TELEMATIC SCHOOLS PROJECT

2024 SUBJECT WORKBOOK
Grade 10

$a+b=c$ MATHEMATICAL LITERACY

A joint initiative between the Western Cape Education Department and Stellenbosch University.

Western Cape Government
Education
FOR YOU

Stellenbosch
UNIVERSITY
IYUNIVESITHI
UNIVERSITEIT

BROADCAST SESSIONS

GRADE 10

- Session 1 :
- **Data Handling**

GRADE 10

- Session 2:
- **Scale & Plans**

GRADE 10

- Session 3:
- **VAT**

GRADE 10

- Session 4:
- **Representing Data in Graphs**

Session	Date	Time	Topic
1	08/04/2024	15:00-16:00	Data Handling
2	24/07/2024	16:00-17:00	Scale & Plans
3	07/10/2024	15:00-16:00	VAT
4	22/10/2024	15:00-16:00	Representing Data in Graphs

SESSION 1 | Data Handling

SUMMARY

WHAT MUST WE BE ABLE TO DO?

- Use one set of data in gr 10 to
  - Investigate problems relating to real life contexts.
  - Collect data on problems being investigated.
  - Classify collected data
  - Sort and group data
  - Organise data in frequency and tally tables
  - Summarise single sets of data
  - Understand the functionof the measures of central tendency and spread.
  - Represent data using charts
  - Identify trends in data
  - Read and select data from representations to answer questions.

What is Data?

- Data is:
- information such as facts and numbers
- used to analyze something or make decisions

How do we approach data handling?



We need to look at the Data Handling Cycle and remember that every stage is dependent on the stage before and will impact the stage after it.

Stages of Data Handling:

1. DEVELOPING A QUESTION

- The first step in the process is to develop a question
- The question must be clear and free of biases and ambiguity

2. COLLECTING DATA

There are 3 main ways of collecting data:

- **Observation-** e.g. counting the number of cars stopping at a stop sign
- **Interview-**e.g. asking people about the number of people in a household
- **Survey-**e.g. asking customers about the service that they have experienced at a clothing retailer

SESSION 1 | Data Handling

SUMMARY

WHAT MUST WE BE ABLE TO DO?

- Use one set of data in gr 10 to
  - Classify collected data

Population and Samples:

A **population** refers to the entire group that you want to draw conclusions about.
e.g. the population of a school will be the principal, teachers, non- teaching staff and learners.

A **sample** is a representative part/piece of the population. The size of the **sample** is always less than the total size of the **population**.
e.g. the sample of a school will be a group of learners of a grade

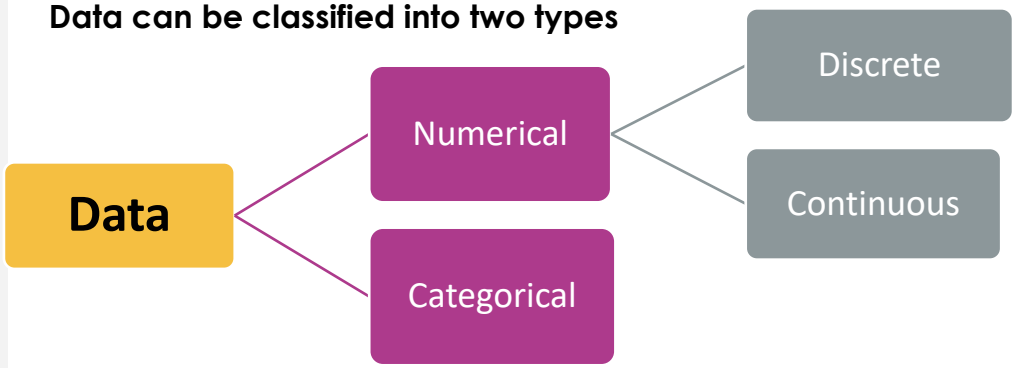
Activity 1:

Decide on the best method of collecting data in the following research investigations:

a) How many people visited a shopping mall on a specific day?
b) What type of music interest most learners at school?
c) How do the teachers who attend a specific workshop fee about the workshop?

3. CLASSIFYING DATA

Data can be classified into two types



Activity 2:

State whether the following datasets are categorical or numerical. If the data is numerical specify if its discrete or continuous:

a) The height of all the girls in grade 12
b) The number of children walking to school.
c) The hair colour of boys in a barber shop.

SUMMARY

WHAT MUST WE BE ABLE TO DO?

- **Use one set of data in gr 10 to**
  - **Sort and group data**
  - **Organise data in frequency and tally tables**

4. ORGANISING DATA

Data can be organized using a Tally Table

and/or Frequency Table

Each time an option appears we make one mark.

Every 5th tick is a line .

Favourite Sport	Tally	Frequency
Rugby	IIII	4
Soccer	𝍸	5
Netball	III	3
Athletics	𝍸 I	6

Frequency is when you count the total of the tallies and write it as a value

Activity 3:

Learners were asked what their favourite flavour of Chips was, the results are captured below:

Cheese	Chutney	Chutney	Beef	Salted
Beef	Cheese	Beef	Salted	Chutney
Chutney	Chutney	Cheese	Salted	Cheese

Zikhona started drawing a table to organize the results:

Complete the Table below for the data set provided:

Flavour	Tally	Frequency
Cheese	IIII	…
Chutney		5
Beef	III	3
…		
	Total:	

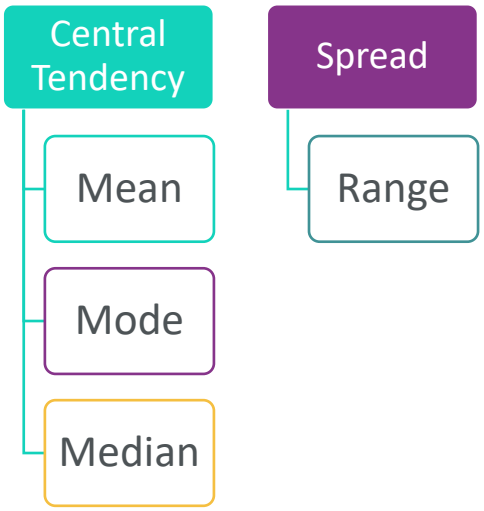
SUMMARY

WHAT MUST WE BE ABLE TO DO?

- Use one set of data in gr 10 to
  - Summarise single sets of data
  - Understand the function of the measures of central tendency and spread.
  - Represent data using charts
  - Identify trends in data
  - Read and select data from representations to answer questions.

5. Summarising Data:

When we want to look at summarizing data we must look at measures of central tendency and measures of spread.



Activity 4:

Below are descriptions. Match the descriptions that best describes each of these ways of summarizing data.

Write down the correct letter (A-F) next to the question number.

A	**The sum of data values divided by the number of data values.**
B	The middle value of an unordered data set
C	The difference between the highest value in a data set and the lowest value in the dataset.
D	Data values are arranged in ascending or descending order
E	The middle value of an ordered data set
F	The data value that occurs the most in the data set.

4.1	**Mode**	
4.2	Median	
4.3	Range	
4.4	Mean	

Now we will have a look at three ways in which summarizing data can be assessed

SESSION 1 | Data Handling

SUMMARY

WHAT MUST WE BE ABLE TO DO?

- **Use one set of data in gr 10 to**
  - **Summarise single sets of data**
  - **Understand the function of the measures of central tendency and spread.**

Activity 5:

James employs 10 workers at his school tuckshop. Below are the weekly wages of the 10 employees.

R500; R450; R350; R750; R350; R450; R750; R450; R400; R300

5.1 Calculate the following:

a) Mean

b) Median

c) Mode

d) Range

5.2 Which measure of central tendency would best describe this data set?

Activity 6:

The table below shows the historical monthly temperature in Cape Town:

Month:	Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
AveTemp °C:	29	30	28	24	22	20	A	21	22	24	25	27

Use the table above to answer the questions that follow:

6.1) Calculate the missing value A , the average temperature for July if the range of this dataset is 11 °C.

6.2) Determine the modal temperature in Cape Town.

6.3) Khanya stated that the median temperature in Cape Town is 22°C.

Verify, showing all calculations if her statement is valid.

SESSION 1 | Data Handling

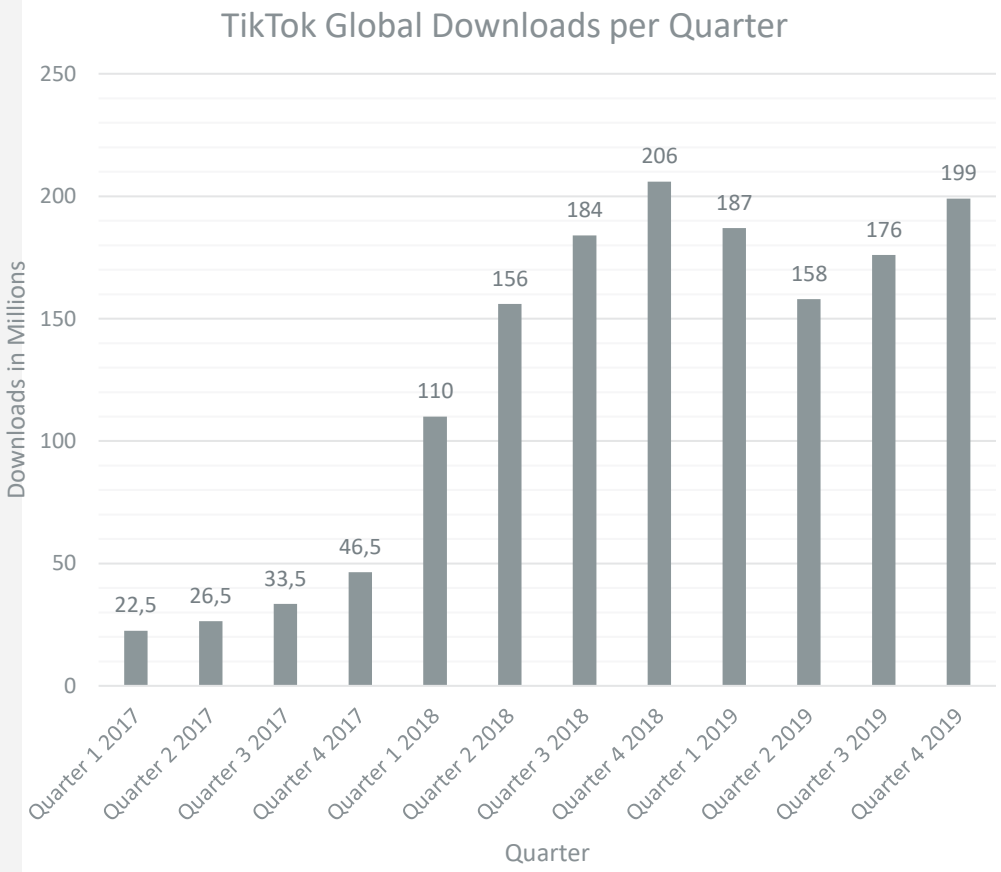
SUMMARY

WHAT MUST WE BE ABLE TO DO?

- Use one set of data in gr 10 to
  - Summarise single sets of data
  - Understand the function of the measures of central tendency and spread.

Activity 7:

Layken is interested in the TikTok trends. She sees the following graph online



7.1 Identify the quarter with the second lowest number of downloads.

7.2 Calculate the median number of downloads over this time period.

7.3 Calculate the range of downloads from TikTok in 2018.

7.4 Sandile claims that the mean number of TikTok downloads in 2018 and 2019 was more than 170 million.

Verify , showing all calculations whether the statement is valid or not.

SESSION 2 | VAT

SUMMARY

WHAT MUST WE BE ABLE TO DO?

- Work with VAT in the context of purchases , bills etc
- Develop an understanding of the difference between VAT exclusive and VAT inclusive
- Perform VAT calculations.

What is VAT?

- • Government has created taxes as a way of raising money for the general population of the country. Example of the kinds of tax we pay include:
- o fuel levy tax,
- o Sin tax (alcohol and tobacco)
- o Value added tax (VAT) and
- o import duty tax.
- VAT rate is 15% of the selling price of most goods and services.

Zero-Rated food items include:

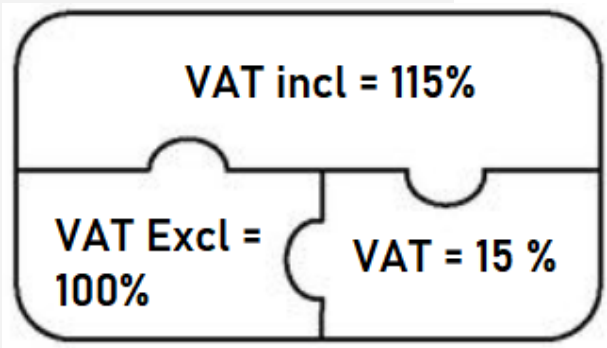


Zero Rated food items are normally indicated on a till slip with: * or # and it means that we pay not VAT on those items

VAT calculations:

You can be asked to calculate the following regarding VAT:

- **VAT inclusive price**
- **VAT exclusive price**
- **VAT amount**



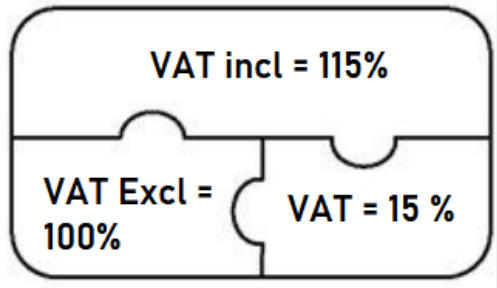
VAT EXCL to VAT INCL	X 1,15
VAT INCL to VAT EXCL	÷1,15
VAT AMOUNT	VAT INCL – VAT EXCL
VAT AMOUNT	VAT EXCL X 15%

SESSION 2 | VAT

SUMMARY

WHAT MUST WE BE ABLE TO DO?

- Work with VAT in the context of purchases , bills etc
- Develop an understanding of the difference between VAT exclusive and VAT inclusive
- Perform VAT calculations.



VAT EXCL to VAT INCL	**X 1,15**
VAT INCL to VAT EXCL	÷1,15
VAT AMOUNT	VAT INCL – VAT EXCL
VAT AMOUNT	VAT EXCL X 15%

Activity 1:

- **Damian is looking to buy some new shoes and sees the following advert online:**
- **Air Force 1 '07 Fresh**
- **Price EXCL VAT: R2 173,87**



a) Calculate the amount of VAT that will be paid on these shoes.
b) Calculate the price of the shoes including VAT.

Activity 2:

- **Kayden is looking at buying a new phone and finds the following deal online:**
- **Apple iPhone 14 256GB 5G**
- **Now only : R21 999 cash (VAT INCL)**



a) Calculate the price of the phone before VAT was added.

b) Calculate the amount of VAT paid on this phone

Activity 3:

The Kolbe family is planning on going to visit the Two Oceans Aquarium when they are visiting Cape Town.

The family consists of Mr and Ms Kolbe and three children aged 3, 12 and 16.

The ticket prices are shown below:

	One day ticket (excl 15 %VAT)
Adults	R204
SA Pensioners	R152
SA Students	R152
Children (14-17 years)	R152
Children (4-13 years)	R96
Children (3 and under)	FREE

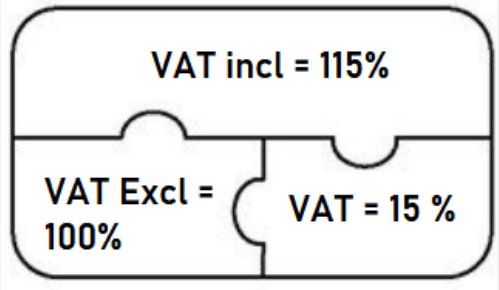
Calculate the total cost of the family's visit to the Aquarium including VAT.

SESSION 2 | VAT

SUMMARY

WHAT MUST WE BE ABLE TO DO?

- Work with VAT in the context of purchases , bills etc
- Develop an understanding of the difference between VAT exclusive and VAT inclusive
- Perform VAT calculations.



VAT EXCL to VAT INCL	X 1,15
VAT INCL to VAT EXCL	÷1,15
VAT AMOUNT	VAT INCL – VAT EXCL
VAT AMOUNT	VAT EXCL X 15%

Activity 4:

Mr Davids is looking at buying a new television for his family. He found the following online:

- **WAS: R14 999**
- **NOW: R10 499**



a) What does the acronym VAT stand for?
b) Calculate the amount of VAT payable on the old price of the TV.

Activity 5:

Aimee wants to explain to her cousin how VAT works and uses the till slip below:

5.1) How are the zero rated items indicated on the slip?

5.2) Explain how the final amount the client must pay ('balance due') was calculated.

5.3) Determine the total of the zero-rated goods.

5.4) Show through calculation that the total of the goods that include VAT is R91,49.

5.5) Calculate the VAT-exclusive amount by using the VAT-inclusive amount.

5.6) What is the VAT amount indicated on the till slip?



FOOD LOVER'S MARKET

PAROW
Shop 33
262 Voortrekker Road - Parow
Tel No.: 021 911 0778
VAT NO. 4620215469

TAX INVOICE

85
BANANAS LS
0.762kg NET @ 24.99/kg 19.04*
BLUEBERRIES PP 125G 10.00*
CLOVER MILK NOLAC UHT 1L 23.99*
F/L RECYCLED C/BAG 2 1.50
H/CONN CHIA SEEDS 40 89.99
STRAWBERRY 250G
2 @ 14.50 29.00*

TOTAL 173.52

TJ EFT 173.52
CHANGE 0.00

VAT SUMMARY

Description	NET	VAT	TOTAL
*Non Vat	82.03	0.00	82.03
VAT	79.55	11.94	91.49
VAT TOTALS	161.58	11.94	173.52

Cashier: CANDICE
C1007 #7875 12:26 30/10/2023 S91318 R007
****
Thank you for your patronage
Customer Care: care@fnv.co.za
Customer Care: 0860 007 728
****

SESSION 3 | SCALE & PLANS

SUMMARY

WHAT MUST WE BE ABLE TO DO?

Calculate actual length and
Distance when map and/or plan
measurements are known

SCALE:

- **A scale drawing represents the true size of an object on paper.**
- **Every measurement of the real object is enlarged or reduced in a specific ratio, that is called the scale factor.**

	Bar Scale:	Number Scale:
Example:		1:100 000
Explanation:	Scale that uses line segments of a certain length to show the scale on the map.	Always written in the following format Map distance : True distance (this means that one unit on the map represents 100 000 units in real life)
Advantage:	When printing a map/plan the scale enlarges/reduces with the graphics.	Can be used with any unit and converted easily
Disadvantage:	Some measurements might be less accurate due to mistakes	When a map or plan is enlarged/reduced a number scale becomes inaccurate

Activity 1:

Using a number scale:

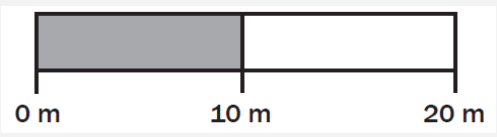
1.1) The distance between two points on a plan with a scale of 1: 150 is 3,5 cm.
Calculate the actual distance between the two points in cm.

1.2) The actual distance between two classrooms at a school is 12m .
Calculate the distance between the two classrooms(in cm) on a plan with a scale of 1: 75

Activity 2:

Using a bar scale:

1.1) Use your ruler and measure the line of the scale.
1.2) Use the information to determine the numerical scale.



SESSION 3 | SCALE & PLANS

SUMMARY

WHAT MUST WE BE ABLE TO DO?

- Understand the symbols used.
- Describe what is being represented.
- Analyse the layout and suggest alternative options
- Determine actual lengths of objects shown on plans using measurement or scale
- Determine qualities of materials needed by using the plans and measurement calculations.
- Draw a scaled 2D plan.
- Find locations
- Follow directions
- Develop Directions
- Describe the position of an object in relation to surrounding objects.

PLANS:

In Grade 10 we will focus on floor plans and layout plans.

This includes:

- Seating plan / layout of
  - a classroom
  - Buildings / sports fields
  - Stores in shopping centre
  - Cinemas / sports stadium

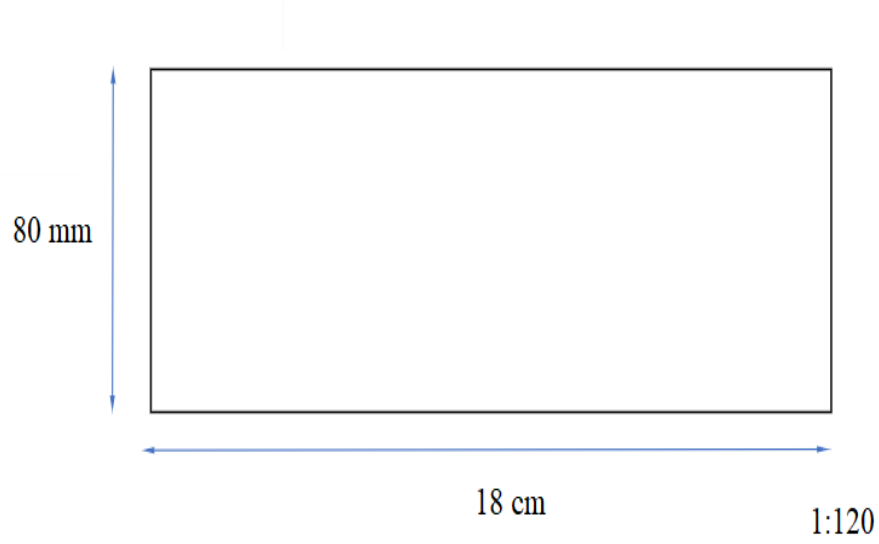
What is a floorplan?

A floorplan shows the design and dimensions of the inside of a building, from a top view.

Activity 3:

Using a scale on a plan:

The principal of Sunshine High School drew up the following plan of a piece of land they want to use:



3.1) Identify the type of scale used on the plan.
3.2) Explain the meaning of the scale in words.
3.3) Calculate the actual dimensions of the piece of land in m.
3.4) The principal wants to build a 5m by 3,5m storage shed on this premises.

Calculate the measurements of the shed on the plan.

SESSION 3 | SCALE & PLANS

SUMMARY

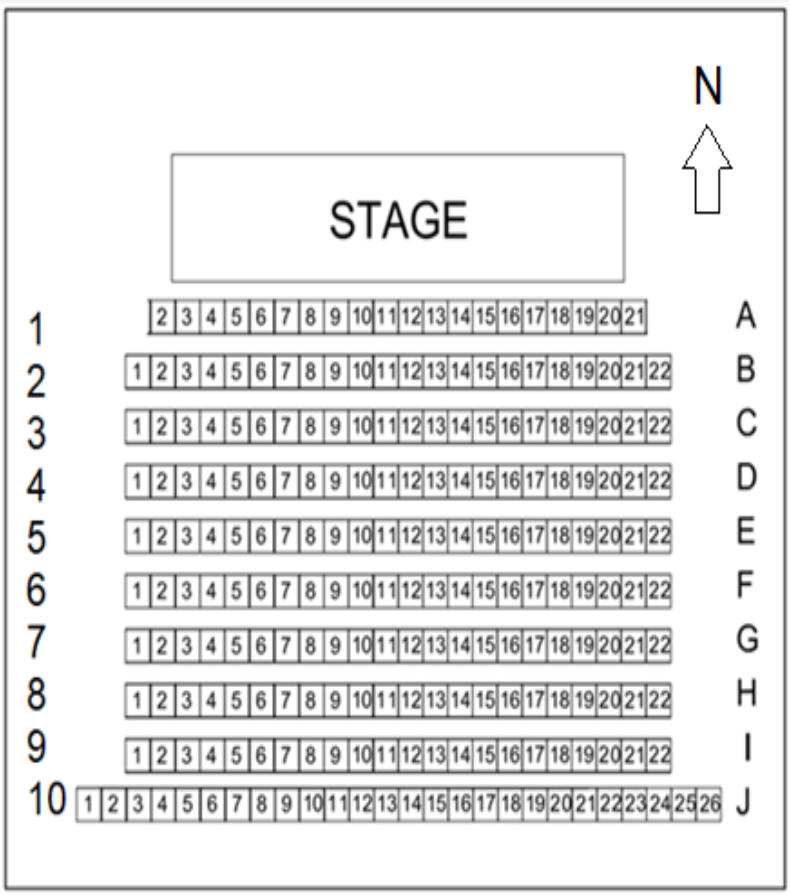
WHAT MUST WE BE ABLE TO DO?

- Understand the symbols used.
- Describe what is being represented.
- Analyse the layout and suggest alternative options
- Determine actual lengths of objects shown on plans using measurement or scale
- Determine qualities of materials needed by using the plans and measurement calculations.
- Draw a scaled 2D plan.
- Find locations
- Follow directions
- Develop Directions
- Describe the position of an object in relation to surrounding objects.

Activity 4:

Interpreting a plan:

The layout plan of a theatre in Cape Town is shown below



4.1) Determine the total number of seats in this theatre.

4.2) Samantha is meeting a friend at the theatre. Her friend gives her the following directions:

- Enter the theatre from the back.
- Walk towards the right end of the theatre
- Walk past four rows of seats.
- Turn left into the next row of seats.
- Your seat will be the 7th seat from the end of the row.

Write down Samantha's seat number.

4.3) Two different systems are indicated on the plan to help patron find their row.

Critically comment on which system you think would work best.

SUMMARY

WHAT MUST WE BE ABLE TO DO?

Represent single sets of collected data using:

- pie charts* (interpret only)
- histograms
- single bar graphs
- line and broken line graphs

- **Read information from graphs** and, if necessary, use estimation to determine values on the graphs.
- **Analyse** data presented in graphs.

Whilst understanding:

- that each type of representation offers a different picture of the data and that certain types of representations are more appropriate for particular types of data
- the effect that the scale of a set of axes and the point at which the axes cross can have on the impression created by a graph.

REPRESENTING DATA USING GRAPHS:

- **We represent collected and summarized data in the form of graphs to make it easy for people to interpret, analyze and understand trends from the graph.**

Types of graphs:

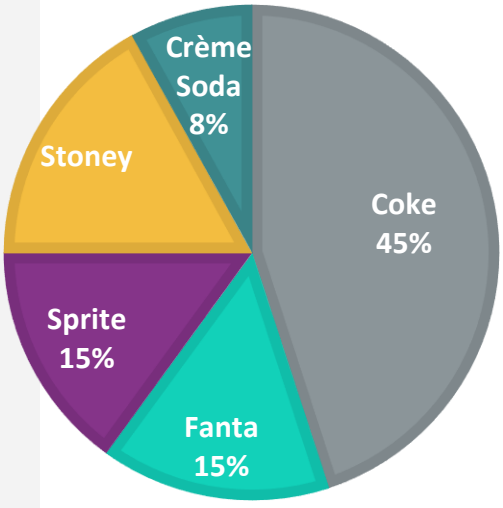
Pie Chart:

Pie Chart:
You are not expected to be able to draw this,but you must be able to : interpret and read values from a pie chart and, if necessary, explain how the sizes of the different segments of a pie chart have been determined.

Activity 1:

New High School decided to track their cooldrink sales for November 2022 to help them guide their orders for the new year.
Use the information they have obtained to help you answer the questions that follow:

RESULTS OF COOLDRINK SALES IN NOVEMBER 2022 FOR THE SCHOOL TUCKSHOP IN %



1.1) Determine the missing percentage for the sales of Stoney cooldrink.

1.2) Write the ratio of Sprite sales to Coke sales as a unit ratio.

1.3) The school orders 2 500 cooldrinks per month on average.

Use the sales provided to calculate the number of crème Soda cooldrinks they should order.

SESSION 4 | GRAPHS

SUMMARY

WHAT MUST WE BE ABLE TO DO?

Represent single sets of collected data using:

- pie charts* (interpret only)
- histograms
- single bar graphs
- line and broken line graphs

- **Read information from graphs** and, if necessary, use estimation to determine values on the graphs.
- **Analyse** data presented in graphs.

Whilst understanding:

- that each type of representation offers a different picture of the data and that certain types of representations are more appropriate for particular types of data

- the effect that the scale of a set of axes and the point at which the axes cross can have on the impression created by a graph.

Let's chat:

Bar Graph:

Bar graphs are used to display data that compared in categories.

Activity 2:

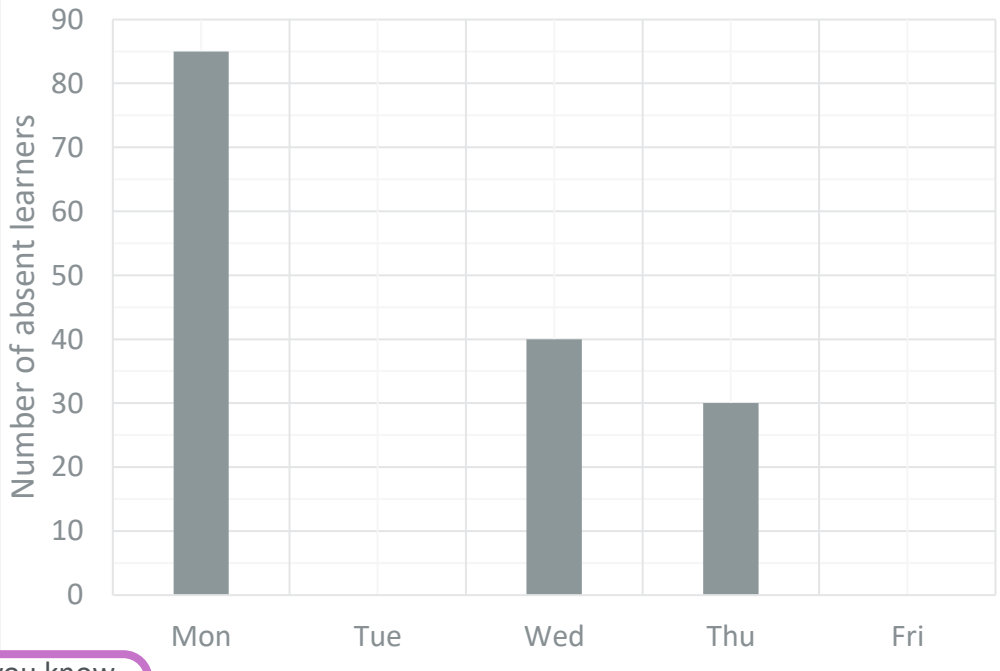
New High School decided to track the number of absentees per day for a month to see if they can observe any patterns.
The information obtained is summarized in the table below:

Mon	Tue	Wed	Thu	Fri
85	35	40	30	65

Use the information in the table to complete the graph on ANSWER SHEET 1.

ANSWER SHEET 1:

Summary of monthly absenteeism at New High School



Do you know how to use the ANSWER SHEET?

Can you identify the intervals?

Can you identify the independent variable?

Can you calculate mean,mode, median and range from the graph?

Can you identify any trends from the graph?

Do you know the difference between a histogram and bar chart?

Can you think why Sat and Sun is not plotted?

SESSION 4 | GRAPHS

SUMMARY

WHAT MUST WE BE ABLE TO DO?

Represent single sets of collected data using:

- pie charts* (interpret only)
- histograms
- single bar graphs
- line and broken line graphs

- **Read information from graphs** and, if necessary, use estimation to determine values on the graphs.
- **Analyse** data presented in graphs.

Whilst understanding:

- that each type of representation offers a different picture of the data and that certain types of representations are more appropriate for particular types of data

- the effect that the scale of a set of axes and the point at which the axes cross can have on the impression created by a graph.

Line Graph:

In data handling we use line graphs to show the relationship between two quantities.
A broken line graph is used for discrete data.

Activity 3:

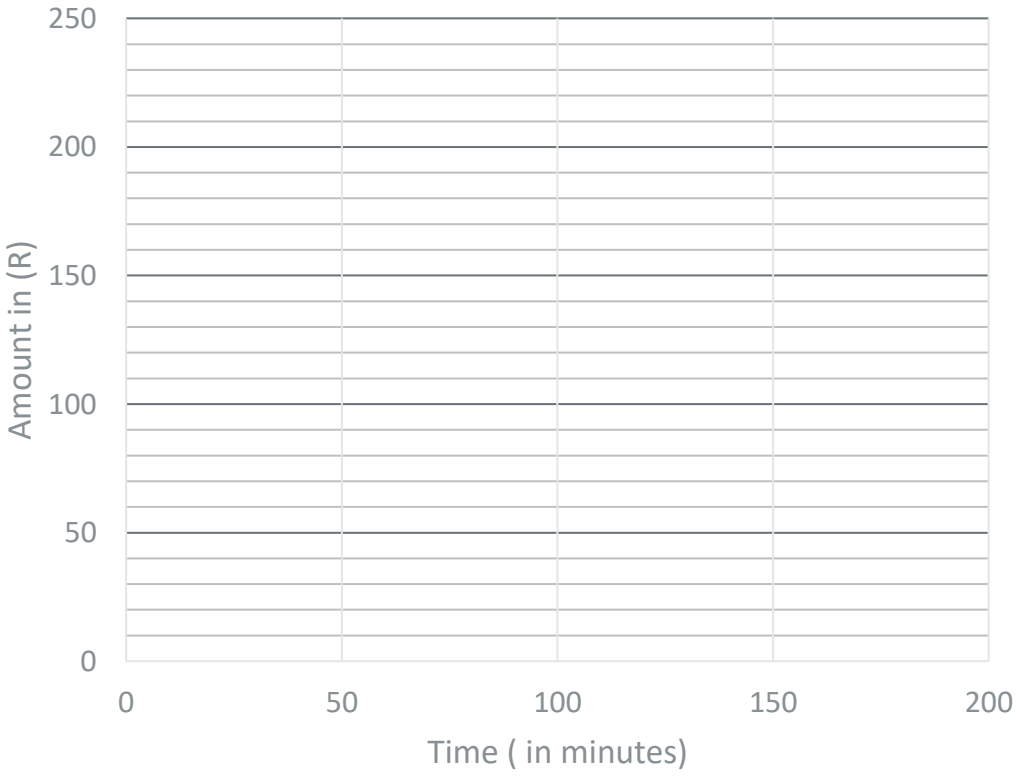
Tarryn wants to calculate the cost of her monthly cellphone bill.
Her phone company offers her a billing rate of 1,3cents per second

Use the information to complete the table & line graph on Answer Sheet 2

ANSWER SHEET 2:

Time(min)	0	50	100	150	200	250
Cost (R)						

Possible cellphone bill for up to 250 minutes usage.



SOLUTIONS TO ACTIVITIES:

Data Handling:

Activity 1:

a) Observation
b) Interview
c) Survey

Activity 2:

a) NUMERICAL; CONTINUOUS (HEIGHT CAN BE MEASURED)

b)NUMERICAL; DISCRETE (DATA AS WHOLE NUMBERS)

c) CATEGORICAL (DATA IN WORDS)

Activity 3:

Flavour	Tally	Frequency
Cheese	IIII	4
Chutney	~~IIII~~	5
Beef	III	3
Salted	III	3
	Total:	15

Activity 4:

4.1	**Mode**	**F**
4.2	Median	E
4.3	Range	C
4.4	Mean	A

Activity 5:

a)

Mean= $\frac{500+450+350+750+350+450+750+450+400+30010}{10}$

Mean=$\frac{4750}{10}$

Mean=R475

b) R300; R350; R350; R400; R450; R450; R450; R500; R750; R750

Median=450+4502

Median=R450

c)Mode=R450

a) R750-R300

= R450

5.2 The median and the mode gives the most useful indication of the weekly wage. Majority of the workers earn wages that are similar to these values

SOLUTIONS TO ACTIVITIES:

Data Handling:

Activity 6:

6.1)30-A=11

A=30-11

A=19

6.2) 24 and 22

6.3)

19;20;21;22;22;24;24;25;27;28;29;30

$\frac{24+24}{2}$

$= 24$

∴Her claim is not valid.

Activity 7:

7.1) Quarter 2 2017

7.2) 22.5 ; 26.5 ; 33.5 ; 46.5 ; 110; 156 ; 158; 176 ; 184 ; 187 ; 199; 206

$\frac{156+158}{2}$

= 157 million

7.3 206 million – 110million = 96 million

7.4 $\frac{110+156+184+206+187+158+176+199}{8}$

$=\frac{1\,376}{8}$

= 172 million

∴ Her statement is valid

VAT:

Activity 1:

$a)\ R2\,173{,}87 \times \frac{15}{100}$

$= R326{,}08$

b) $R2\,173{,}87 + R326{,}08$

$= R2\,499{,}95$

Activity 2:

$a)\ R21\,999 \div 1{,}15$

$= \text{R}19\,129{,}57$

$b)\ R21\,999 - \text{R}19\,129{,}57$

$= R2\,869{,}43$

Activity 3:

Adults: $R204 \times 2 = R\,408$

$Children(3): FREE$

$Children(12): R96$

$Children(16): R152$

$Total\ for\ Family: R408 + R96 + R152$

$= R656$ excl VAT

$R656 \times 1{,}15$

$= R754{,}40$

Activity 4:

VALUE ADDED TAX

R 14 999÷1,15

=R13 042,61

R14 999-R13 042,61

=R1 956,39

SOLUTIONS TO ACTIVITIES:

VAT:

Activity 5:

5.1) Asterisk / *
5.2) Add the total payable for each item including VAT
5.3) R19,04+R10,00+R23,99+R29,00
=R82,03
5.4) R1,50+R89,99
=R91,49
5.5) R91,49÷1,15
=R79,56
5.6) R11,94

SCALE & PLANS:

Activity 1:

a) $3{,}5 \times 150 = 525\ cm$
$b)\ 12\ m = 1200\ cm$
$1\ 200\ cm \div 75 = 16\ cm$

Activity 2:

Will depend on size of copied material

Activity 3:

3.1) number/ ratio scale
3.2) One unit on the plan represents 120 units in real life.
3.3) length:
$18 \times 120 = 2\ 160\ cm$
$= 21{,}6\ m$
Width: $80\ mm = 8\ cm$
$8 \times 120 = 960\ cm$
$9{,}6\ m$
3.4) Length: $5\ m = 500\ cm$
$500 \div 120$
$= 4{,}17\ cm$

Width: $3{,}5\ m = 350\ cm$
$350 \div 120$
$= 2{,}92\ cm$

Activity 4:

4.1) 222
4.2) F16
4.3) using the letters as numbers are already found on the seat numbers.
4.4) SE

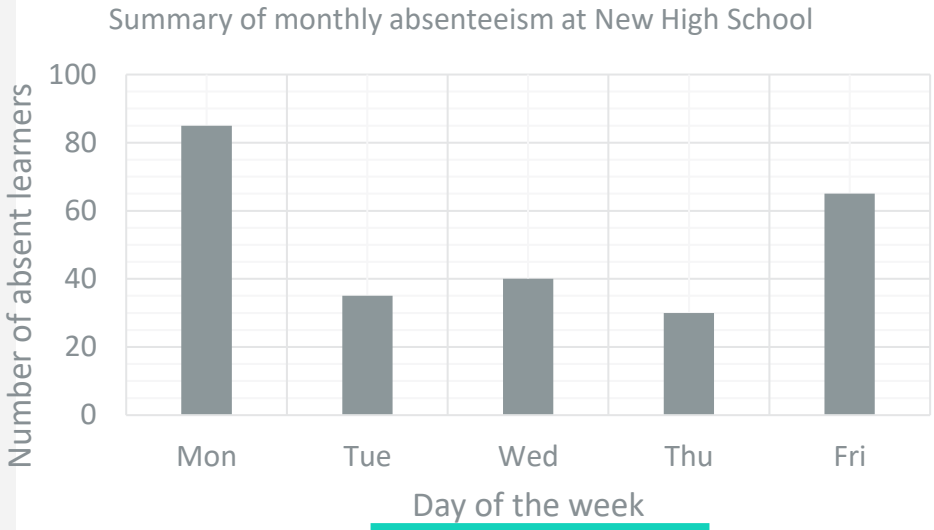
SOLUTIONS TO ACTIVITIES:

Graphs:

Activity 1:

1.1) 17%
1.2) 15:45
1:3
1.3) 8% x 2 500
= 200

Activity 2:



Activity 3:

