number multiplied by one is that same number of which it's the given fraction.

- Remember the counting number is multiplied by the numerator and the

Example

1. Find the equivalent fractions for

a) $\frac{2}{3}$

$$\frac{2}{3} = \frac{2x2}{3x2} = \frac{2x3}{3x3} = \frac{2x4}{3x4}$$

$$\frac{2}{3} = \frac{4}{6} = \frac{6}{9} = \frac{8}{12}$$

Finding missing numbers in equivalent fractions

Note:

- When finding the missing numerator or denominator, list down the equivalent fractions and the compare the values which correspond with the given values.

Example

1. Find the missing number.

$$\frac{1}{2} = \frac{\square}{6}$$

$$\frac{1}{2} = \frac{1x2}{2x2} = \frac{1x3}{2x3} = \frac{1x4}{2x4} = \frac{1x5}{2x5}$$

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

$$\frac{1}{2} = \frac{\boxed{3}}{6}$$

Activity

1. Find the next three equivalent fractions for the following fractions:-
   a. $\frac{2}{5}$ b. $\frac{1}{4}$ c. $\frac{2}{7}$

2. Find the missing numbers in the following;
   a. $\frac{2}{3} = \frac{\square}{15}$ b) $\frac{1}{4} = \frac{\square}{12}$

3. Fill in the missing numbers
   a. $\frac{3}{4} = \frac{15}{\square}$ b) $\frac{5}{12} = \frac{15}{\square}$

LESSON 4

SUB TOPIC : REDUCING FRACTIONS

LEARNING OUTCOMES :

By the end of the lesson, you should be able to:

- Reduces fractions to the their lowest terms

Life skills

- Critical thinking
- Co-operation.

Introduction

- Review the concept of finding factors of numbers through mental work.

Mental work.

1. List all factors of 6
2. List down all factors of 12.
3. Divide: 18 ÷ 3
4. List the first 3 equivalent fractions of $\frac{2}{3}$
5. List down all factors of 18.

CONTENT :

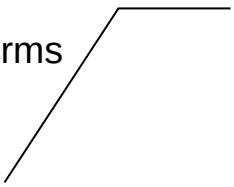
Reducing fractions

- This refers to finding a lowest equivalent fraction by dividing the numerator and denominator with the same common factor.
- You can use any common factor or the greatest common factor (G. C. F) of the two numbers.

Examples

1. Reduce $\frac{5}{10}$ to its lowest terms

$$\frac{5}{10} = \frac{5 \div 5}{10 \div 5} = \frac{1}{2}$$



5 is a common factor of 5 and 10 and that's why we are dividing it through the denominator and numerator.

2. Reduce $\frac{9}{15}$ to its simplest form.

Solution

$$\frac{9}{15} = \frac{9 \div 3}{15 \div 3} = \frac{3}{5}$$

Activity

Reduce the following fractions to their lowest terms.

a) $\frac{9}{15}$ b) $\frac{3}{6}$ c) $\frac{2}{10}$ d) $\frac{5}{20}$

Find the next three equivalent fractions of

a) $\frac{1}{5}$ b) $\frac{2}{3}$ c) $\frac{4}{7}$

LESSON 5

SUB TOPIC : ARRANGING FRACTIONS

LEARNING OUTCOMES :

By the end of the lesson, you should be able to:

- Explain the meaning of ascending and descending.
- Identifies similar words to mean ascending and descending order.
- Lists the equivalent fractions
- Compare values of fraction
- Arrange fractions in the required order.

Introduction :

- Focus remains on multiplication tables (recite table 4, 5, 6 and 7)since it still guides the work you are going to learn in this lesson.

Mental work

1. List the first 4 equivalent fractions of $\frac{1}{8}$.
2. List the first 7 multiples of 6.
3. Set P = {multiples of 5 less than 30}. Find n(P)
4. List the first 12 multiples of 3.
5. Set Q = {counting numbers less than 10}. List down all members of set Q.

CONTENT :

Arranging fractions in order .

- Fractions can be arranged in two forms basing on their value ie, ascending and descending order.
- Ascending order means arranging from the **smallest to the biggest**. It is also known as increasing order.
- Descending order means arranging from **the largest to the smallest**. It is also known as a decreasing order.

Example:-

1. Arrange $\frac{1}{8}$, $\frac{1}{4}$ and $\frac{1}{5}$ in an ascending order.

Steps.

- List the equivalent fractions of the given fractions.
- Compare and identify equivalent fractions that have the same denominator.
- Since they share the same denominators, compare the numerator to guide you on the value and position of the lowest given equivalent fraction.

Solution

$\frac{1}{8} = \frac{2}{16} = \frac{3}{24} = \frac{4}{32} = \frac{5}{40} = \frac{6}{48} = \frac{7}{56}$

$\frac{1}{4} = \frac{2}{8} = \frac{3}{12} = \frac{4}{16} = \frac{5}{20} = \frac{6}{24} = \frac{7}{28} = \frac{8}{32} = \frac{9}{36} = \frac{10}{40}$

$\frac{1}{5} = \frac{2}{10} = \frac{3}{15} = \frac{4}{20} = \frac{5}{25} = \frac{6}{30} = \frac{7}{35} = \frac{8}{40}$

$\therefore$ **Order from the smallest is** $\frac{1}{8}$, $\frac{1}{5}$, $\frac{1}{4}$

Activity

1. Arrange the following in an increasing order.

i) $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{3}$

ii) $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{7}$

iii) $\frac{1}{3}$, $\frac{1}{8}$, $\frac{1}{5}$

iv) $\frac{1}{10}$, $\frac{1}{5}$, $\frac{1}{2}$

2. Arrange the following fractions in a decreasing order.

v) $\frac{1}{7}, \frac{1}{9}, \frac{1}{2}$

vi) $\frac{1}{3}, \frac{1}{8}, \frac{1}{4}$

vii) $\frac{1}{4}, \frac{1}{6}, \frac{1}{3}$

viii) $\frac{1}{3}, \frac{1}{9}, \frac{1}{12}$

LESSON 6

SUB TOPIC : COMPARING FRACTIONS

LEARNING OUTCOMES :

By the end of the lesson, you should be able to:

- Explain the meaning of ascending and descending order.
- Compares values of fractions.
- Uses correct symbols to compare values of fractions.

Life skills

- Critical thinking
- Co-operation
- Responsibility

Introduction

- In this lesson, you will still need to review multiplication tables.
- Recite table 2,3 ,4 ,5 and 6.

CONTENT :

Comparing fractions

- Fractions are compared using the following signs.

- **>** is greater than
- **<** is less than
- **=** equal to

- When using **<** or **>** consider them as your mouth in that it will open to eat the bigger fraction as illustrated below.

Example:-

Compare $\frac{1}{2}$ and $\frac{1}{3}$ using **>** , **<** or **=** .

Steps

- List the equivalent fractions of the given fractions.
- Compare the equivalent fractions and identify fractions with the same denominator
- Study the fractions identified and compare the numerators in order to determine the bigger or smaller value.
- For any case using < or >, let the symbol used open up to eat the bigger fraction.

Solution: $\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8}$

$\frac{1}{3} = \frac{2}{6} = \frac{3}{9} = \frac{4}{12}$

$\therefore \frac{1}{2} \quad \frac{1}{3} = \frac{3}{6} \quad \frac{2}{6}$

$= \frac{1}{2} > \frac{1}{3}$

- In order to list equivalent fractions easily, list the multiples of the numerator and denominator of the given fraction

Activity

1. Compare the following fractions using >, < or =

i) $\frac{1}{3} \text{—} \frac{1}{4}$ ii) $\frac{5}{6} \text{—} \frac{5}{8}$ iii) $\frac{1}{2} \text{—} \frac{1}{3}$

iv) $\frac{1}{2} \text{—} \frac{2}{12}$ v) $\frac{3}{4} \text{—} \frac{5}{6}$ vi) $\frac{1}{2} \text{—} \frac{4}{8}$

vii) $\frac{3}{12} \text{—} \frac{1}{4}$ viii) $\frac{2}{3} \text{—} \frac{1}{5}$ ix) $\frac{7}{8} \text{—} \frac{7}{9}$

x) $\frac{9}{11} \text{—} \frac{11}{22}$

2. Which fraction is bigger

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

LESSON 7

TOPIC : FRACTIONS
SUB TOPIC : ADDITION OF FRACTIONS WITH THE SAME DENOMINATOR
COMPETENCES : BY THE END OF THE LESSON, THE LEARNER SHOULD be able to:

- Explains the meaning of denominator and numerator.
- Adds fractions with the same denominator.

Life skills

- Creative thinking
- Responsibility

Introduction :

- Recite tables 2, 3, 4, 5 ,6, and 7

CONTENT

Note:

- When adding fractions with the same denominators, add the numerators and maintain only one denominator.

Examples
Work out the following:-

1. Add : $\frac{1}{4} + \frac{2}{4}$

   Solution

   $\frac{1}{4} + \frac{2}{4} = \frac{1+2}{4}$

   $= \frac{3}{4}$

2. Work out: $1\frac{1}{3} + 4\frac{1}{3}$

- When given mixed numbers, add whole numbers separately from fractions but later present the answer as a whole/one.

Solution

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

$= 5 + \frac{1+1}{3}$

$= 5 + \frac{2}{3}$

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

Activity

Workout the following g:-

i) $3\frac{1}{2} + 2\frac{1}{2}$

ii) $4\frac{1}{3} + 3\frac{1}{3}$

iii) $5\frac{1}{4} + 4\frac{2}{4}$

iv) $1\frac{1}{5} + 3\frac{2}{5}$

v) $4\frac{1}{5} + 3\frac{2}{5}$

vi) $5\frac{1}{3} + 1\frac{1}{3}$

vii) $\frac{1}{2} + \frac{1}{2}$

viii) $\frac{1}{4} + \frac{2}{4}$

ix) $\frac{5}{10} + \frac{1}{10}$

x) $\frac{1}{5} + \frac{1}{5}$

LESSON 8

SUB TOPIC : Subtraction of fractions

COMPETENCES : By the end of the lesson, the learner should:

- Subtract fractions with the same denominator.

Life skills

- Creative thinking
- Critical thinking

Introduction :

- Let us do this mental work first.

Mental work.

1. Work out : $\frac{1}{4} + \frac{2}{4}$
2. List the first 3 equivalent fractions of $\frac{2}{4}$
3. Circle the larger fraction between $\frac{1}{4}$ and $\frac{2}{4}$
4. List down the first 4 multiples of 6.
5. Reduce $\frac{2}{4}$ to its lowest terms .

CONTENT :

Note **;**

-
- When subtracting fractions with the same denominators, subtract the numerators and maintain only one denominator.

Work out the following:-

1. Subtract : $\frac{7}{12} - \frac{1}{12} = \frac{7-1}{12}$

   $= \frac{6}{12} \div \frac{6}{6}$

   $= \frac{1}{2}$

2. Workout . $6\frac{2}{4} - 2\frac{1}{4}$

   Note

- With subtraction, subtract the whole numbers separately from the factions. However you need to add the result to the difference of fractions.
- Remember, difference is the result you get after subtraction.

$6\frac{2}{4} - 2\frac{1}{4} = (6 - 2) + \frac{2}{4} - \frac{1}{4}$

$= 4 + \frac{2-1}{4}$

$= 4 + \frac{1}{4}$

$= 4\ \frac{1}{4}$

Activity

Subtract the following

i) $\frac{2}{4} - \frac{1}{4}$ ii) $\frac{5}{7} - \frac{2}{7}$ iii) $\frac{5}{10} - \frac{3}{10}$

iv) $\frac{6}{10} - \frac{3}{10}$ v) $\frac{9}{11} - \frac{3}{11}$ vi) $\frac{6}{7} - \frac{1}{7}$

vii) $\frac{11}{12} - \frac{3}{12}$ viii) $\frac{6}{14} - \frac{2}{14}$ ix) $4\frac{2}{5} - 1\frac{1}{5}$

x) $5\frac{3}{7} - 3\frac{1}{7}$ xi) $6\frac{3}{7} - 3\frac{1}{9}$ xii) $8\frac{5}{6} - 1\frac{4}{6}$

LESSON 9.

TOPIC ; FRACTIONS

SUB TOPIC : Addition and subtraction of fractions with the different denominators

COMPETENCES : By the end of the lesson, the learner should be able to,

- Add and subtract fractions with different denominators.

Life skills

- Problem solving
- responsibility

Introduction :

- Recite table 5, 6, 7 and 8.
- Multiples of numbers are important in this lesson to help you find equivalent fractions.

CONTENT :

steps;

- Find the equivalent fractions of the given fractions
- Identify the equivalent fractions that have the same denominators
- Add or subtract the two identified fractions.
- When you get an improper fraction, remember to change it to a mixed number.
- Reduce to the lowest terms incase the result you get has common factors.

Examples

Work out the following:-

1. Add : $\frac{1}{2} + \frac{2}{3}$

$\frac{1}{2} = \frac{2}{4} = \frac{3}{6} = \frac{4}{8} = \frac{5}{10} = \frac{6}{12}$

$\frac{2}{3} = \frac{4}{6} = \frac{6}{9} = \frac{8}{12} = \frac{10}{15}$

$\frac{1}{2} + \frac{2}{3} = \frac{3}{6} + \frac{4}{6}$

$= \frac{3+4}{6}$

$= \frac{7}{6}$

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

-Identify the equivalent fractions with the same denominator and add or subtract them.

-Remember, for similar denominators, add or subtract the numerators and maintain the denominator.

-Change to mixed number if you get an improper fraction and reduce if a common fraction has

2. work out ; $\frac{3}{4} - \frac{2}{3}$

1. $\frac{3}{4} = \frac{6}{8} = \frac{9}{12} = \frac{12}{16}$

$\frac{2}{3} = \frac{4}{6} = \frac{6}{9} = \frac{8}{12} = \frac{10}{15}$

$\frac{3}{4} - \frac{2}{3} = \frac{9}{12} - \frac{8}{12}$

$= \frac{9-8}{12}$

$= \frac{1}{12}$

Activity :

Work out the following

i) $\frac{1}{2} + \frac{2}{5}$ ii) $3\frac{1}{3} + 2\frac{1}{2}$ iii) $4\frac{1}{4} + 1\frac{1}{5}$

iv) $4\frac{1}{3} + 1\frac{3}{4}$ v) $\frac{1}{2} - \frac{1}{4}$ vi) $\frac{2}{3} - \frac{1}{4}$

Application of fractions

1. James dug $\frac{1}{3}$ of the garden on Monday and $\frac{1}{3}$ of it on Tuesday. What fraction of the garden die he dig in the two days?

2. A cup is $\frac{2}{5}$ full of water. John added $\frac{1}{5}$ of the water to the cup. What fraction of the water is in the cup?

3. Kapere had $\frac{3}{7}$ of a mango. His mother gave him more $\frac{2}{7}$ of the mango. What fraction of the mango does he have?

4. Ojok had $\frac{5}{8}$ of the eggs. If $\frac{2}{8}$ of them got spoilt, what fraction of the eggs are good?

5. A tank was full of water and Amooti used $\frac{5}{12}$ of the water to take water her crops. What fraction of the water remained in the tank?

6. A teacher had an orange she gave a $\frac{1}{3}$ of the orange to Opio. What fraction of the orange did she remain with?

LESSON 10.

TOPIC ; FRACTIONS

SUB TOPIC : Expressing common fractions as decimals

COMPETENCES : By the end of the lesson,

- Reads, spells, pronounces and describes new words such as Decimals / decimal places / decimal point/ common fractions.
- Describes a decimal fraction and decimal places.
- Works out problems on conversion of decimal fractions to common fractions.

Life skills

- Problem solving
- Responsibility

CONTENT :

Changing common fraction to decimal fractions

Note;

A common fraction is a fraction with a numerator and a denominator eg, $\frac{3}{4}$, $\frac{2}{3}$, $\frac{9}{12}$, $\frac{8}{10}$ etc

- A decimal fraction is a fraction with a decimal point eg, 0.4, 0.34, 5.6 etc
- Both proper and improper fractions are common fractions.
- Changing common fractions to decimal fraction depends on the nature of the denominator.

Express the following as decimals.

Steps;

- You need to take note of the zeros the denominator has.
- The number of zeros will determine the number of places the decimal point moves. Eg, if the common fraction has a denominator as 10, the decimal point will move one place towards the left.
- Incase of a mixed number, change it to an improper fraction and then move the decimal point towards the left depending on the number of zeros.

Examples

i) $\frac{3}{10}$ = 0.3

2. 0

ii) $\frac{24}{100}$ = 0.24

iii) $2\frac{4}{10}$ = 2 + $\frac{4}{10}$

= 2 + 0.4 0. 4

= 2. 4

Note

- All whole numbers have a decimal point after there ones
- The jumps shown indicate the number of places the decimal point moves.
- The number of zeros on the denominator will determine the number of places the decimal point will move towards the left.

Activity change the following to decimals

i) $\frac{3}{10}$ ii) $\frac{4}{10}$ iii) $\frac{5}{10}$ iv) $\frac{6}{10}$ v) $\frac{9}{10}$

vi) $\frac{14}{100}$ vii) $\frac{26}{100}$ viii) $\frac{64}{100}$ ix) $\frac{32}{100}$ x) $\frac{54}{100}$

xi) $2\frac{5}{10}$ xii) $3\frac{24}{100}$ xiii) $4\frac{16}{100}$ xiv) $5\frac{17}{100}$