education

Department of Education
FREE STATE PROVINCE

PREPARATORY EXAMINATION

GRADE 12

MATHEMATICAL LITERACY P2

SEPTEMBER 2023

Stanmorephysics

MARKS: 150

TIME: 3 HOURS

This question paper consists of 14 pages and an addendum with 5 annexures.

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INSTRUCTIONS AND INFORMATION

1. This question paper consists of FIVE questions. Answer ALL the questions.

2. Use the ANNEXURES in the ADDENDUM to answer the following questions:

   - ANNEXURE A for QUESTION 2.1
   - ANNEXURE B for QUESTION 2.2
   - ANNEXURE C for QUESTION 3.1
   - ANNEXURE D for QUESTION 5.1
   - ANNEXURE E for QUESTION 5.2

3. Number the answers correctly according to the numbering system used in this question paper.

4. Start EACH question on a NEW page.

5. An approved calculator (non-programmable and non-graphical) may be used unless stated otherwise.

6. Show ALL calculations clearly.

7. Round off ALL final answers appropriately according to the given context unless stated otherwise.

8. Indicate units of measurement, where applicable.

9. Maps and diagrams are NOT drawn to scale, unless stated otherwise.

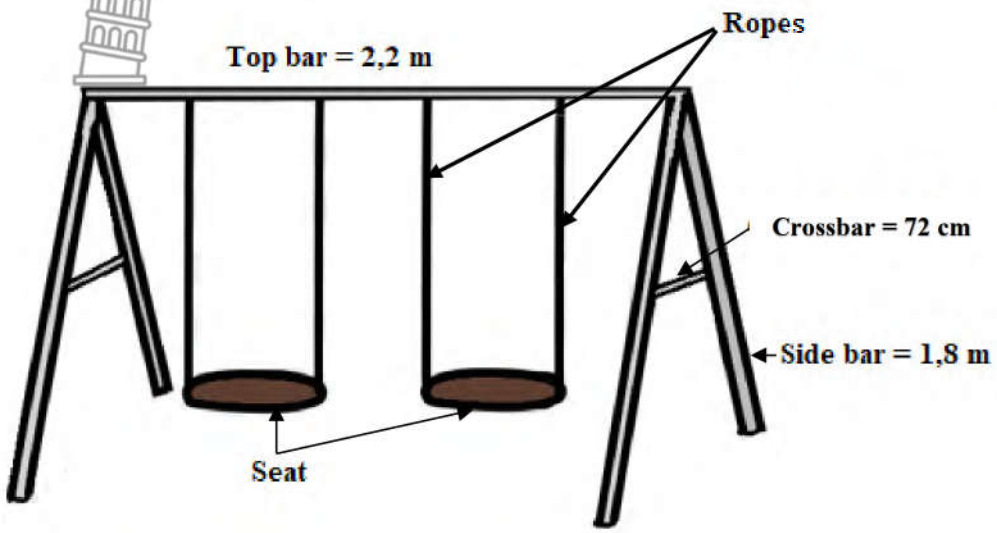
10. Write neatly and legibly.

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QUESTION 1

1.1 Mr Mofokeng wants to build a swing for his kids to play. The following is a picture of the swing with measurements:

DIAGRAM 1 SWING FOR CHILDREN

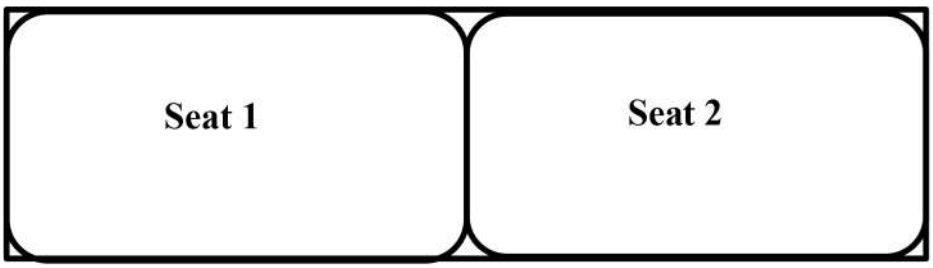


Use the diagram above to answer the questions that follow.

1.1.1 Convert the length of the crossbar to metres (m). (2)

1.1.2 Two pieces of rope are used to tie each seat to the top bar. The length of one piece of rope is 1,2 m. Calculate the total length of rope needed to tie two seats to the top bar. (2)

1.1.3 Each seat is 35 cm long and 15 cm wide. It is cut from a wooden board as follows:



Determine the minimum length of board needed if you cut the wooden board on the lines forming the seats. (2)

1.1.4 Measure the length, in mm, of the crossbar on DIAGRAM 1. (2)

1.1.5 Mr Mofokeng gives his kids the following choices for painting the swing: For the swing: Blue, green or red; for the two seats: yellow or pink.

Write down the number of colour combinations the children can choose from for their swing. (2)

1.1.6 The top bar, sidebars and crossbars will be cut from lengths of steel.

a) Determine the total length of the steel needed for this swing. (2)

b) After the top bar is cut from a 6 m piece of steel, there is 3,8 m of steel left.

Calculate how many sidebars can be cut from the leftover piece of steel. (2)

1.2 The following two clocks are given:

CLOCK A	**CLOCK B**
	 **Diameter = 28 cm**

Use the information above to answer the questions that follow.

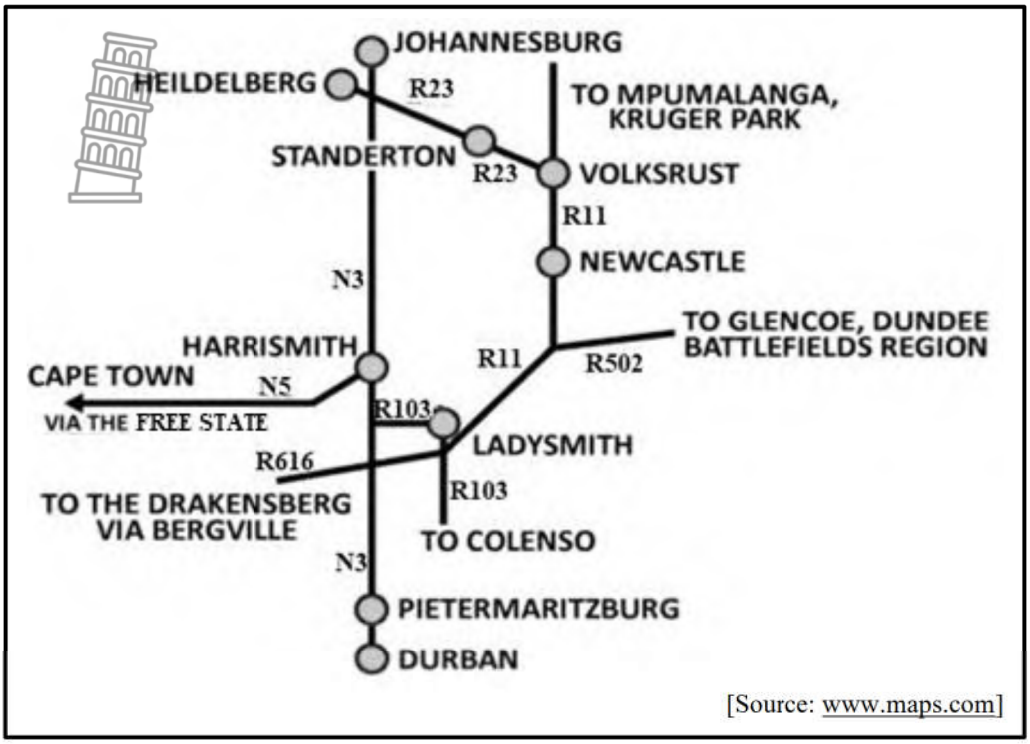
1.2.1 Define the concept *diameter* using the given context. (2)

1.2.2 The following statements are made regarding clocks A and B. Write down ONLY the letter of the statement that is true.

A The time on clock B is eight minutes to twelve.
B The time on clock A is in 12 hour-format.
C Clock A is an analogue clock.
D The time on clock A is in the morning. (2)

1.2.3 Jaco had to be at school at 8 am but only arrived at the time indicated on clock A. Write down the number of minutes that elapsed from when he was supposed to be at school till arrival. (3)

1.3 Mr Johnson stays in Johannesburg but regularly travels to Durban. He uses the following route map to plan his trip to Durban:



[Source: www.maps.com]

Use the information on the route map to answer the questions that follow.

1.3.1 Explain what a route map is in the context of the question. (2)

1.3.2 Write down which national road(s) is the shortest route from Johannesburg to Durban. (2)

1.3.3 Mr Johnson decides to travel to Durban via Newcastle.
Name TWO towns besides Newcastle that he will drive through. (2)

1.3.4 Mr Johnson wants to travel with the N3 and then the N5 to Cape Town. Determine the province through which he will drive according to this route map. (2)

1.3.5 Determine the probability of finding the R505 on the route map. Write your answer as a percentage. (2)

[31]

QUESTION 2

2.1 Mr January imports bar stools that he sells again for a profit. The imported bar stools come in boxes with an assembly diagram. ANNEXURE A shows the assembly diagram for one of these chairs.

Use the information in ANNEXURE A to answer the questions that follow.

2.1.1 Write down the function of the part labelled as F within the context. (2)

2.1.2 Match each of the descriptions for A, B and C below to steps 1 to 3 on the diagram to explain how to assemble the bar stool. Write only the correct order of letters (A–C) next to your number.

A. Push the seat and pedestal with footrest combination onto the shock absorber.
B. Remove the cap from the shock absorber and press the shock absorber into the base.
C. Fasten the pedestal with the footrest with screws to the seat. (3)

2.1.3 The shock absorber allows the bar stool to be adjusted upwards or downwards. Give ONE reason why a bar stool must be adjustable. (2)

2.2 Mr January stays in Kroonstad in the Free State. He travels to Vereeniging to sell his bar stools. The map on ANNEXURE B shows the route taken by Mr January from Kroonstad to Vereeniging.

Use the information above and ANNEXURE B to answer the questions that follow.

2.2.1 Name the type of map shown in ANNEXURE B. (2)

2.2.2 Calculate the distance from Kroonstad to Vereeniging. (3)

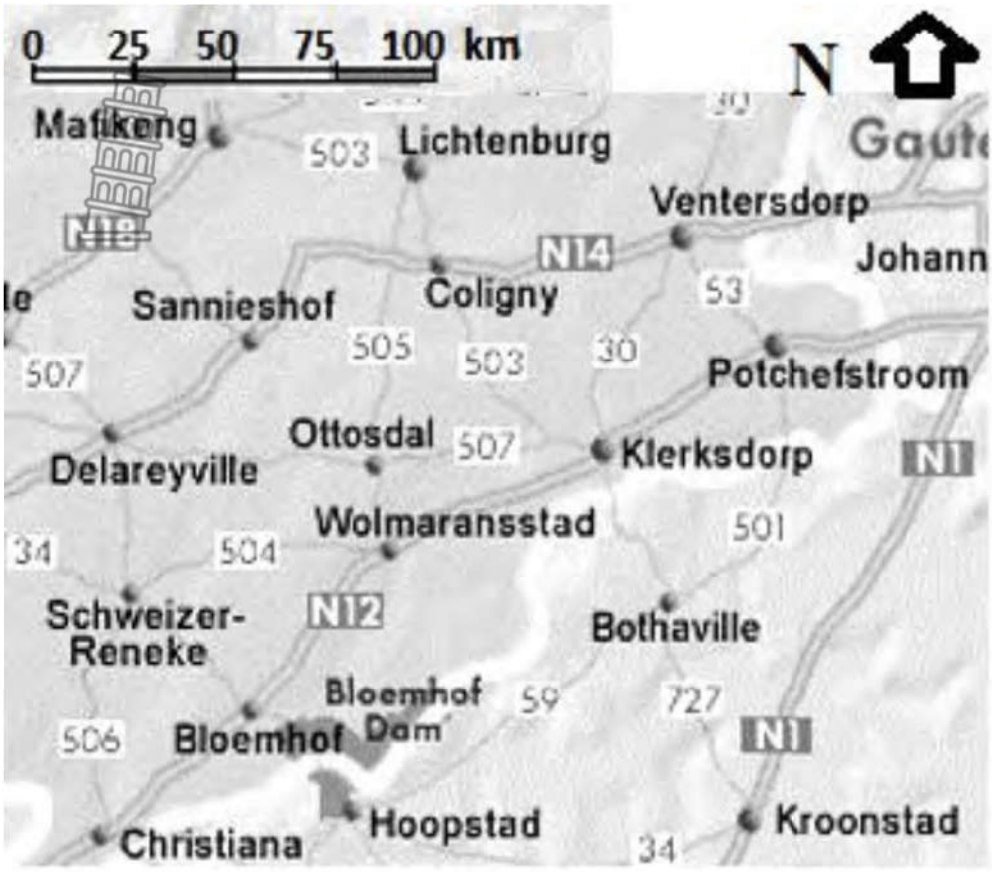
2.2.3 Mr January wants to extend his business to Klerksdorp. After visiting Vereeniging, he travels to Klerksdorp to investigate the possibility of extending his business.

Name the road(s) he will use if he drives from his home to Vereeniging and then to Klerksdorp via Potchefstroom. (2)

2.2.4 Mr January gets a contract to supply bar stools to all the national parks shown on the map. Write down the number of national parks he will supply with bar stools. (2)

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2.3 The following provincial map also shows Klerksdorp and Potchefstroom:



[Source: http://www.suedafrika.net]

Use the map above to answer the following questions.

2.3.1 Give two differences between the provincial map above and the type of map in ANNEXURE B. (4)

2.3.2 Write down the general direction of Potchefstroom from Klerksdorp. (2)

2.3.3 Mr January states that the real distance between Potchefstroom and Klerksdorp differs between the above map and the map shown in Annexure B. Verify, showing all calculations, if Mr January is correct. (6)

[28]

QUESTION 3

3.1 Ms Jones is a mother who wants to make a dollhouse for her kids for Christmas. She finds a plan for the following dollhouse on the Internet.

ANNEXURE C shows the parts and dimensions of the dollhouse.

DOLLHOUSE TO BE CONSTRUCTED:



[Adapted from www.abeautifulmess.com]

The whole dollhouse is cut out of a plywood board with dimensions of 4 feet × 4 feet.

Note: 1 foot = 30,48 cm

You may use the following formulae:

Area of rectangle = length × width
Area of triangle = $\frac{1}{2}$ × base × height

Use the information above and ANNEXURE C to answer the questions that follow.

3.1.1 Define the concept *area*. (2)

3.1.2 Determine the area of the plywood board in square metres. Round your answer to two decimal places. (5)

3.1.3 Use the sizes of the dollhouse on ANNEXURE C to calculate the following:

(a) The area of the triangular part of the backboard. (2)

(b) The area of the rectangular part of the backboard. (2)

(c) The total area, in m², of all the boards to make the dollhouse. (4)

3.2 Ms Jones also bought a pool for her kids for Christmas.

The pool looks as follows:



[Source: leisurefayre.com]

Ms Jones finds the following dimensions for the pool:

Diameter = 3,4 m
The volume of water when the swimming pool is 90% full = 9 090 ℓ
Note: 0,001 m^3 = 1 ℓ

You may use the following formula:

The Volume of a cylinder = $\pi \times (\text{radius})^2 \times$ height, where $\pi = 3{,}142$

Use the information above to answer the following questions.

3.2.1 Ms Jones also wants to buy a ladder for the kids to get into the pool. The ladder should be higher than the height of the pool. She has a ladder of 1,1 m in mind; will the ladder be high enough?

Show calculations to verify your answer. (8)

3.2.2 Give a reason why the ladder below must be placed over the edge of the pool.





(2)
[25]

QUESTION 4

4.1 Mr and Mrs Tsie are looking forward to buying their first family home. They find the following house plan that will suit their needs:



[Source: nethouseplans.com]

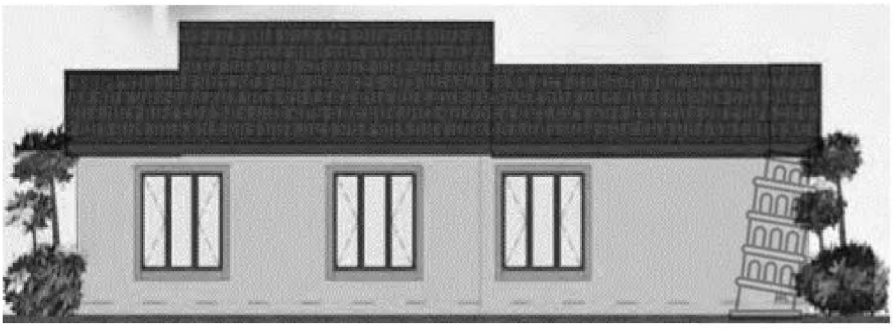
Use the information above and answer the questions that follow.

4.1.1 Write down the number of interior doors and the number of exterior doors the house has. (4)

4.1.2 Complete the statement by providing the correct direction.

As you enter the house through the door at the lounge, turn … and walk towards the dining room. (2)

4.1.3 Identify the following elevation plan of the house:



(2)

4.1.4 The Tsies must decide on the floor covering of the two bedrooms and the short passage leading from the door to bedroom 1. The total area to be covered is 49 m^2.
Mr Tsie suggests they use laminated flooring. Mrs Tsie says that it will be cheaper to tile the same area.

The costs involved for both floor coverings are given below.

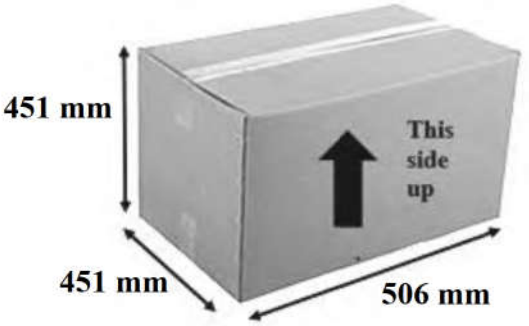
Laminated flooring	**Tiles**
• Cost R245 per m^2 for all materials. • Labour costs R50 per m^2.	• The tiles cost R95,99 per m^2. • The grout: one 5 kg bag for every 13 m^2. • The cost of one 5 kg bag of grout is R60,00. • They will need 11 bags (20 kg) of tile cement which will cost R65,00 per bag. • Labour will cost R2 500 for the whole job.

a) Determine the cost for laminated flooring in the mentioned area. (4)

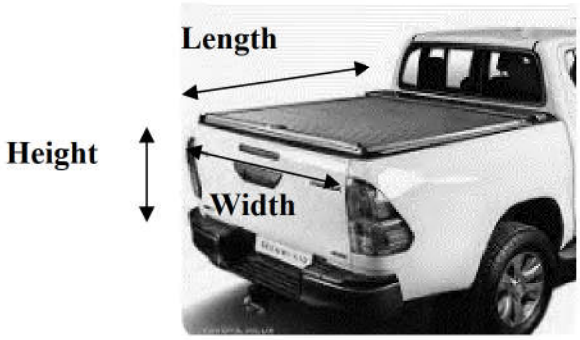
b) Calculate the number of bags of grout they need to buy to do the tiling. (2)

c) Determine the total cost to tile the area. (4)

4.2 When moving from one house to the other, the Tsie family pack their belongings in moving boxes as follows:

Mrs Tsie packing her belongings	**The moving box has the following dimensions:**
	

The boxes will be loaded onto the back of a bakkie. The dimensions of the load bin of the bakkie they will use to move are shown below.

Dimensions of the load bin of the bakkie	**Picture of the load bin of the bakkie**
Length = 1 690 mm Width = 1 355 mm Height = 520 mm	

4.2.1 The moving boxes must be packed as indicated on the box.

Calculate the maximum number of moving boxes they will be able to load on the back of the bakkie if they only pack one layer. (7)

4.2.2 The bakkie they use for the move has a petrol consumption of 11 km/ℓ. The distance from their old house to their new one is 55 km. They need to load the bakkie six times with boxes. The bakkie returns to the first house every time.

Calculate the petrol cost to transport all boxes from one house to the other if the petrol price is R25,97/ℓ. (6)

[31]

QUESTION 5

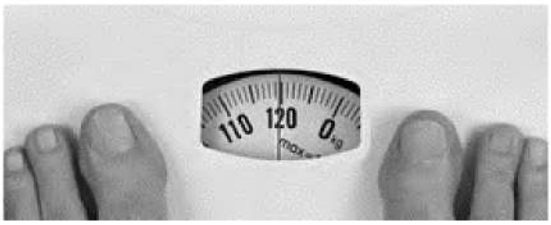
5.1 Leo is overweight and visits Lilly, a dietician who helps patients to learn healthy eating habits. Lilly weighed him to determine his mass to plan his diet.

ANNEXURE D shows the diet and the kilojoule counter. The energy provided by food to the human body is measured in kilojoules (kJ). Each food source has its energy value.

Note:
'Cheat day' – A day you are allowed to deviate from your diet plan.

Use the information above and ANNEXURE D to answer the questions that follow.

5.1.1 Leo has a BMI of 44,1 kg/m^2. His mass is shown on the scale below.



Determine, rounded to two decimal places, Leo's height using the following formula:

$$\textbf{BMI} = \frac{\textbf{mass in kg}}{(\textbf{height in m})^2}$$ (5)

5.1.2 Write down how the kilojoule count for day 1 compares with that of day 2 for
(a) breakfast and
(b) lunch. Show all your calculations.
(7)

5.1.3 Leo has a 'cheat day' on Saturdays. He wants to grill a 350 g steak. Calculate the number of kilojoules he will consume eating this steak. (3)

5.2 Lilly also advised Leo to do some exercise to assist with the weight loss process. Leo stays in Bloemfontein.

ANNEXURE E shows a part of a map of Bloemfontein.

Use ANNEXURE E to answer the following questions.

5.2.1 Identify the type of map shown on ANNEXURE E. (2)

5.2.2 Leo decides to start exercising on a small scale. His office is located at the corner of Markgraaff and Barnes Street. His wife will pick him up at the corner of Selbourne Street and First Avenue.

Using compass directions, describe Leo's route if he only wants to take one turn. (5)

5.2.3 Write down the general direction of the endpoint of Leo's route from Leo's workplace. (2)

5.2.4 Give ONE reason why there are two streets marked N8. (2)

5.2.5 The daily distance that Leo will be running is 1,291 km. Leo starts running at 17:05 and reaches his endpoint at 17:20. Calculate Leo's running speed. Give your answer in km/h.

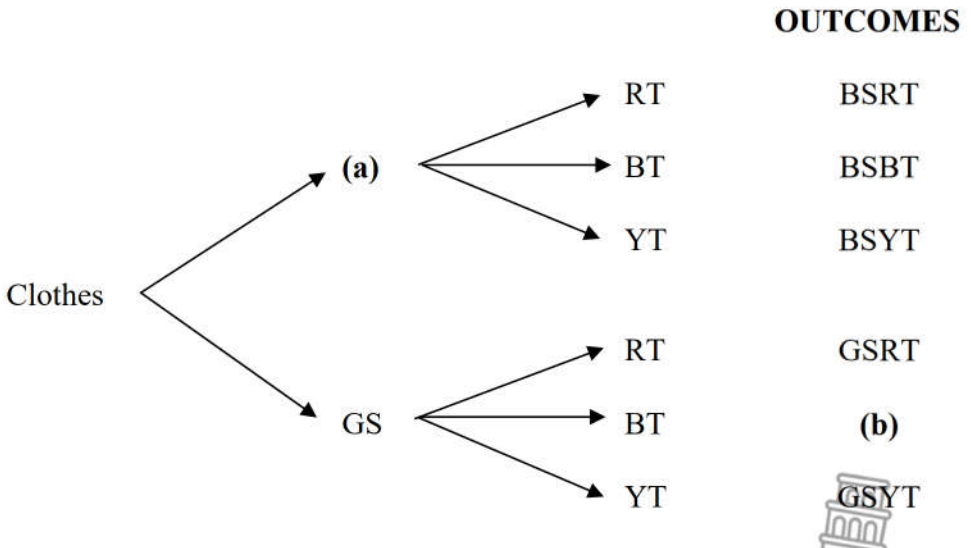
You may use the following formula: **Distance = Speed × Time.** (5)

5.3 Leo's wife bought him new clothes to exercise in.

She bought him two pairs of shorts: Black shorts (BS) and grey shorts (GS), and three T-shirts: a red one (RT), a blue one (BT) and a yellow one (YT).

The following tree diagram shows the different combinations that Leo can choose from when he combines a short and a T-shirt.

TREE DIAGRAM TO SHOW LEO'S EXERCISE OUTFITS



Complete the tree diagram by writing down the answers for **(a)** and **(b)**. (4)
[35]

TOTAL: 150

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MATHEMATICAL LITERACY P2

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ADDENDUM

This addendum consists of 6 pages with 5 annexures.

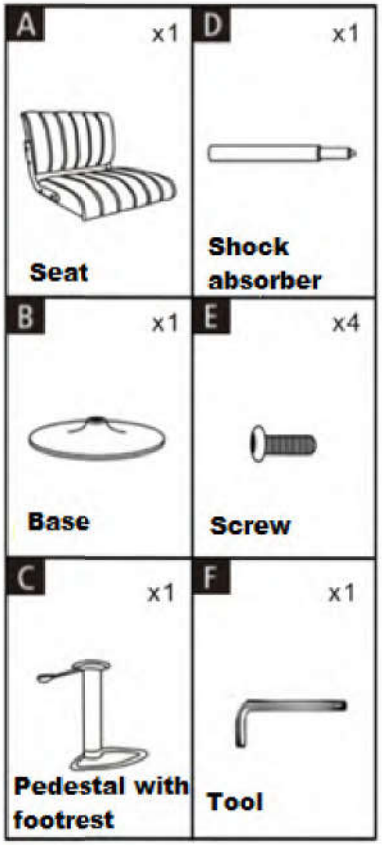
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ANNEXURE A

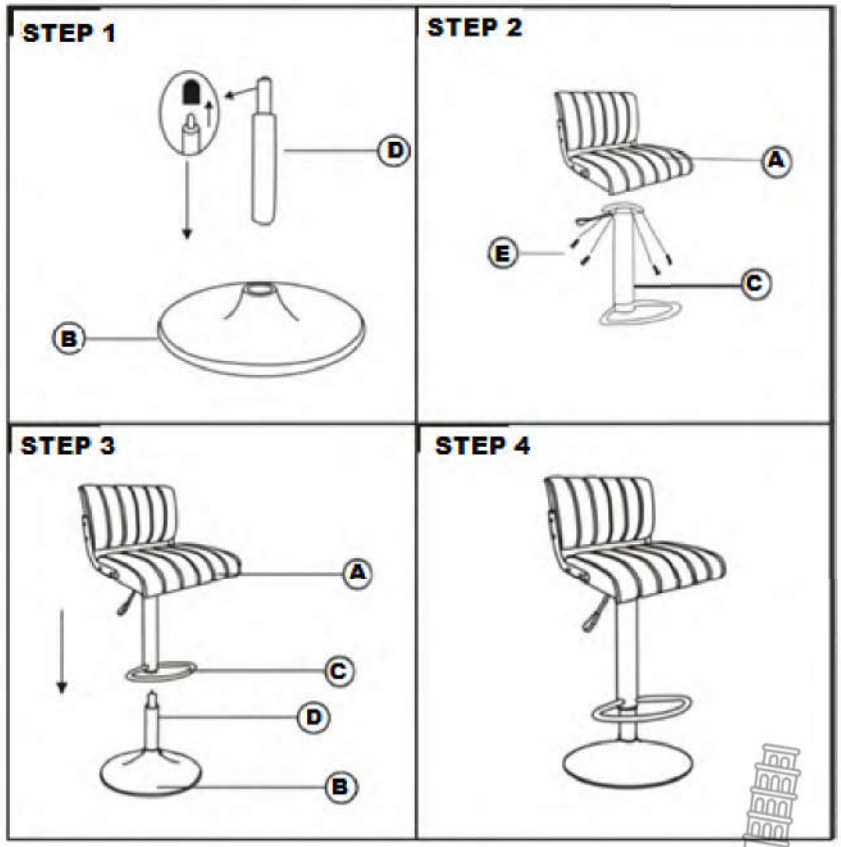
QUESTION 2.1

DIAGRAM: 2 ASSEMBLY DIAGRAM FOR BAR STOOL

PARTS



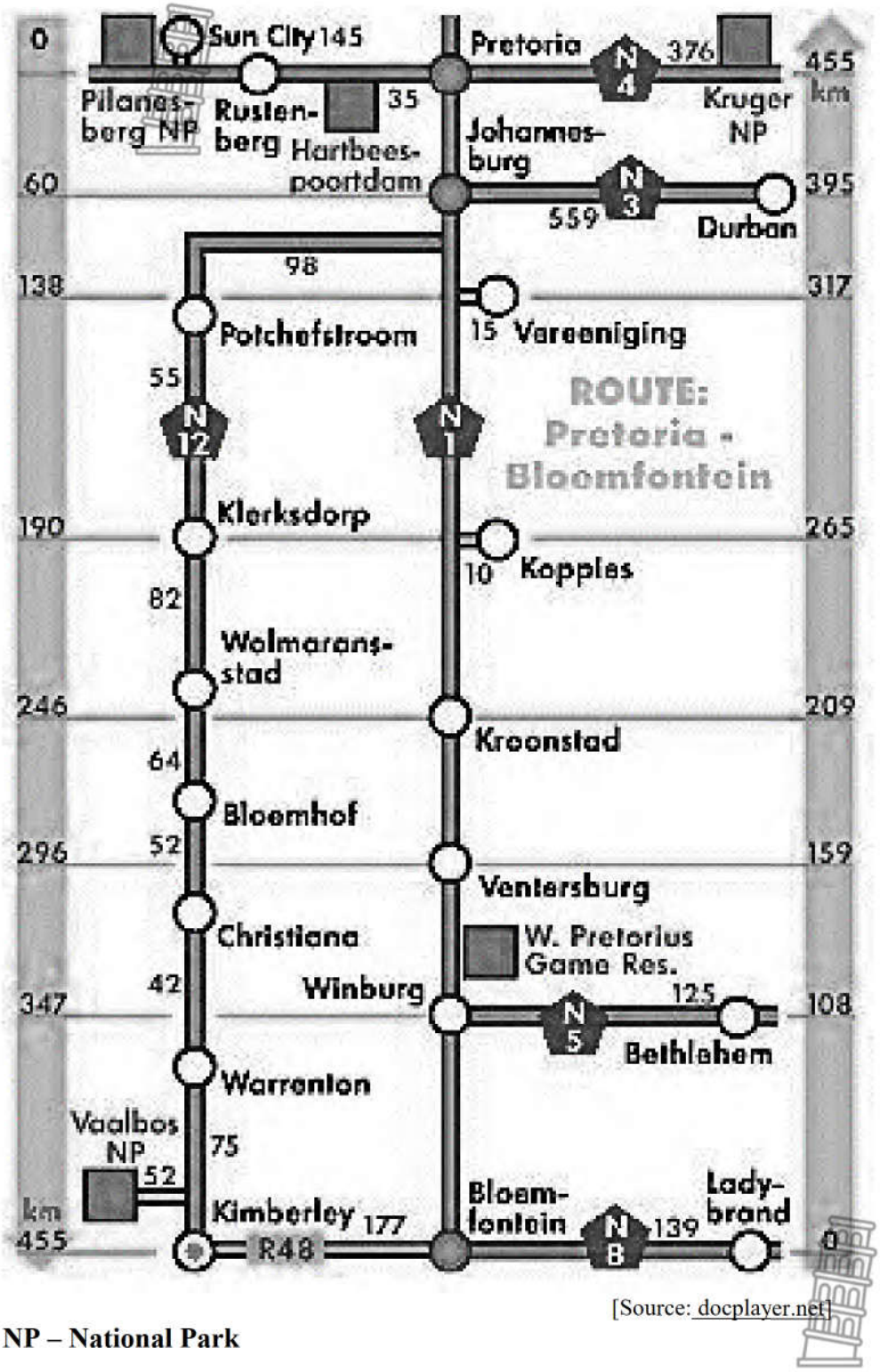
ASSEMBLY INSTRUCTION



[Source:iwmhchair.com]

ANNEXURE B

QUESTION 2.2



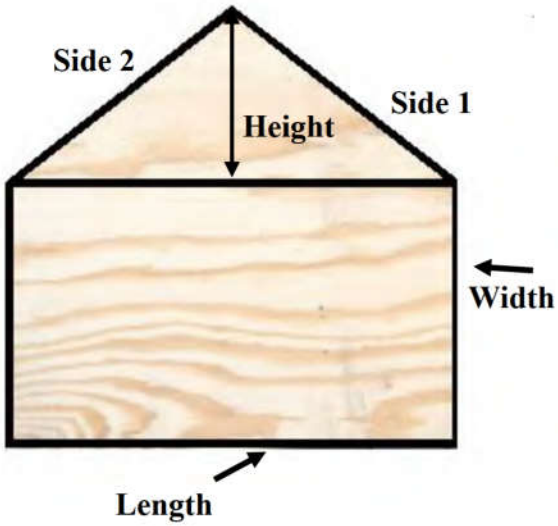
[Source: docplayer.net]

NP – National Park

ANNEXURE C

QUESTION 3.1

PARTS OF DOLLHOUSE WITH DIMENSIONS

NAME, QUANTITY AND PICTURE	DIMENSIONS
BACK BOARD (ONE) 	**Side 1 = 39,79 cm** **Side 2 = 39,79 cm** **Height = 25,576 cm** **Width = 30,48 cm** **Length = 60,96 cm**
SIDE BOARD (TWO) 	**Area of one board = 464,5152 cm²** **Length = 30,48 cm** **Width = 15,24 cm**
MIDDLE BOARD (THREE) 	**Area of one board = 926,4396 cm²** **Length = 60,79 cm** **Width = 15,24 cm**
ROOF BOARD (TWO) 	**Area of one board = 1 248,4608 cm²** **Length = 60,96 cm** **Width = 20,48 cm**

[Adapted from abeautifulmess.com]

ANNEXURE D

QUESTION 5.1

LEO'S DIET FOR 2 DAYS TO LOSE WEIGHT

	DAY 1	DAY 2
BREAKFAST	2 Eggs 1 Slice of wholewheat toast $\frac{1}{2}$ Grapefruit	2 Eggs 1 Slice of wholewheat toast $\frac{1}{2}$ Grapefruit
MORNING TEA	1Small rusk 1 Small apple	1 small rusk 1 small orange
LUNCH	200 g chicken breast Salad with tomato and cucumber 1 Cup of spinach 1 Cup of cabbage 5 small potatoes	Sandwich with two slices of wholewheat bread 100 g cheese Sliced tomato 1 small apple
AFTERNOON TEA	10 raw almonds 1 small orange	10 raw almonds 1 small orange
SUPPER	100 g grilled fish Salad with tomato and lettuce 5 small potatoes	100 g grilled steak 1 cup mushrooms

KILOJOULE COUNTER:

FOOD	KILOJOULES
1 egg	310
1 slice whole wheat toast	536
1 grapefruit	342
1 small rusk	171
200 g of chicken breast	1 565
1 small apple	324
5 small potatoes	1 100
10 raw almonds	288
1 cup of spinach	30
1 cup of cabbage	89
100 g grilled fish	456
1 small orange	189
100 g cheese	843
100 g grilled steak	1 054
1 cup mushrooms	75

NOTE: FREE VEGETABLES (ZERO KILOJOULES)
*TOMATO
*CUCUMBER
*LETTUCE

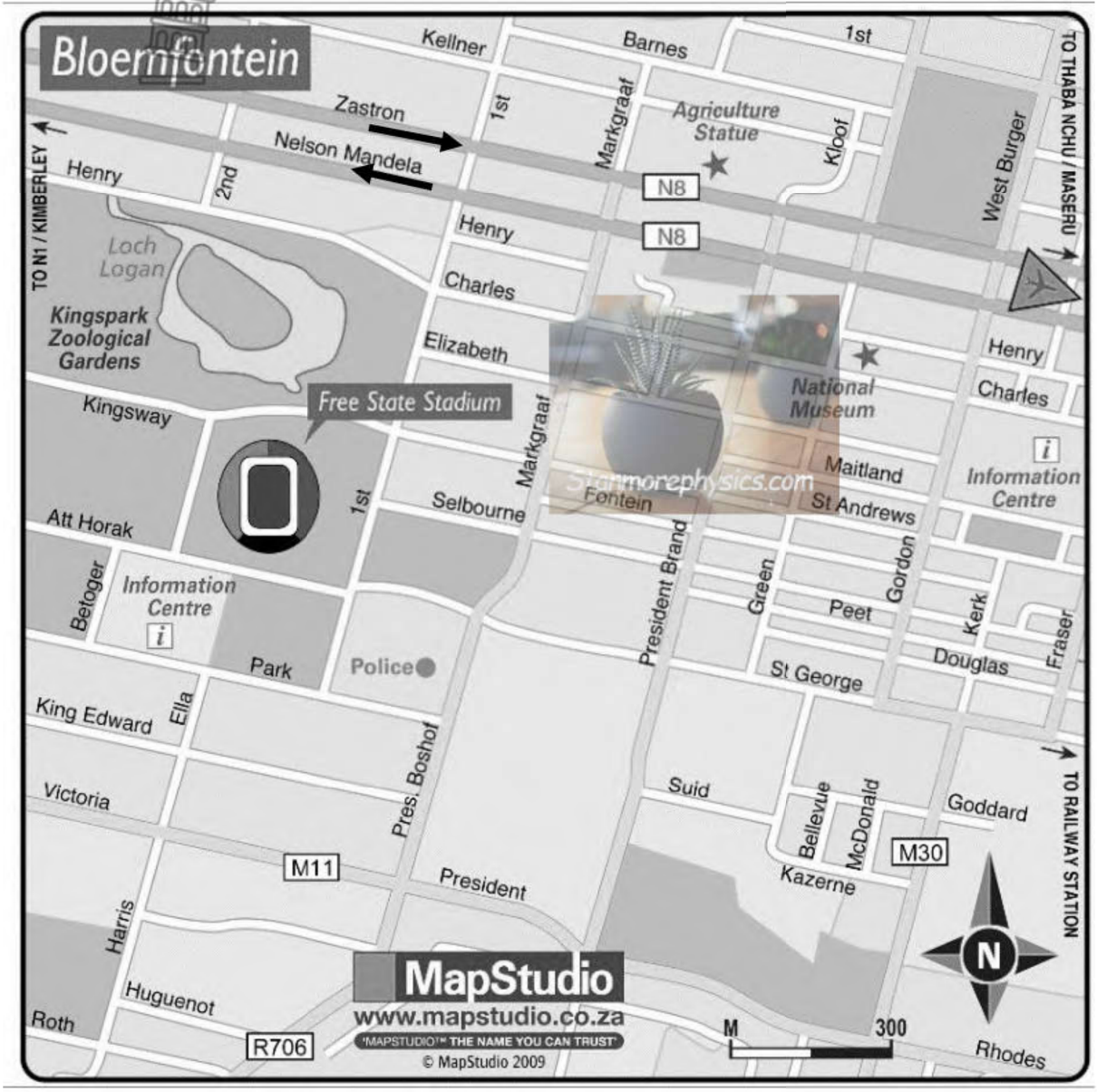
*Can be eaten freely.

[Adapted from www.healthdirect.gov.au]

ANNEXURE E

QUESTION 5.2

MAP OF BLOEMFONTEIN



[Source: www.mapstudio.co.za]

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VOORBEREIDENDE EKSAMEN

GRADE/*GRAAD* 12

MATHEMATICAL LITERACY P2
WISKUNDIGE GELETTERDHEID V2

SEPTEMBER 2023

MARKS/*PUNTE*: 150

MARKING GUIDELINES/*NASIENRIGLYNE*

Symbol/*Kode*	Explanation/*Verduideliking*
M	Method/*Metode*
MA	Method with accuracy/*Metode met akkuraatheid*
CA	Consistent accuracy/*Volgehoue akkuraatheid*
A	Accuracy/*Akkuraatheid*
C	Conversion/*Herleiding*
S	Simplification/*Vereenvoudiging*
RT	Reading from a table/a graph/document/diagram/*Lees vanaf tabel/'n grafiek/dokument/ diagram*
SF	Correct substitution in a formula/*Korrekte vervanging in 'n formule*
O	Opinion/Explanation/*Opinie/Verduideliking*
P	Penalty, e.g. for no units, incorrect rounding off, etc./*Penalisasie, bv. vir geen eenhede, verkeerde afronding ens.*
R	Rounding off/*Afronding*
NPR	No penalty for correct rounding/*Geen penalisasie vir korrekte afronding nie*
AO	Answer only/*Slegs antwoord*
MCA	Method with constant accuracy/*Metode met volgehoue akkuraatheid*
NPU	No penalty for unit/*Geen penalisasie vir eenheid nie*

These marking guidelines consists of 13 pages.
Hierdie nasienriglyne bestaan uit 13 bladsye.

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