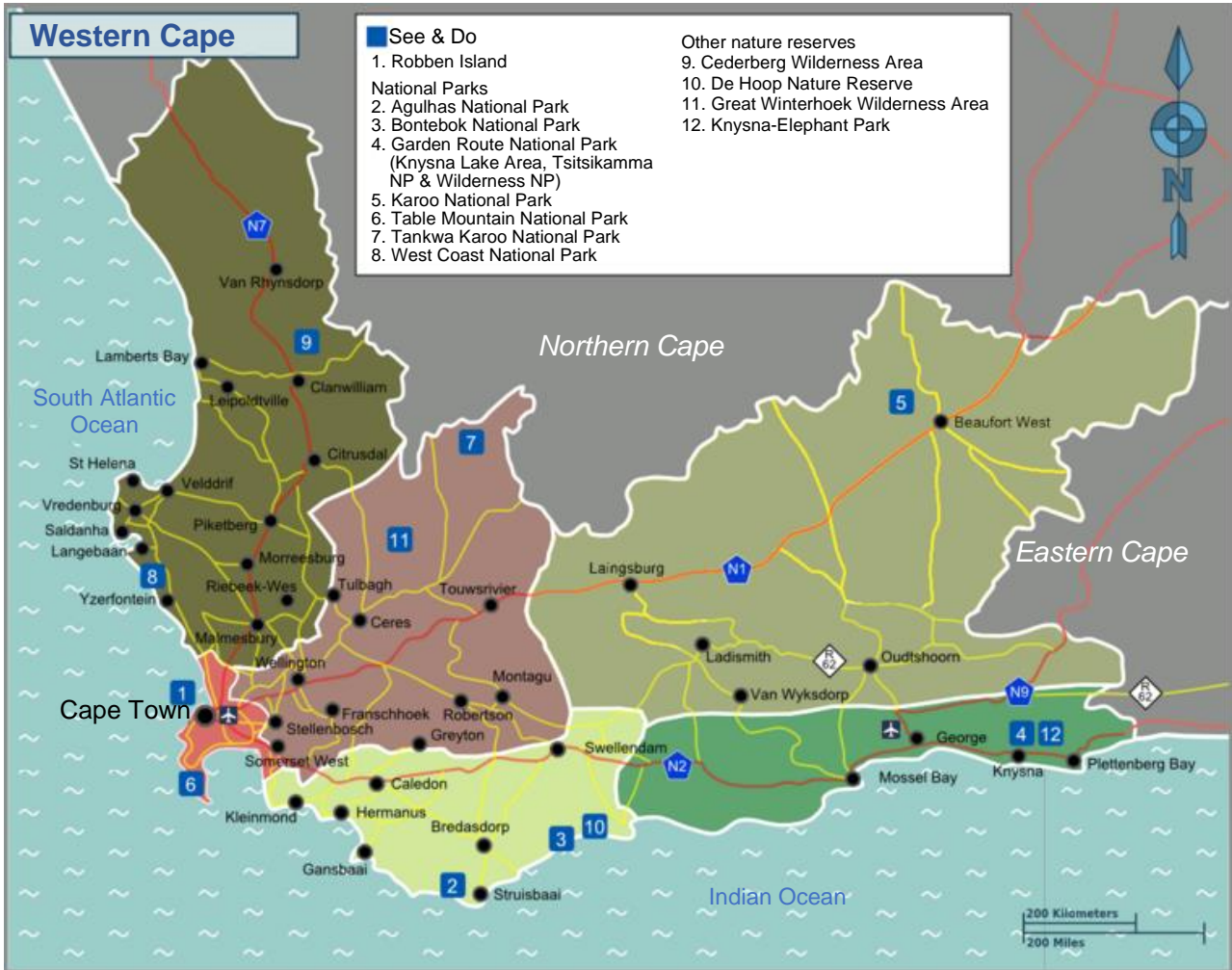


QUESTION 1

The Western Cape is a popular holiday destination for both local and international holiday makers. It is divided into several smaller regions, shown by the different coloured areas on the map below. The map also shows cities, towns and roads in these regions.



[Source: <https://commons.wikimedia.org/wiki/File:Map-South_Africa-Western_Cape_travel_regions_%282023%29.png>]

1.1 Study the map above before answering the questions that follow.

1.1.1 Into how many regions is the Western Cape divided?

(2)

1.1.2 Identify two oceans shown on the map.

(2)

1.1.3 Name two provinces that border the Western Cape.

(2)

1.1.4 Give the type of scale used on this map.

(2)

1.2 Steve Peters will be travelling from Cape Town to Knysna to visit family.

1.2.1 Use a ruler to measure, to the nearest millimetre, the straight-line distance from Cape Town to Knysna.

(2)

1.2.2 (a) Identify the road that Steve Peters should travel to get from Cape Town to Knysna.

(2)


(b) What does the letter N stand for on the road marked N9?

(2)

1.2.3 Name TWO tourist attractions that Steve Peters will be able to visit in Knysna.

(2)

1.3 Steve Peters will be flying from Johannesburg OR Tambo International Airport to Cape Town International Airport. He finds the following information online about the luggage policy of FlySafair.



Hand Luggage	Checked-in Luggage
Your fare covers two free carry-on bags. The larger of the two should not weigh more than 7 kg.	Checked-in luggage can be purchased separately. Should you wish to add a 20 kg bag to your flight, this can be selected on our Extras page during the online flight-booking process for R155.
Max Weight: 7 kg	Max Weight: 20 kg
Maximum dimensions: Height: 56 cm Length: 36 cm Width: 23 cm	Maximum dimensions: Height: 90 cm Length: 75 cm Width: 43 cm

[Source: <<https://www.flysafair.co.za/travel-tools/extras/luggage-policy>>]

Use the above information to answer the following questions.

1.3.1 Calculate the luggage fees if Steve Peters brings the following items on his flight: a laptop bag weighing 3 kg, a 7 kg suitcase and a 19,5 kg suitcase.
Note: He aims to fully utilise the airline's luggage allowance.

(2)

1.3.2 Convert the maximum weight of checked-in luggage to grams.

Maximum weight = _____

(2)

1.3.3 Steve Peters calculated the volume of his checked-in luggage.

(a) Explain the meaning of *volume*.

(2)

(b) The correct formula for the volume of a rectangular prism is: (circle the correct answer)

A Volume = length ÷ width ÷ height

B Volume = length + width + height

C Volume = length × width × height

D Volume = 2(length + width) (2)

(c) Which of the following is **not a correct** unit of measurement for volume or capacity? (circle the correct answer)

A cm³

B ml

C m³

D cm² (2)

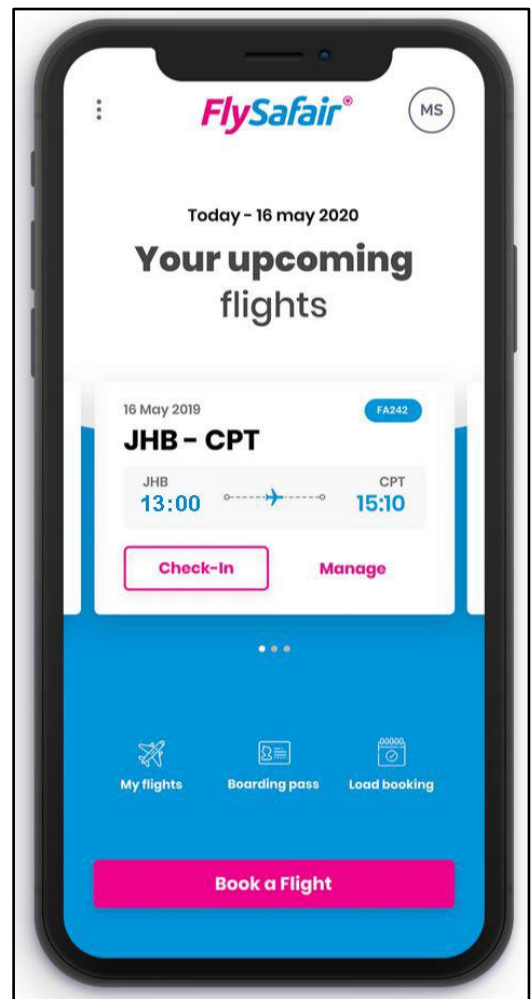
1.4 The following is Steve Peters' boarding pass for his flight from Johannesburg to Cape Town. Use the picture alongside to answer the following questions.

1.4.1 (a) Determine the estimated departure time of Steve's flight from Johannesburg (JHB).

_____ (2)

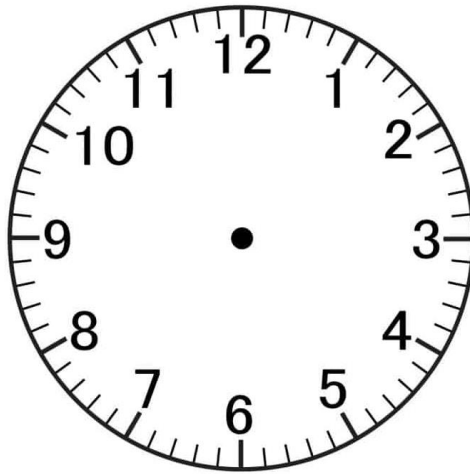
(b) Write down, in words, the time Steve's flight landed in Cape Town (CPT).

_____ (2)



[Source: <<https://www.flysafair.co.za>>]

1.4.2 Steve's flight was delayed and only landed at 15:45. Use the clock face below to display this time. Make sure your hour hand is shorter than your minute hand.

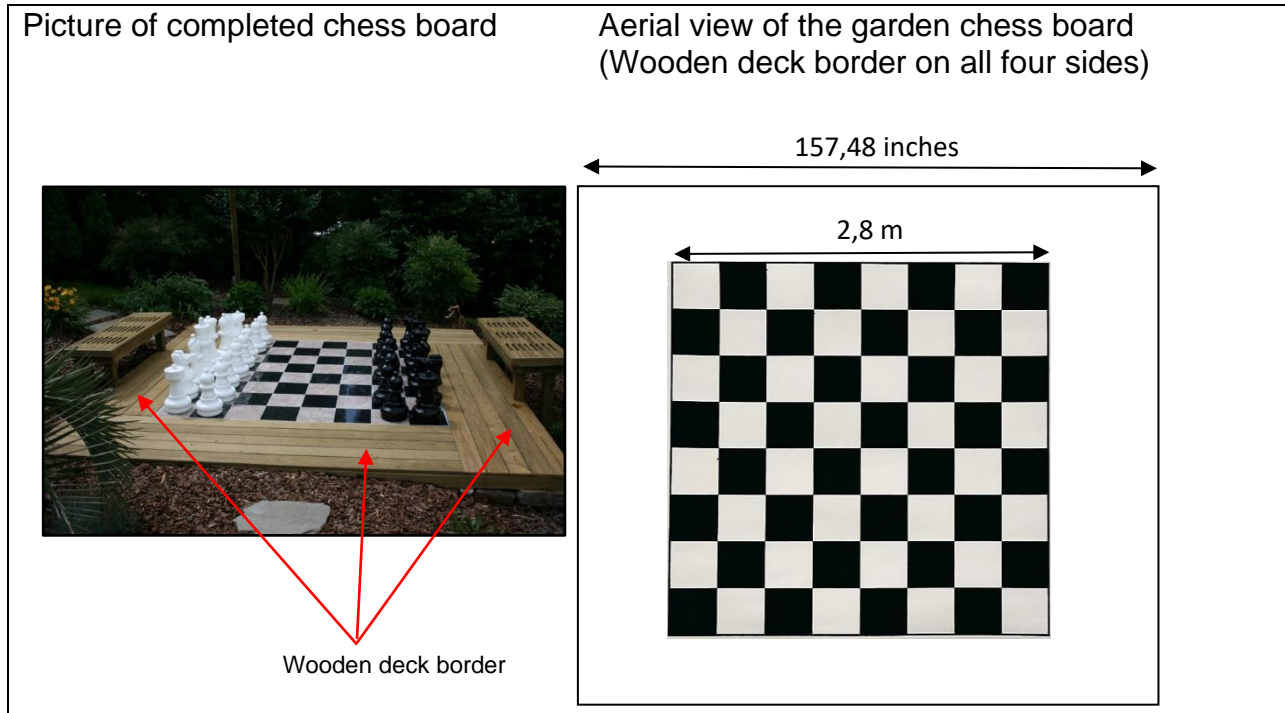


(2)
[32]

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QUESTION 2

Chess is a very popular game played on a square board of 64 squares. Dumisani Ndlovu would like to build a chess board in his garden. He will make the black and white chess board with ceramic floor tiles. He will then add a wooden deck border all around the chess board. A picture and an aerial view of the finished garden chess board is shown below.



2.1 Use the picture and plan of the chess board to help Dumisani with the construction of his garden chess board.

2.1.1 Explain the meaning of *aerial view*.

(2)

2.1.2 Calculate, in m², the area of the chess board without the wooden deck border.

You may use the following formula:

$$\text{Area of rectangle} = \text{length} \times \text{breadth}$$

(2)

- 2.1.3 (a) Show, rounded to the nearest cm, that the length of the wooden deck is 400 cm, if 1 inch = 2,54 cm.

(2)

- (b) Calculate, in m², the area taken up by the wooden deck surrounding the chessboard.

You may use the following formula:

$$\text{Area of rectangle} = \text{length} \times \text{breadth}$$

(4)

2.1.4 The surrounding wooden deck border will be made up of single pieces of wooden decking boards assembled.




Figure 1: Deck made from single decking boards assembled together

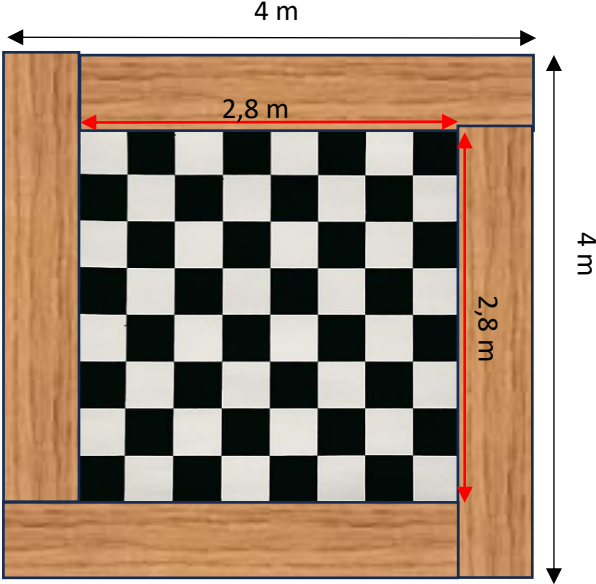


Figure 2: Floor Plan of chess board with wooden deck border




Figure 3: Single decking board

Decking Board Dimensions:
 Length 1700 mm
 Width 120 mm
 Cost R260 per board excluding VAT

[Source: <<https://leroymerlin.co.za/decking-board>>]

Use the information above to answer the following questions.

- (a) Using calculations, show that the width of the wooden deck around the chess board is 600 mm.

(3)

- (b) Using the dimensions given, calculate the number of single decking boards Dumisani will need to complete his deck if he assembles the decking boards as shown in Figure 1.

(6)

(c) Using your answer in **Question 2.1.4 (b)**, calculate the total cost of the decking, including VAT.

(3)

2.2 Dumisani will need to purchase 64 ceramic floor tiles to make up the chess board.

2.2.1 Each player in a game of chess has 16 pieces. Calculate the total number of unoccupied squares on a chessboard when all the pieces are placed, each on a separate square, on both sides of the board.

(3)


2.2.2 Determine the number of white and black ceramic floor tiles Dumisani needs to purchase to complete the chessboard.

White _____

Black _____

(2)

2.2.3 Dumisani could not locate sufficient black ceramic floor tiles. He decides to paint all the required black tiles using a special tile paint, as shown in the picture below. The dimensions of each tile are 350 mm by 350 mm.

	Plascon Stoep Enamel	
	Colour	Black
	Size	1 litre can
	Spread rate	14,3 m ² /litre
	Cost per tin	R329

Dumisani states that he will only need one can of paint if he paints the required tiles with two coats of paint. Show, using calculations, if Dumisani's statement is correct.

You may use the following formula:

$$\text{Area of square} = \text{side} \times \text{side}$$

(7)
[34]

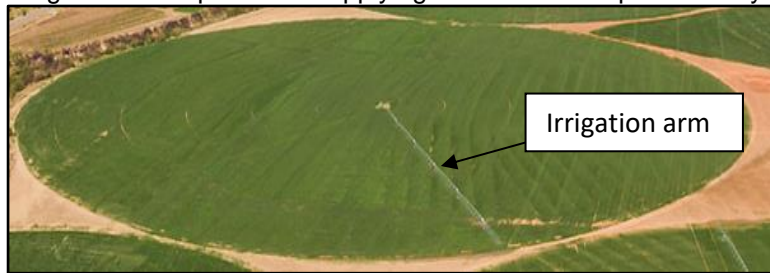
QUESTION 3

Farming in South Africa is big business. An important aspect of farming in South Africa is having fields under irrigation*. One of the ways to irrigate large areas is by using a centre pivot irrigation system. Centre pivot irrigation system or circle irrigation is a method of crop irrigation in which equipment rotates around a pivot and crops are watered with sprinklers. A circular area centred on the pivot is irrigated, often creating a circular pattern in crops when viewed from above like the one shown in the photograph alongside and below.



[Source: <https://www.agrico.co.za>]

*Irrigation is the process of applying water to the crops artificially to fulfil their water requirements.



[Source: <https://www.agrico.co.za>]

Use the above information to answer the following questions.

3.1 Agrico have developed the G4 centre pivot system. The structure allows for shorter sections of 70 m pieces to be connected to create a long, segmented arm that can irrigate large fields at once.

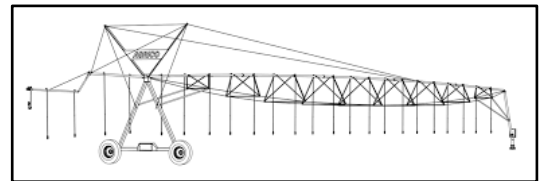


Figure 1: One irrigation section of 70 m

3.1.1 Piet Cronjé has connected five of these 70 m sections together, to form one long irrigation arm. Calculate the total length of the irrigation arm he has created.

(2)

3.1.2 Using your answer from **Question 3.1.1**, calculate, in m², the total area of the circular field that Piet Cronjé has under irrigation.

You may use the following formula:

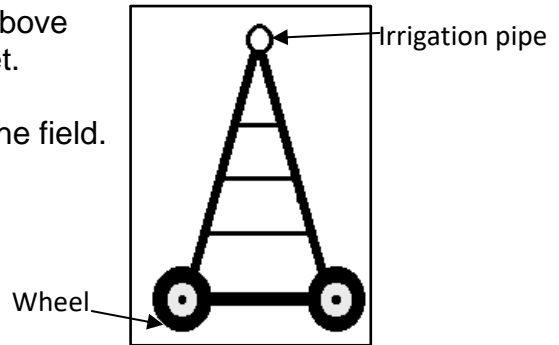
$$\text{Area of a circle} = \pi \times \text{radius}^2 \quad \pi = 3,142$$

(3)

3.1.3 Using your answer from **Question 3.1.2**, convert, to one decimal place, the area of the circular field to hectares. Note: 1 hectare = 10 000 m².

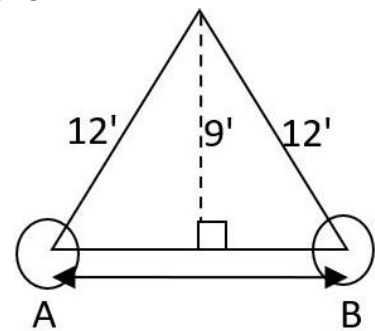
(3)

3.2 The irrigation pipe is supported by towers above the ground. The minimum height is nine feet. Wheels and electric motors are installed on the tower to move the centre pivot around the field.



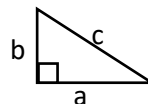
Use the above information to answer the following questions.

3.2.1 Calculate, in metres, the length from A to B. All lengths in the diagram alongside are in feet. Round off your answer to the nearest metre if 1 foot = 0,3048 metres.



You may use the following formula:

$$a^2 + b^2 = c^2 \text{ (Pythagoras Theorem)}$$



(6)

3.2.2 Each tyre on the wheels of the irrigation tower has a diameter of 1160 mm. Calculate, in metres, the circumference of one tyre.



You may use the following formula:

$$\text{Circumference of a circle} = \pi \times \text{diameter}$$



$$\pi = 3,142$$

(3)

3.2.3 The wheels of the irrigation tower rotate at an average rate of 2 minutes per metre. Calculate the time required to complete one full cycle around the field, given that the field has a circumference of 2,2 km. Provide your answer in hours and minutes.

(5)

3.3 The following galvanised piping is used in the central pivot system as shown in the picture below. These pipes can be joined together at the ends using bolts.

Pipe dimensions

Outside diameter: 17 cm

Inside diameter: 16 cm

Length: 3500 cm

[Source: <<https://directpivotparts.com/products>>]

Use the above information to answer the following questions.

3.3.1 Calculate, in cm³, the inside volume of one of these galvanised pipes.

You may use the following formula:

$$\text{Volume of a cylinder} = \pi \times \text{radius}^2 \times \text{height}$$

$$\pi = 3,142$$

(3)

3.3.2 (a) Calculate how many of these pipes you would need to fit together in order to make an irrigation arm of 420 metres.

(3)

- (b) Using your answers from **Question 3.3.1** and **Question 3.3.2 (a)**, calculate the total volume of water in these pipes, if all the pipes are full to capacity. Round off your answer to the nearest kilolitre.

$$1 \text{ ml} = 1 \text{ cm}^3$$

(5)
[33]

QUESTION 4

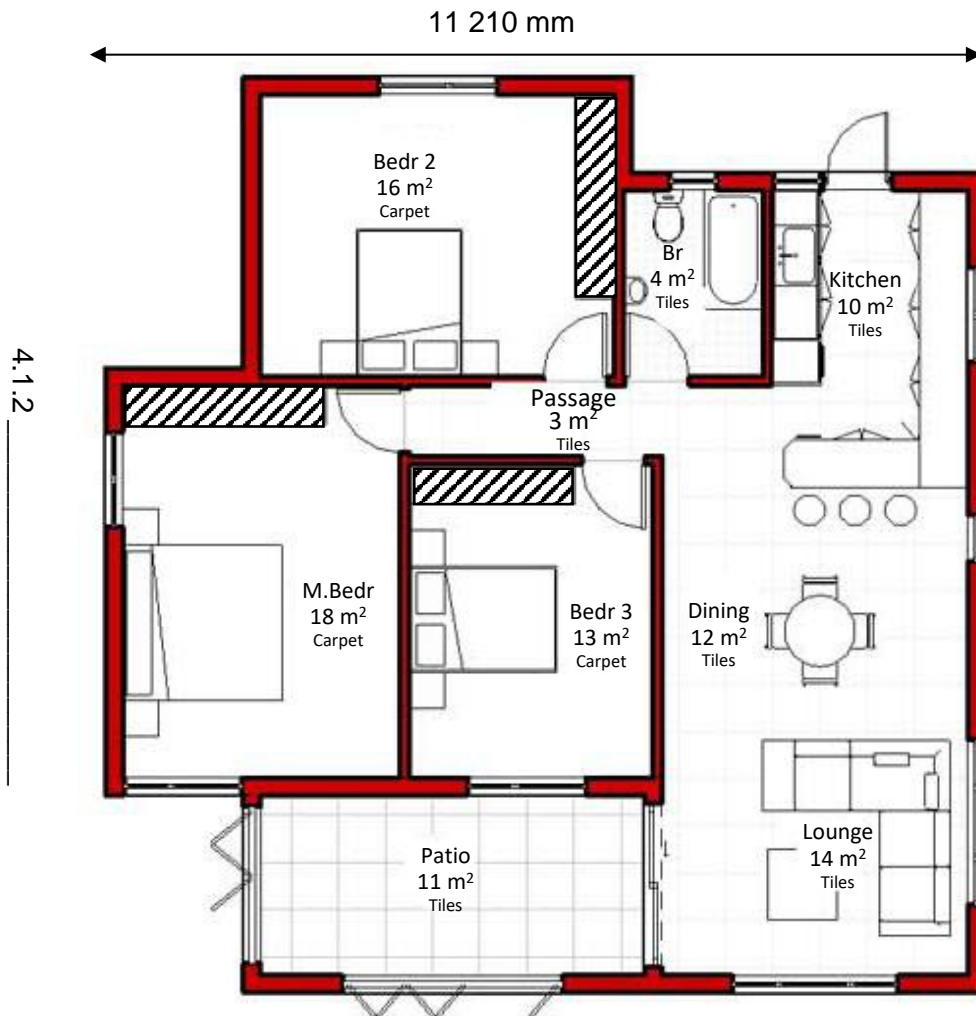
Nceba Tsotsobe is a young drafter working in Johannesburg. A drafter is an expert in using technical drawing equipment or computer software to create highly technical drawings of buildings and structures.



4.1 Nceba has been working on a new housing project in Centurion, a city near Pretoria. She has created the following construction drawing for a single house.

4.1.1 Give the specific name of the construction drawing shown below.

(2)



[Source: <<https://www.archid.co.za/read-house-plans-floor-plans>>]

4.1.2 Label the side **4.1.2** on the drawing above with the correct compass direction, given that the patio is south facing. (2)

4.1.3 Using the measurement of 11 210 mm and a ruler, calculate, to the nearest 10, the unit ratio scale of this drawing. Show all your working.

(4)

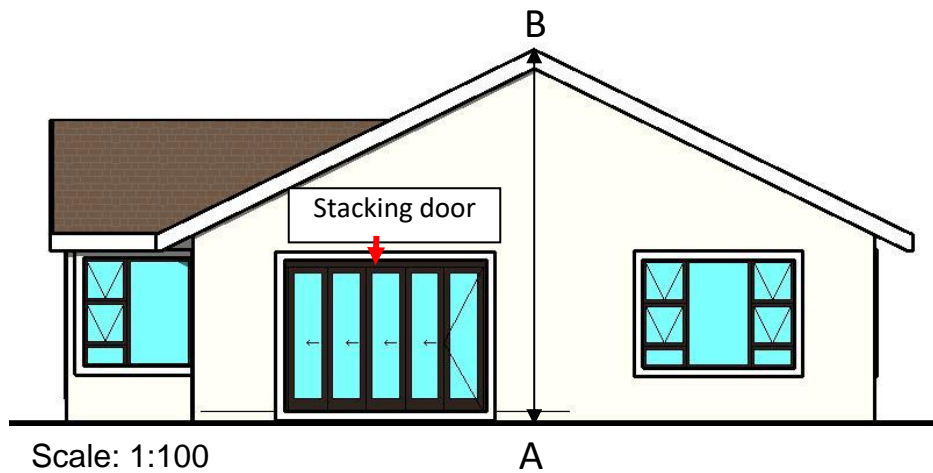
4.1.4 Give a possible reason why the bedroom doors in the main bedroom and bedroom 3 do not open into the passage.

(2)

4.1.5 This drawing shows a small three-bedroom house. Identify ONE feature, other than size, of this house which could be a challenge for a family of four.

(2)

4.2 Nceba also drew the side elevation for this house as shown below.



[Source: <<https://www.archid.co.za/read-house-plans-floor-plans>>]

Use the above house elevation to answer the following questions.

4.2.1 Circle the side of the house that is illustrated in this elevation plan.

- A North elevation
- B South elevation
- C East elevation
- D West elevation (2)

4.2.2 A stacking door is shown in this elevation plan. Nceba has drawn another stacking door in this house. Which elevation plan would this second stacking door be shown on?

(2)

4.2.3 Use the given scale to calculate, in metres, the height of the house, shown by the line AB.

(4)

4.3 As this is a new building, owners can select their choice of wall and roof colour when purchasing their house. They have the following options:

Wall Colour	Roof Colour
Navy Blue	Red
Grey	Green



List all the possible combinations of wall colour and roof colour a home owner can choose from.

(4)

4.4 The new homeowner will be moving into his new house in three days time. He studies the weather forecast for these three days as shown in the table below.

Date	Max Temperature	Chance of Rain
Friday 10 May 2024	10 °C	0,48
Saturday 11 May 2024	17 °C	0,23
Sunday 12 May 2024	22 °C	0,03

4.4.1 State which day has the highest chance of rainfall.

(2)

4.4.2 Calculate the percentage chance that it will not rain on Saturday, 11 May 2024.

(2)

4.4.3 If a day is selected randomly, what is the likelihood that the temperature will exceed 17°C?

(2)

[30]

QUESTION 5

At the end of the year thousands of Grade 12 students travel to Durban to enjoy a week of fun after their final matric examinations during the week-long Matric holiday parties.



The Red Frogs crew is well known for its service during the Matric holiday. They assist matriculants by walking young people home, cooking pancakes, cleaning rooms and most importantly, offering emotional support through what can often be a challenging week.

Dave Alan will be travelling with three friends from Johannesburg to Ballito, on the KwaZulu-Natal North Coast, to work with the Red Frogs crew.

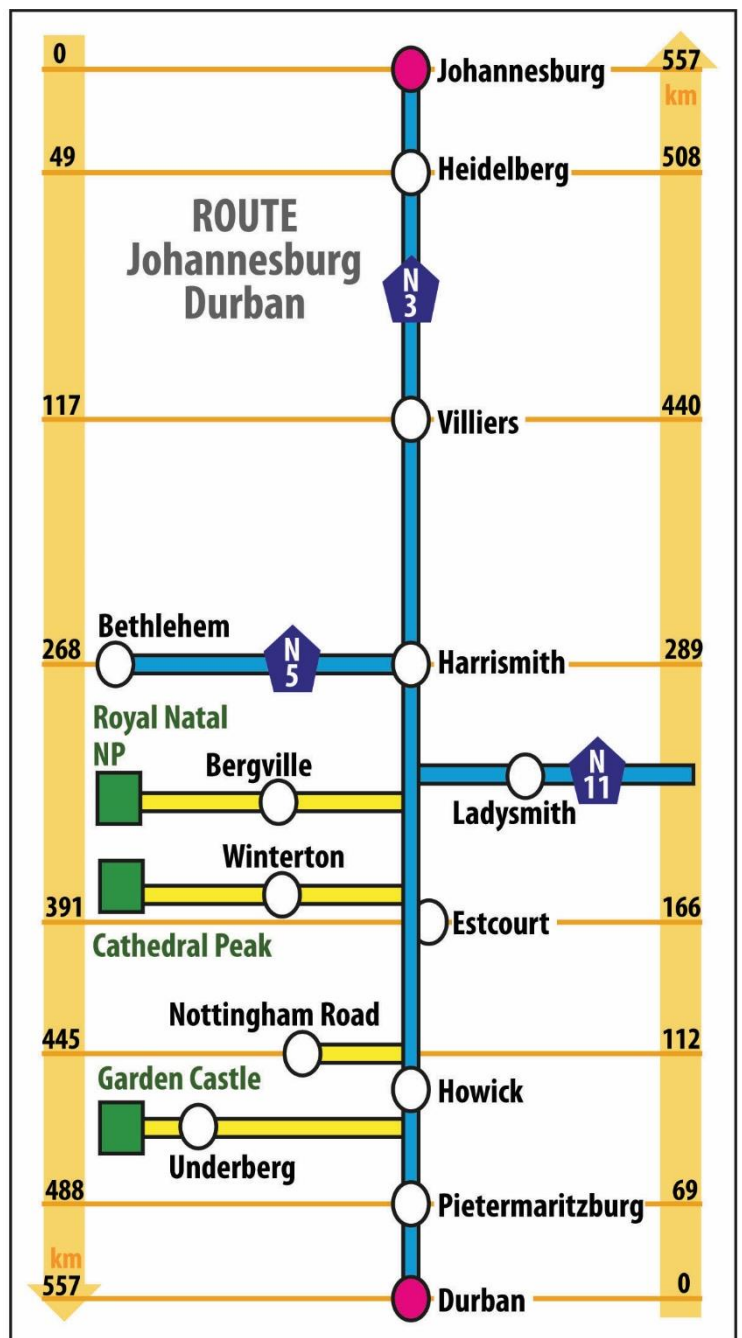
5.1 Dave and his team will need to travel by car from Johannesburg to Ballito. The distance from Durban to Ballito is 43 km along the N2. Use the strip map alongside to answer the questions that follow.

5.1.1 Along which two highways will Dave's team travel?

_____ (2)

5.1.2 They will make a single stop along the N3 route to refuel and rest. Use the map to identify a suitable stop that will divide their journey into approximately two equal segments. Use calculations and distances to justify your answer.

_____ (2)



5.1.3 Dave and his team need to be in Ballito at 6 pm for a team meeting. Determine the latest time they can leave Johannesburg to get to their meeting on time.

Additional information:

- One stop of 45 minutes
- Average travelling speed of 100 km/h

You may use the following formula:

$$Time = \frac{Distance}{Speed}$$

(7)

5.2 One of the services that the Red Frogs provide is to help students back to their accommodation safely. Study the map below and then answer the questions that follow.



5.2.1 Hop's Restaurant & Bar Ballito is on the corner of two roads. Name these two roads.

(2)

5.2.2 (a) A Red Frog crew member needs to help a student get from Hop's Restaurant & Bar Ballito to their accommodation at Sibakwa Guest House. In which general direction will they need to walk?

(2)

(b) Hence, use a pen or highlighter to trace on the given map the **most direct** route that the Red Frog crew member and the student might take to return to the Sibakwa Guest House. (2)

(c) Provide written directions for the route you have traced, making sure to include all street names and directions.

(4)
[21]

Total: 150 marks

