# Mathematics Grade 5 -7 Examination Materials

## FRACTIONS

**Definition:** A fraction is a part of a whole. A fraction shows in how many equal parts a whole has been divided

**Example**


**Types of fractions**

(i) **Proper fractions**: - proper fractions are when the numerator is smaller than the denominator for example (a) ½, (b) $^{3}/_{10}$,

(ii) **Improper Fractions**: are when the numerator is larger than the denominator. For example (a) $^{5}/_{2}$ (b) $^{7}/_{3}$

(iii) Mixed fractions or mixed numbers : a mixed fraction is formed when a whole number and a fraction are combined for example :-

2 ¾ (b) 7 $^{2}/_{5}$

Activity: 1

Study and identify the names of the following fractions

1. 3 ¼
2. ¼
3. $^{11}/_{7}$

**ADDITION OF FRACTIONS**

Fractions with the same denominator

Example: - $\frac{2}{8} + \frac{5}{8} = \frac{2+5}{8} = \frac{7}{8}$

**Activity: 2**

4. Add $\frac{5}{11} + \frac{6}{11}$

5. Find the sum of $\frac{6}{9}$ and $\frac{8}{9}$

6. John travels $^{7}/_{12}$ km to the sports stadium; he then travels another $^{3}/_{12}$ km to the gym. Find the total distance covered.

**FRACTIONS WITH DIFFERENT DENOMINATORS**

LCM stands for lowest common multiple. This is the smallest numbers in Which all of the given numbers can divide?

For example, the LCM of 3 and 14 is 12 because 12 is the smallest number into Which both 3 and 4 can divide.

**Example:** (a) $^{3}/_{4} + {}^{3}/_{5}$

$= \frac{15 + 12}{20}$

$= \frac{27}{20}$

$= 1\frac{7}{20}$ ***answer***

(b) $\frac{12}{15} + \frac{2}{3}$

$= \frac{12 + 10}{15}$

$= \frac{22}{15}$

$= 1\frac{7}{15}$ ***answer***

Activity 3

7. $\frac{2}{8} + \frac{3}{4}$

8. A pool is 3/5 m long and ¼ m wide. Calculate the perimeter of the pool.

9. Which of the following symbols can be put in the Box?

½ $\square/_{8}$ >< , = € /

**MIXED FRACTIONS**

Adding mixed fractions or numbers

Example

$4\ ^{2}/_{4} + 2\ ^{5}/_{8}$

$= \frac{18}{4} + \frac{21}{8}$

$= \frac{36 + 21}{8}$

$= \frac{57}{8}$

$= \mathbf{7^{1}/_{8}}$

**Activity 4**

10. Add 4 ½ + 1 ¼

11. Mr. Banda expects to do one part of a Journey in 2½ hours and the other part in 2 ¼ hours. How long will the whole Journey take?

12. Calculate $4 + 3\ ^{2}/_{3} + 1\ ^{5}/_{6}$

**Subtraction of fractions**

When subtracting fractions you need to wok with the common denominator (LCM), Just as you do when adding fractions.

**Example :**

**Simplify** (a) $^{5}/_{9} - {}^{2}/_{9}$

Solution

$= {}^{5}/_{9} - {}^{2}/_{9}$

$= \frac{5 - 2}{9}$

$= {}^{\cancel{3}^{1}}/_{\cancel{9}^{3}}$

**$= {}^{1}/_{3}$**

(b) $5\ {}^{1}/_{3} - 2\ ¼ - 1\ {}^{7}/_{8}$

$^{16}/_{3} - {}^{9}/_{4} - {}^{15}/_{3}$

$= \frac{128 - 54 - 45}{24}$

$= \frac{29}{24}$

**$= 1\ {}^{5}/_{24}$**

**Activity: 5**

13. Simplify $\frac{5}{13} - \frac{2}{13}$

14. Find the value of 5 ¼ - 2 ¾ - 1 ½

15. From 5 ½ kilograms of sugar, Kaluba used 2 4/9 kilograms. How much sugar did he have left?

**MULTIPLICATION OF FRACTIONS**

When multiplying fractions. It is necessary to convert mixed fractions to Improper fractions

**Example**

$4\ \frac{1}{2} \times 1\ \frac{1}{3} = \frac{(4 \times 2) + 1}{2} \times \frac{(1 \times 3) + 1}{3} = \frac{9}{2} \times \frac{4}{3} = \frac{9}{2} \times \frac{4}{3} = \frac{36}{6}$

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

**Activity: 6**

Multiply $5\ \frac{1}{2}$ by $3\ \frac{1}{3}$

17. Find the product of $\frac{3}{4}$; $\frac{4}{5}$ and $4\ \frac{3}{4}$

18. Mary walks $2\ \frac{1}{2}$ km to and from school every day. Find the number of Kilometres she will cover in 5 days.

19. A packet of rice weighs $5\ \frac{1}{2}$ kg. How many kilograms will $10\ \frac{1}{2}$ packets Weight?

**DIVISION OF FRACTIONS**

Division is the opposite operation of multiplication. When we divide, we are Multiplying by the second fractions inverse.

**For example**; 5÷2 is the same as 5 x ½. We say that ½ is the inverse (or Reciprocal) of 2.

**Example**

$8\ \frac{1}{3} \div 5\ \frac{1}{3}$

$= \frac{25}{3} \div \frac{16}{3}$

$= \frac{25}{3} \times \frac{3}{16}$

$= \frac{25}{1} \times \frac{1}{16}$

$= \frac{25}{16}$

**$= 1\ \frac{9}{16}$**

**Activity: 7**

20. Workout $\frac{3}{5} \div 6\ \frac{2}{3}$

21. Divide $3\ \frac{1}{2} \div 1\ \frac{1}{4}$

22. $6\ \frac{1}{2} \div 3\ \frac{3}{5}$

## ORDER OF OPERATIONS

**BODMAS** is an easy way to remember which operation must be done first. BODMAS stands for Brackets, of Division multiplication Addition and Subtraction.

**Example**: find the answer for the following using BODMAS

(i) $2 + 4 \times 6$ (ii) $16 - 3 \times 4 \div 2 + [16 - 12]$

**Solution:**

$2 + 4 \times 6 = 2 + (4 \times 6)$
$= 2 + 24 = 26$ **answer**

**Solution**

$16 - 3 \times 4 \div 2 + (16 - 12)$
$= 16 - 3 \times 4 \div 2 + 4$
$= 16 - 3 \times 2 + 4$
$= 16 - 3 + 4$
$= 10 + 4$
$=$ **14 answer**

23. $12 \div 3 + 4 \times 2$

24. $20 - 10 \div 2 + (3 \times 4)$

Numbers and Notation
Introduction to numerals
The first ten Roman numerals are:-

I , II, III, IV , V, VI, VII, VIII, IX, X.

**Examples:**

1 Write the number 9 as a Roman numeral.

**Solution**

9 = IX

**ACTIVITY: 8**

Identify the following roman numerals

25. (a) X (b) IV (c) V (d) VIII

**Converting between Arabic and roman Numerals**

The Arabic numbering system is the digits from 0 to 9;
0, 1, 2, 3, 4,5, 6,7 ,8 ,9

In both the Roman and Arabic systems, numbers are formed by combining

numerals or symbols together and adding their values.

There are some more Roman numerals and their Arabic equivalents:

| Roman Numeral | Arabic Numeral | Roman Numeral | Arabic Numeral |
|---|---|---|---|
| I | 1 | C | 100 |
| V | 5 | D | 500 |
| X | 10 | M | 1000 |
| L | 50 | | |

**Example**

1 Convert LV to Arabic numerals

Solution: L = 50
V = 5

LV = L + V
LV = 50 + 5
LV = **55**

2 Convert XC to Arabic numerals

Solution:

XC = C – X
XC = 100 – 10
XC = 90

**Activity: 9**

26. Write the Roman numeral X X X I X in Hindu – Arabic numerals

27. The Roman numerals DCCLIII can be written in Arabic numerals as .....

28. Use >< or = to identify the correct relation between the following Roman Numerals

( a) X ☐ IX (b) CLX ☐ MDL (c) MMCC ☐ 2 200

29. The number 3 5 46 can be written in words as.....

30. What is the value of 5 in the number 845 723 ?

**Addition**

**Vertical addition**

Big numbers can be added easily using vertical addition. You have to carry the units to tens, the tens to the hundreds and so on. Write down what you carry below the answer.

Example:

Add the following 14, 786 + 17 886 + 9 876

Solution: 14 786
17 886
+ 9 876
4 2 5 4 8
+ + + +
2 2 2 1 (record the regrouped number below the answer)

**Activity: 10**

31. Add 523 445 to 365 444

32. Find the sum of 813 247 and 572 180

33. Mbala district employed 869 female teachers and 587 male teachers in 2015. How many teachers were employed altogether?

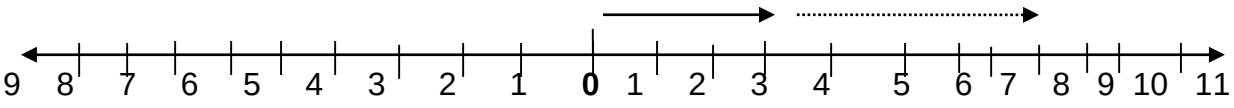
34. In an election, the number of votes for three members of parliament were 5 464, 18 001 and 12 971. How many votes did they get altogether

**ADD ON THE NUMBER LINE**

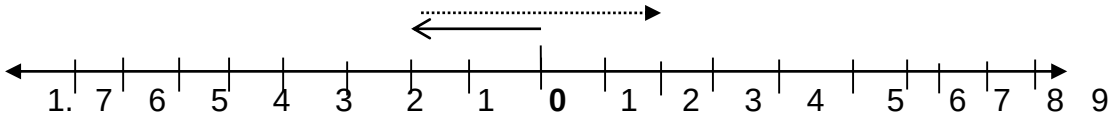
A number line goes from left to right, with the smallest number on the left and the biggest number on the right.

**Example:**

(a) add 3 + 5 on the number line




(i) 3 + 5 = 8




-2 + 4 = 2

**ACTIVITY; 11**

35. Show 4 + (-2) on a number line

36. Draw number lines for the following additions
(a) (-3) + (-8) (b) 8 + 13

**Subtraction**

Subtract using place values
Example: use place values to calculate
98 657 - 57 234

Solution

98 657
- 57 234
**41 423**

**Activity: 12**

37. Use place values to calculate the following:
(i) 59 732 - 42 511 (ii) 43 789 - 12 666
38. Find the difference between 851 204 and 749 040

39. A farmer is transporting 100 000 eggs to market. On the way, 66 149 eggs are broken. How many unbroken eggs reach the market?

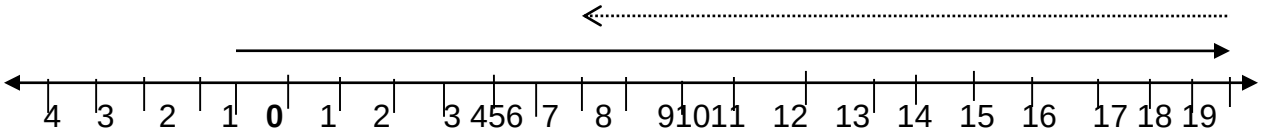
**Subtract using the number line**

On the number line, you start on the first number given in the calculation.
You then move to the left using the second number that you want to subtract from the first number the number where you end is the answer.

**Example**

Show the following subtraction on the number line and find the Difference:- 19 - 12 = ☐

**Solution**

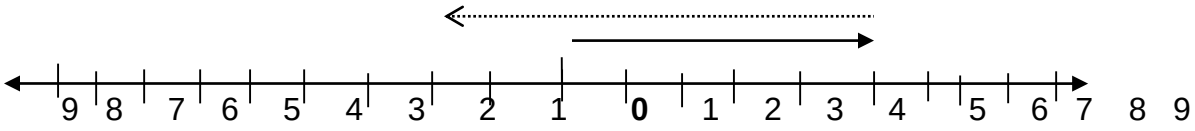



19 - 12 = 7

**Activity : 13**

40. Use number lines to find these differences :
(a) 17 - 18 + ☐ = (b) (-6☐2 = (c) 5 - ☐) =

41. Write down the subtraction shown by the number line




Multiplication

Remember when using long multiplication to multiply whole numbers , remember to arrange the numbers properly according to their place values.

Multiply by 3 – 4 digit numbers

Example (a) 7 4 3 x 28

Solution

| H | T | O |
|---|---|---|
| 7 | 4 | 3 |
| X | 2 | 8 |
| 1 4 | 8 | 6 0 |
| +5 | 9 | 4 4 |
| **2** | **0** | **8 0 4** |

(b) 2 4 2 x 3 1 7 8

solution

| TH | H | T | O |
|---|---|---|---|
| | 3 | 1 | 7 8 |
| X | 2 | 4 | 2 |
| 6 | 3 | 5 6 | 0 0 |
| 1 | 2 | 7 1 | 2 0 |
| + | 6 | 5 | 5 6 |
| **7** | **6** | **9** | **0 7 6** |

**ACTIVITY: 14**

42. Workout the following using the long multiplication method
(a) 3 613 x 217 (b) 1 412 x 214

43. A box contains 128 pieces of chalk. If a school buys 150 boxes, find the total number of pieces of chalk

**Division**

**Division** is the opposite or inverse, of multiplication for every division Problem, there is a related multiplication problem.

Dividing whole numbers without a reminder

Example: divide 49 283 by 221

Solution

49 283 ÷ 221 =

```
        223
221 ) 49 283
      -44 200   → (200 x 22)
        5 083
       -4 420   → (20 x 221)
          663
          663   → (3 x 221)
            0
```

**Activity : 15**

44. Calculate the following:
    (a) 45 576 ÷ 216 (b) 22 344 ÷ 147

45. A bricklayer uses 696 bricks to build a room. There are 161 472 bricks. How Many rooms could he build?

**Dividing whole numbers with a remainder**

**Example:** 127 ÷5

**Solution**

25 r 2
5 | 127

(A) 10

27

(B) 25

**2**

**Activity 16:**

46. 3 403 ÷ 21

47. 25 | 25 026

**FACTORS AND MULTIPLES**

Multiples: when you count in 5s, you make a list of the multiples
Of 5: 5, 10, 15, 20, 25, 30, .....

Any number that can be divided exactly by 5, is a multiple of 5
**Examples:**

(a) Give any four multiples of 3.
(b) Give the first five multiples of 7.

**Solutions**

(a) 6, 15, 24, 33 are multiples of 3
(b) 7, 14, 21, 28, 35

**ACTIVITY: 17**

48. Give the first 10 multiples of: -

(i) 8
(ii) 13
(c) 24

**FACTORS**

A factor can be divide (go into) a larger number without a remainder. E.g.

4 is a factor of 12, because 4 divide exactly into 12.

**Example**

Find the factors of 10

**Solution**

10 ÷ 10 = 1, 10 ÷ 5 = 2, 10 ÷ 2 = 5, 10 ÷ 1 =10
The factors are 1, 2, 5 and 10

49. Give the factors of the following:
(i) 36 (ii) 45

50. Find all the factor pairs of the following numbers:-
(i) 18 (ii) 24

51. Write true or false in the blank space
(i) Is 7 a factor of 25: .....

(ii) Is 9 a factor of 63 : .....

**HIGHEST COMMON FACTOR (HCF)**

The highest common factor (HCF) of two numbers is the largest whole Number that is a factor of both numbers

**Example:**

Find the highest common factor of 8, 12 and 20

**Solution:**

Factors of 8 = 1, 2, 4 , 8

Factors of 12 = 1, 2, 3, 4, 6, 12

Factors of 20 = 1, 2, 4, 5, 10, 20

Common Factors of 8, 12 and 20 = 1, 2, 4

**The HCF is 4**

**ACTIVITY: 19**

52. Copy and complete the table

| | NUMBERS | FACTORS | CF | HCF |
|---|---|---|---|---|
| 1 | 8<br>1 2 | | | |
| 2 | 1 8<br>2 4 | | | |
| 3 | 1 4<br>2 1 | | | |

**Lowest Common Multiple**

The lowest common multiple in brackets (LCM) of two whole numbers is the smallest whole number that is a multiple of both numbers.

**Example**

Find the lowest common multiple of 3 and 7 .

**Solution**

Multiples of 3 = 3 , 6, 9, 12, 15, 18, 21, 24, 27, 30 .....

Multiples of 7 = 7 , 14, 21 .....

LCM = 21

**Activity : 20**

53. Find the lowest common multiple of 4 and 6

54. A stationery shop sells cards in packs of 6 and envelopes in packs of 4. Kondwani wants the same number of cards and envelopes for her party. How many packs of each must she buy?
(Hint: Find the (LCM)

**DECIMALS**

A decimal number is made of a whole number, a decimal point and a Decimal fraction. The decimal point goes between the whole number which is on the left; and the decimal fraction, which is on the right.

The decimal point helps to identify what the place value of each digit in

The decimal number is.

**For example:** 15 – 376. It is read as “Fifteen point three seven six “

**Addition of Decimals**

**Example:** 14. 75 + 0.367 + 29.501

**Solution**

14. 750
0.367
29.501
44.618

**Activity: 21**

55. (a) 175.5 + 16.99 + 2.8

56. Four boys have the following masses: John is 55.6kg, Peter is 39.75kg, Moses is 65.1 kg and Thomas is 43.0kg. Find the total mass of the boys.

**SUBTRACTION OF DECIMALS**

To subtract decimals, follow these steps:

8 Write down the numbers below one another with the decimal points Lined up vertically

9 Pad with zeros at the end so that the numbers have the same length

Subtract using column subtract, borrowing point in your necessary. Remember to write The decimal point in your answer

**Example:**
Simplify the following:
32. 15 – 15 .03
**Solution:**
32.16→ write down the largest number first
- 15.03→ write the smaller number directly below
17.12s→ u bracts using column subtraction with borrowing if necessary

**Activity: 22**

57. Find the difference between 178.3 and 100.9584

58. Joseph has 123.13g of gold to trade. He sells 51.87g to pay for his son’s school

Fees and 12.78g to buy food for his family. How many grams of gold are left?

59. 321.6 – 165.3456

**MULTIPLICATION**

- To multiply decimals, follow these steps:
- Ignore the decimal points and multiply normally as if you are dealing with whole numbers.
- Count the total number of decimal places in the two numbers.
- Then insert the decimal point that number of decimal places from the right.

**Examples**
Find the products of these decimals

- 0.4 x 0. 22

**Solution**
0.4 x 0.22
4 x 22 = 88→ multiply without decimal point
0.4 x 0.22 = 0.088

(ii) 120.7 x 2.56 = 1 207

X 256
241 400
60 350
7 242
308. 992

**ACTIVITY: 23**

60. Multiply 16.2 by 3.2

61. Find the product of 0.754 and 0.93
62. Workout 11.4 x 0.232

**DIVISION OF DECIMALS**

When dividing decimals, we use the methods of long division
Lets assume that we have the expression 0.52 ÷0.2. We call 0.52 the dividend and 0.2 is the divisor .

To divide decimals, follow these steps:

- Change the number you are dividing by to a whole number by moving the

decimal points of both numbers to the right. This is done by multiplying by

10 or 100 or 1000 and so on.

- Use long division, and insert the decimal point in the answer directly above the decimals point in the dividend

**Examples:**

- Simplify the following (b) 8.48÷0.8

0.52 ÷4

**Solution**

```
   0. 13
  ------
4 | 0.52
  - 4
  ----
    1 2
  - 1 2
  -----
      0
```

**Solution**

```
     10.6
    ------
8 | 84 . 8
  - 8
  -----
    0  4
       4  8
  - 4 8
  -----
       0
```

**Activity: 24**

63. Divide 1 .4 by 0. 07

64. A bus travelled 34. 12 8 km and took 0. 5 hour to reach its destination. What was the average speed travelled.

65. Divide 5 .3 9 by 1. 1

**Converting common fractions to decimals**

- There are two methods to convert common fractions to decimals

The first methods use long division.
The second method uses denominators that are powers of ten.

**Examples**

Convert these common fractions to decimals :-

(i) ¼ Solution:

**Methods of Long Division**

```
4  1.00 →  4 goes into 1 = 0;  write 0 at top and insert decimal point
   10      bring down 0 to become 10
   80      4 goes into      = 2 remainder 2
   20      Bring down 0
   20      4  goes into 20 = 5 remainder 0
   0
```

Therefore, ¼ = 0.25

(ii) Methods of powers of 10

¼ → we can multiply 4 by 25 to get 100, which is a power of 10

$\frac{1 \times 25}{4 \times 25} = \frac{25}{100}$ → multiply both numerators and denominators by 25

= 0.25 → since 100 has 2 zeros, insert the decimal point two places

From the right

Therefore, ¼ = 0.25

**Activity: 25**

66. Change these common fractions to decimals

(i) $\frac{7}{8}$ (ii) $\frac{4}{9}$ (iii) $10\frac{3}{4}$

Converting decimals to common fractions
We convert a decimal to a common fraction by writing it as a fraction with a Numerator that is the correct power of 10. Then we simply it. If possible

**Example:**
Convert these decimals to common fractions:

- 0.04 = 4

Solution

0 .0 4 = $\frac{4}{100}$

**= $\frac{1}{25}$ answer**

(ii) 1.035

Solution

$1.035 = 1\frac{35}{1\,000}$

**$1\frac{7}{200}$ answer**

**Activity: 26**

67. Convert these decimals to common fractions;
(i) 1.7 (ii) 3. 25 (iii) 5.0 55

Ordering fractions and decimals

- When working with problems that involve both fractions and decimals, it is

Best to convert them to, one form, either converting fractions to decimals or vice versa.

**Example**

- Order these fractions and decimals from smallest to largest.

➢ ½, $^1/_5$, $^2/_5$ , ¾ , $^2/_3$

**Solution**

½, $^1/_5$ , $^2/_5$, ¾ , $^2/_3$ Find the latest common denominator in this case it is 60

= $\frac{30}{60}$ , $\frac{12}{60}$, $\frac{24}{60}$ , $\frac{45}{60}$, $\frac{40}{60}$ convert to .....

= $\frac{12}{60}$, $\frac{24}{60}$, $\frac{30}{60}$, $\frac{40}{60}$, $\frac{45}{60}$ arrange .....

- Fractions of the common denominator
- Arrange the fractions in order from small to larger based on the numerators.

Therefore, the ascending order is:

$^1/_5$, $^2/_5$ , ½, $^2/_3$, ¾

**Activity: 27**

68. Arrange in ascending order

(i) ½ , $^1/_3$, $^3/_5$ , ¾, $^1/_6$ , $^1/_5$

➢ 0.0 3 9 , ¾, 0.891 , $^1/_6$

69. Order these from largest to smallest (descending order)

(i) 0.01 ,1.1, 0.007 , 1. 7

*Using $<, >$ and $=$ toshowhowdecimals relate to one another*

**Example:-**

| s/no | **Comparison** | **Meaning** |
|---|---|---|
| 1 | 0 . 4 > 0 . 2 5 | 0 . 4 is greater than 0 . 2 5 |

| | | |
|---|---|---|
| 2 | 0 . 1 4 < 0 . 3 | 0 . 1 4 < 0 . 3 is less than 0 . 3 |
| 3 | 0 . 7 + 0 . 7 | 0 . 7 = 0 . 7 is equal to 0 . 7 |

**Activity : 28**

70. Compare each pair of decimals using the symbols < , > or =

- 0.42 ☐ 0.301
- 0.55 ☐ 0.550
- 3.145 ☐ 0.8

P**ERCENTAGES**

The term "**Percent"** means out of hundred" so 70 percent means 70 out of 100. Percentages are used to describe parts of a whole, where the whole is made
Up of 100 equal parts. The percentage symbol is used to show that the number is a percentage.

**Example:** $60\% = \frac{60}{100}$

**Convert percentages to decimals**

(a) To convert a percentage to a decimal, follow these steps :

- Divide by 100
- Remove the "%" sign

Example

(i) Convert this percentage to a decimal
75%

Solution

$75\% = \frac{75}{}$

100
= 75÷ 100
**= 0.75**

(ii) Convert this decimal to a percentage.
0. 45

Solution

0.45 = 0.45 x 100 → multiply the decimal by 100
= 45% → add the % symbol

**Activity: 28**

71. Convert 55% to a decimal
72. Convert 1.25 to a percentage
73. Change 125% to a decimal

**Percentages and Common Fractions**
**From Common Fractions to Percentages**

**Example**: change ¾ to a percentage:
**Solution**
¾ x 100%
= 300%
4
**= 75%**

**Activity: 29**

74. Convert these common fractions to percentages.
(i) ¾ (ii) 32/50 (iii) 14/70

75. Fifteen out of the 30 children in grade 7 are girls. What percentage of the Class are boys

**From Percentages To Common Fractions**

Convert these percentages to common fractions

Example (i) 62.5 %

Solution

$62.5\% = \frac{62.5}{100}$

$= \frac{62.5 \times 10}{100 \times 10}$

$= \frac{625}{100}$

$= \frac{25}{40}$

$= \mathbf{\frac{5}{8}}$ **answer**

(ii) 7%

Solution

$7\% = \mathbf{\frac{7}{100}}$ **answer**

**Activity: 30**

76. Convert these percentages to common fractions
(i) 90% (ii) 1.25%

77. Mwango Bwalya sold 64 trousers at a market last week 25% of the trousers were jeans . How many jeans were sold/

SETS

(i) A set is a collection of well defined objects. These objects are called numbers
or elements.

**Elements of a Set**

Set A = (mango, orange, banana, guava) has four elements. This can be Written as ∩ (A) = 4

**(ii) Venn Diagrams**

Membership of a set

**Example:**

SET A = (a, b, c, d)

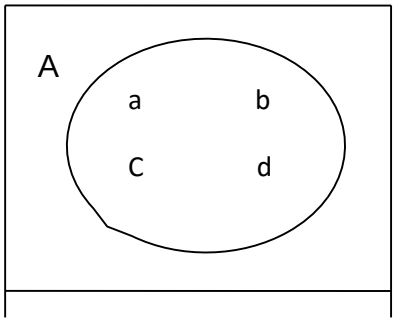
Show in two Venn diagrams that

(i) B is a member of set A

(ii) E is not a member of set A

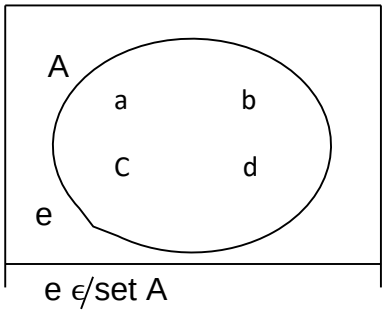
**Solution**

1.




b ϵset A

2.




e ϵ/set A

**Activity: 31**

Copy and fill in the blank space with the symbol

78. 20 ---------- (5, 10, 15, 20, 25)

79. 13 ---------- (2, 4, 6, 8, 10)

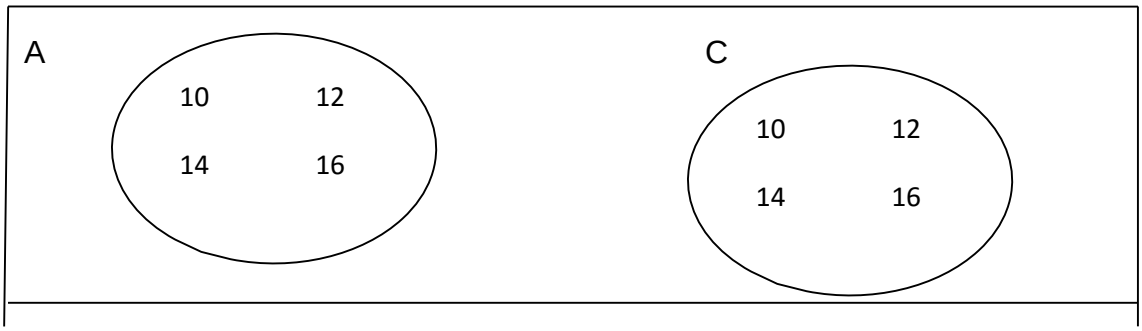
80. SET A = (a, b, c, d, e, f) are the following true or false

(a) a ϵ Set A (b) g ϵ set A

(c) c ϵ set A (d) K ϵ set A

**Equal Sets**

**Example:** look at the following Venn diagram



Set A = set C because all the members of set
A belong to set C

**ACTIVITY 32**

Set A = (tree, grass, leaf, branch)

Set B = (grass, tree, branch, leaf )

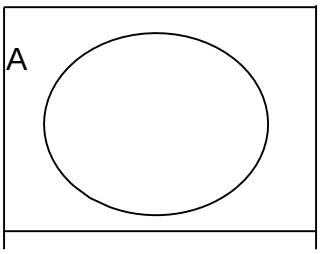
81. State whether each of the following is true or false

**False**

(i) A= B (ii) ∩ (A) = ∩ (B) (iii) ∩ (A) = 4

**Empty sets**

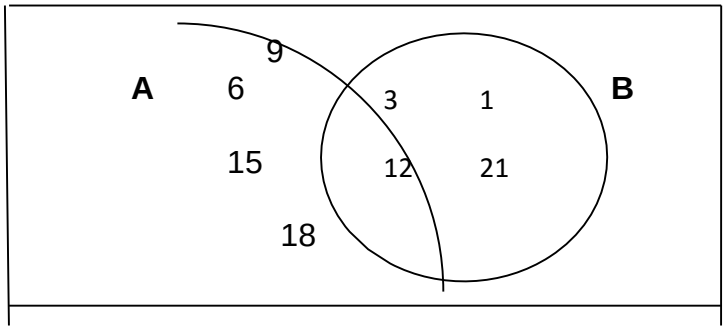
Example:-
Set A = (pigs with three heads) = ( ) or ∅
A set with no elements is an empty set




Or { }

(b) Intersection of sets (∩ )

**Example**: Set A {3, 6, 9, 12, 15, 18}
Set B = {1, 3, 12, 21 }



(c) The common elements in set A and b are 3 and 12. This set is called the
Intersection. We write A ∩ B = { 3, 12 }

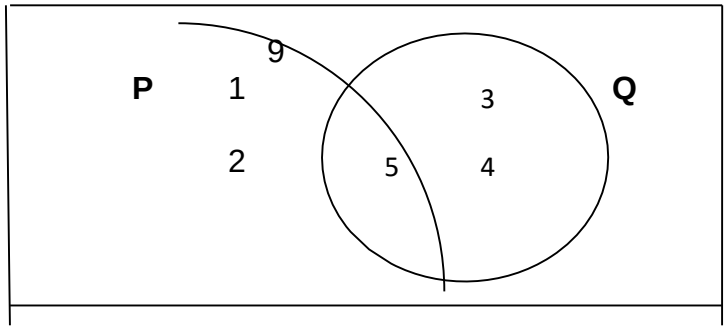
**(d) Union of Sets (Ú)**

**Example:** Set A = (1, 2, 3, 4, 5)
Set B = (5, 6, 4, 7, 3, 8)

A Ú B = (1, 2, 3, 4, 5, 6, 7, 8) This set is called the Union of the set A and B. Although 3, 4 and 5 appear in both sets we only show them once

**Activity: 33**

82. Study the Venn diagram below. List the following sets;
(i) P ∩ Q (ii) P (iii) PÚ Q




83. Set Z = {2, 4, 6, 8, 10} and set W = {10, 12, 14, 16 }
Show Z ∩ W in a Venn diagram

84. Set M = {1, 3, 5, 7, 9} and set K= {1, 3, 5, 11, 13, 15 }
Show M Ú K in a Venn diagram

**SUBSETS**

A subset is a set within a set. A set is a subset of itself. An empty set is a Subset of all the sets

**Example**

(i) If A = {a, b , c } and B = {a, c } then set B is a subset of set A
Because all the members of set B belong to set A

We write this as B C A and we read it as B is a subset of A

(ii) We can also list all the subsets of set A
{ a } { b } { c } { a, b } {b c} {a c } {a b c } and { }

**Activity 34**

85. Set A = {orange, guava, lemon}
Write down all subsets of A

86. Which of the following are not subsets of

C = {b, d}?
{d } { b} { a } {b d } {a d } { } { c, d }

87. List all the subsets for each of the following sets

(i) Set P = {a b}
(ii) Set R = {d, e, f}

(e) The number of sunsets of a set

(f) There is a formula that we can use to find the total number of subsets of a set

Number of subsets is = $2^n$ where n stands for the number of elements in the set .

**Example:**

P = {1, 2, 3 } Find the number of subsets in set P
Solution
Set P = {1, 2, 3}
$= 2^n$
$= 2^3$
= 2 x 2 x 2
**= 8 answer**

**Activity: 35**

88. P = {cup, spoon, plate, bottle}
(i) Write down its number of elements in set P
(ii) Find the number of subsets in set P

89. Q = {Cut, cow, dog, man, pig}
(i) Find ∩ (Q)
(ii) Find the number of subsets in set Q

90. A set has 4 elements
Find the number of subsets

**MEASUREMENTS**

Adding and subtracting measures

**Example**

- Find the sum of the following masses:
  23kg 458g and 24kg 275kg

**Solution**

| | Kg | g |
|---|---|---|
| | 23 | 458 |
| +24 | 275 | |
| | 47 | 733 |

- Subtract : 11 hours 52 minutes from 12 hours 07 minutes

| | Hour's | minutes |
|---|---|---|
| | 12 | 07 |
| - | 11 | 52 |
| | | **15** |

**Activity: 36**

91. Workout each of the following
(i) 27 hours 9 minutes + 16 hours 11 minutes
(ii) 470cm 6mm - 399 cm 8mm
- $89.2^0C + 67^0C$

92. How much more salt should Chanda put in a container with 11kg 760g to Make it weigh 25kg

93. To make a drink, Father has to add 8. 785l of water to 3.215 l of orange juice. Find how much drink he has made.

**MULTIPLYING MEASURES**
**Examples**

1 Multiply 11 hours 30 minutes by 2
2 Multiply $19.7^0$ C by 4

**Solutions**

(i) 96km 180m x 4

(ii) 6.52kg x 15

(iii) 13 hours 24 minutes x 6

**DIVIDING MEASURES**

**Example**

(i) 88 hours ÷ 11

**Solution**

88 hours ÷ 11 55 min ÷ 11

8 hours 05 minutes

11 88 h 55 min

(ii) 5 68km 26 m ÷ 9

**Solution**

63km 114m

9 568km 26 m

**Activity: 38**

95.

4 171 cm 2 mm

96. At Mbala secondary School, children learn for 5 hours 20 minutes everyday In 8 periods. Calculate the length of each period.

97. A packet of sugar weighs 500g. How many packets can be made from 12kg500g?

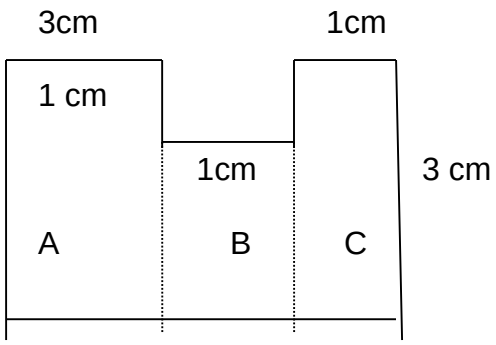
**PERIMETER AND AREA**

- The **Perimeter** is the total distance around any shape
- The **Area** is the amount of surface covered by a shape

**Perimeter and area of other shapes**

**Example:**

- Calculate the Perimeter and Area of the shape below




**Solution**

Perimeter = 3 + 1 + 1 + 1 + 1 + 3 + 5 + 3 = 18cm

Area = area 'A' + Area 'B '+ area 'C '

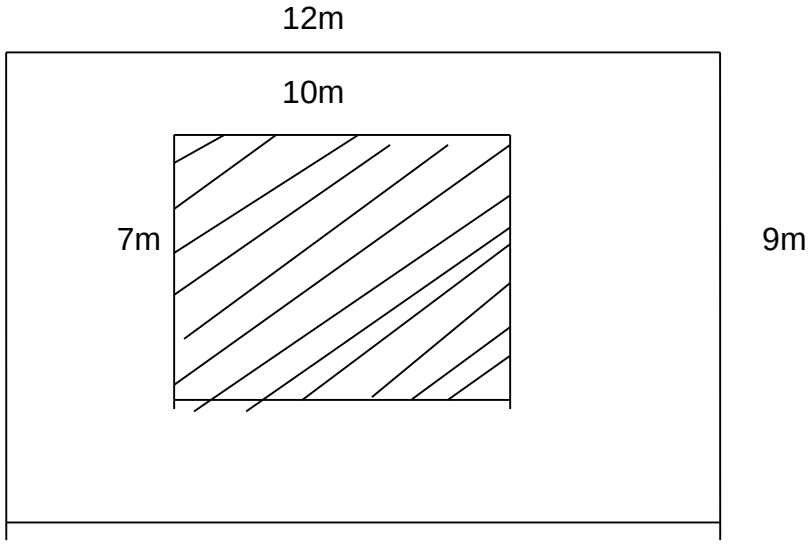
(3 x 3) + (2 x 1) + (3 x 1)

= 9 + 2 + 3

**= 14cm$^2$**

**Activity: 39**

98. Study the diagram showing the floor in Mrs. Lung is sitting room. The Shaded part shows the area covered by the carpet.



**Find the:-**

(i) Area of the sitting room

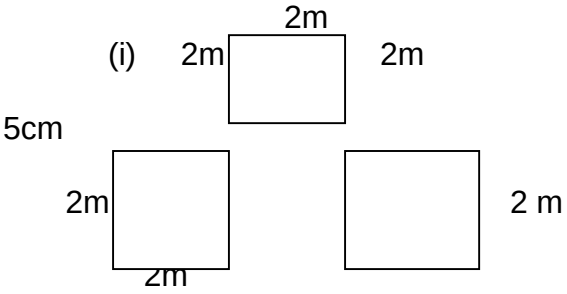
(ii) Area of the carpet

(iii) Area of the room not covered by the carpet

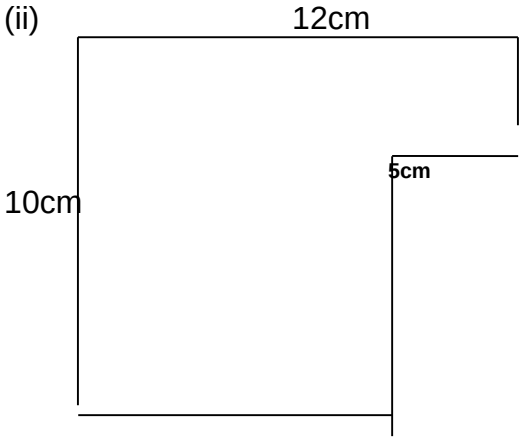
(iv) Cost of the carpet at K22.50 per square metre

99. Find the perimeter of the following shape below

(i)




(ii)




**Volume**

(i) Volume is the amount of space taken up by something, measured In cubic units

Remember: volume = Length x breadth x height

**VOLUME OF RECTANGULAR SHAPES**

**Example:**

A rectangular box is 24cm long, 16cm wide and 6cm high. Chanda packs smaller

Boxes measuring 6cm x 4cm x 3cm into the big box. How many can he put into the

Big box.

**Solution**

V (big Box) : V= 24 x 16 x 6

$= 2304cm^3$

V (small Box): V= 6 x 4 x 3

$= 72cm^3$

No. of boxes = 2 304 ÷72

**= 32 boxes**

**Activity : 40**

100. A well measures 1.5m by 1.7m. How much water can it contain, if its depth is 6.2m?

101. The size of a desk top is 120cm long, 50cm wide and 2cm thick. How many Desk tops can be made from 600cm x 250cm x 2cm

## SOCIAL AND COMMERCIAL ARITHMETIC

### BUDGET

(ii) A budget is a table that shows how much money comes in and how much money goes out.

(iii) The money that comes in is called the **Income**.
The money that goes out is called **Expenditure.**

### A PERSONAL BUDGET

A personal Budget is a plan for an individual showing how much he or she Earns and spends

**Example:**

Elizabeth's income every month is about K120, from pocket money and selling Jewellery. She makes herself (income). She has the following expenses; Beads K40, entertainments K35, toiletries K15, snacks K15. She saves everything that is left over after she has bought what she needs. She wants to buy herself a new party dress.

(i) Draw up a personal budget showing all this information.

**Solution**

| **Income** | **Expenditure** | |
|---|---|---|
| K120 | Beads | K40 |
| | Toiletries | K15 |
| | Entertainments | K35 |
| | Snacks | K15 |
| | Total | K105 |
| | Balance | K15 |

**ACTIVITY: 41**

102. Look at Elizabeth's budget in the example above.

1 What is more, her income or her expenditure?

(a) A new party dress costs K300, how long will it take for her to save for it?

(c ) If Elizabeth wants to buy the new party dress after 12 months of saving And she does not want to borrow money for that, What can she do to achieve this?

103. Draw up your own personal budget.

**THE END**

## MATHEMATICS ANSWERS

1. Mixed fraction or mixed numbers
2. Proper fraction
3. Improper fraction
4. $\frac{11}{11}\ or\ 1$
5. $1\frac{5}{9}$
6. $\frac{10}{12} or \frac{5}{6}$
7. $\frac{8}{8} or\ 1$
8. $1\frac{7}{10m}$
9. $=$
10. $5\frac{3}{4}$
11. $4\frac{7}{12}$
12. $9\frac{1}{2}$
13. $\frac{2}{13}$
14. $4$
15. $3\frac{1}{18}$

16. $18\frac{1}{3}$

17. $2\frac{11}{20}$

18. $12\frac{1}{2}$

19. $57\frac{3}{4}$

20. $4$

21. $2\frac{4}{5}$

22. $23\frac{2}{5}$

23. 12

24. 27

25. (a) 10 (b) 4 (c) 5 (d) 8

26. 39

27. 753

28. (a) > (b) < (c) =

29. Three thousand five hundred forty six.

30. Thousands

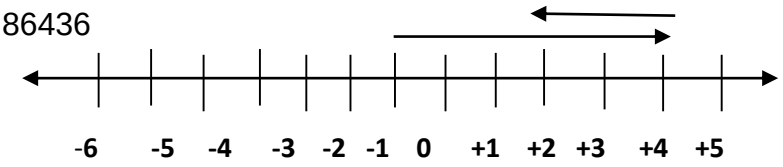
31. 888889

32. 1385427

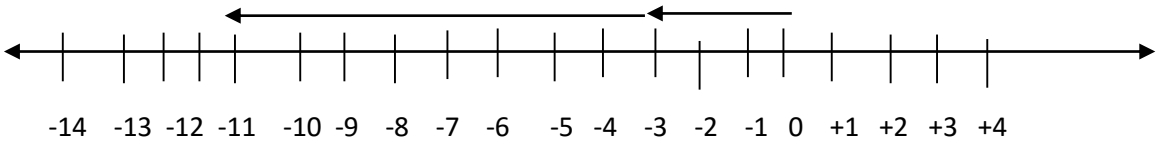
33. 1456

34. 86436

35.




36. (a)




37. (i) 59732 (ii) 43 789

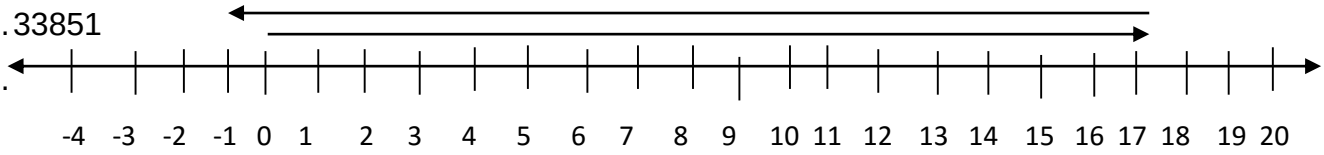
– 42511 - 12 666

17 211 31 123

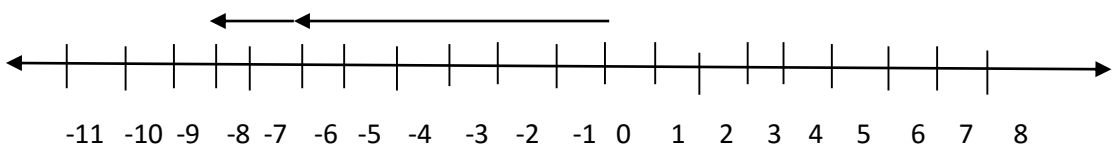
38. 102164

39. 33851

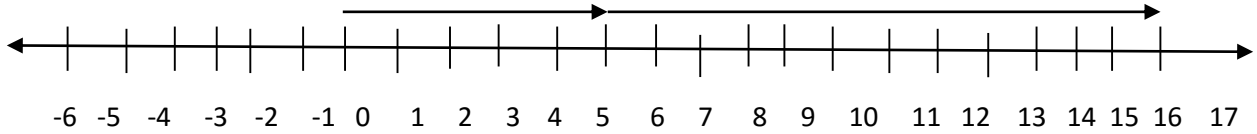
40.




17-18= -1




(-6) -2= -8




(C) 5-(-12) 17

41. 5-7=2

42. (a) 3613

× 127

25291

+ 36130

722600

784021

(b) 1412

× 214

5648

282400

302168

43. 128
× 150
000
+6400
12800
19200

44. (a) 211 (b) 152
45. 232 houses
46. 16211
47. 100111

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| i | 16 | 24 | 32 | 40 | 48 | 52 | 64 | 72 | 80 | 88 |
| ii | 13 | 26 | 33 | 52 | 65 | 78 | 91 | 104 | 117 | 130 |
| iii | 24 | 48 | 72 | 96 | 120 | 144 | 168 | 192 | 216 | 240 |

48.
49. (i) {1,2,3,4,6,9}=36
(ii) {1, 3, 5,9} =45
50. (i) {1,3,6,18}=18
(ii) 24= {1, 2, 3, 4, 6, 8, 12}
51. (i) false
(ii) true
52. (i) ={1,2,4,} r={1,2,4,6,} CF= {1,2,4,} HCF={4}
(ii) 18={1,2,3,6},24={1,2,3,4,6,12},CF={1,2,3,6}
(iii) 14={1,2,7},21={1,3,7},CF={1,7}
53. = {12, 24, 36, 48 ……}
54. ,
55. ,
56. ,

**Activity 22**

57. 77.3416
58. 58.471
59. 156.2544

**Activity 23**

60. 51.84
61. 0.70122
62. 2.6448

**Activity 24**

63. 20
64. 68.256km/h
65. 4.5

**Activity 25**

66. 0.875
    0.444
    10.75

**Activity 26**

67. $\frac{17}{10} or\ 1\frac{7}{10}$

$3\frac{1}{4}$

$5\frac{11}{200}$

**ACTIVITY: 27**

68.

$\frac{1}{6}$

$\frac{1}{5}$

$\frac{1}{3}$

$\frac{1}{2}$

$\frac{3}{5}$

$\frac{3}{4}$

**(ii)** 0.039,$\frac{1}{6}$ ,$\frac{3}{4}$ , 0.891

69. 1.7,1.1,o.o1,0.007

**Activity 28**

70. (i) > (ii) = (iii) <
71. 0.55
72. 125%
73. 1.25

**Activity 29**

74. (1) 75% (ii) 64% (iii) 20%
75. 50%

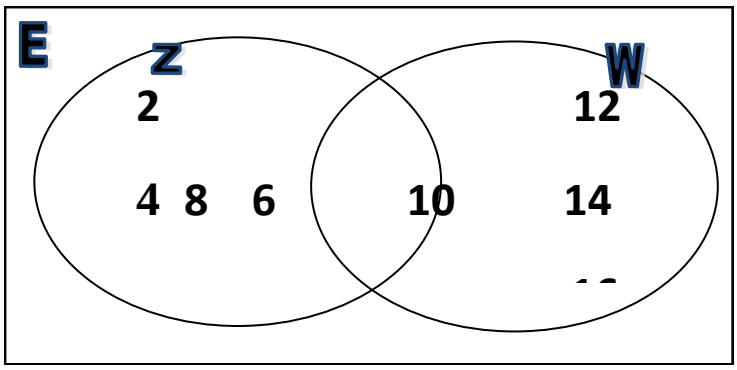
**Activity 30**

76. (i) $\frac{9}{10}$ (ii) $1\frac{1}{4}$
77. 16 jeans
78. £-
79. €
80. (i) a £set a - true
    (ii) g € set a –true
    (iii) c € set a – false
    (iv)k e set a – false

**Activity 32**

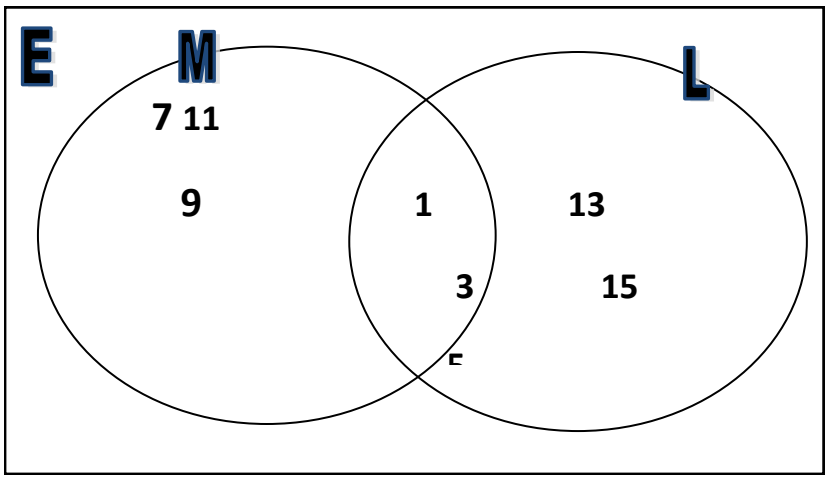
81. (i) a/ - true
    (ii) n (a) - n (c) – true

**Activity 33**

82. (i) p n Q - {5}
    (ii) p={1,2,5}
    (iii) P u Q= {1, 2, 3, 4, 5}
83. 

**Activity:34**

84




{ORANGE} , {GUAVA} ,{LEMON}

{ORANGE} ,GUAVA} ,{GUAVA,LEMON}

{ORANGE, LEMON}, {ORANGE, LEMON, LEMON}

{ }

84. {A},{A,D},{C,D}

85. (i) {A} ,{ } ,{A, },{ }

(ii) {d} ,{e} ,{f} {d,e} {d,f},{f,e} ,{ d,e,f} ,{ }

**ACTIVITY:35**

86. (i) 4

(ii) $2^n = 2^4$ =2×2×2×2=16

87. (i) =5

(ii) $2^n = 2^5$ = 2×2×2×2×2=32

88. $2^n$ =2×2×2×2=16

**ACTIVITY: 36**

89. (i) 27h:09min
+16h: 11min
---
43h: 20min
---

(ii) 470cm 6mm
_ 399cm 8mm
---
70 cm 8mm
---

(iii) 89 .2
+ 67.0
---
156.2
---

**92.** 25kg 000g
- 11kg 760g
---
13kg 240g
---

**93.** 12 litres

**Activity: 37**

**94.** (i) 96 km 180m
× 4
---
384km 720m
---

(ii) 97.8 kg

(iii) 80hrs  24 minutes

**ACTIVITY: 38**

**95.** 42cm  8mm

**96.** 40 minutes

**97.** 25 packets of sugar

**ACTIVITY: 39**

**98.** (a)=l x a =12mx9m =109$m$

= lx = 10m x 7m =70m

(c) 109m – 70m =39m

(d) K22.50 x70m =K 1575.00

98. (i) 2x2x2x2x2x2x2x2x2x2x2x2=24m

(ii) 10+7+5+5+5+12=44cm

**ACTIVITY: 40**

**99.** v=l x  h=15.81m

**100.** 600cm x  250 x 2 ÷ 120 x 50 x 2 =25 desktops

**101.** Offer income

**102.** K300 ÷ k15 = 20 months

**103.** K300 ÷ 12 months =k 25.00

**104.** Personal budget should e correct with at least a balance for unexpected expenses