basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P2

EXEMPLAR 2014

MARKS: 150

TIME: 3 hours

This question paper consists of 10 pages and 3 annexures.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of FOUR questions. Answer ALL the questions.
2. Answer QUESTION 1.1.3(a), QUESTION 1.2.2, QUESTION 2.2.1, QUESTION 2.2.4 and QUESTION 3.1.4 on the attached ANNEXURES. Write your examination number and centre number in the spaces provided on the ANNEXURES and hand in the ANNEXURES with your ANSWER BOOK.
3. Number the answers correctly according to the numbering system used in this question paper.
4. Start EACH question on a NEW page.
5. You may use an approved calculator (non-programmable and non-graphical), unless stated otherwise.
6. Show ALL calculations clearly.
7. Round off ALL final answers to TWO decimal places, unless stated otherwise.
8. Indicate units of measurement, where applicable.
9. Maps and diagrams are NOT necessarily drawn to scale, unless stated otherwise.
10. Write neatly and legibly.

QUESTION 1

1.1 The Grade 12 class of XYZ High School is planning a Dinner and Dance evening to raise funds which they will use towards their matric farewell. The organising committee is divided into two groups. One group will investigate the use of the school hall and the other group will try to find another possible venue.

Tickets for the Dinner and Dance evening will be printed at the school at a cost of R2,20 per ticket.

The group that investigated the possibility of using the school hall gathered the following information:

- The venue is free of charge but it must be tidied up before the next assembly.
- The venue includes round tables with a diameter of 1,8 m that can each seat 10 persons.
- Dimensions of the hall: 23 m × 18 m
- Disk jockey (DJ): R1 500 to play from 19:00 to 23:00 + R500 to play from 23:00 to 24:00 and after 12 o' clock midnight R1 000 per hour.
- Catering: R150 per person for a three-course meal (They will only pay for the actual number of persons.)
- Decorating the venue (candles, flowers, table cloths, serviettes et cetera.): R128 per table

1.1.1 Calculate how much it will cost if the disk jockey plays from 7 o'clock in the evening to 2 o'clock the next morning. (3)

1.1.2 Kgothso calculated that they will need 9 m^2 per round table. The committee also decides that the middle third of the length of the hall will be left open for space to dance in.

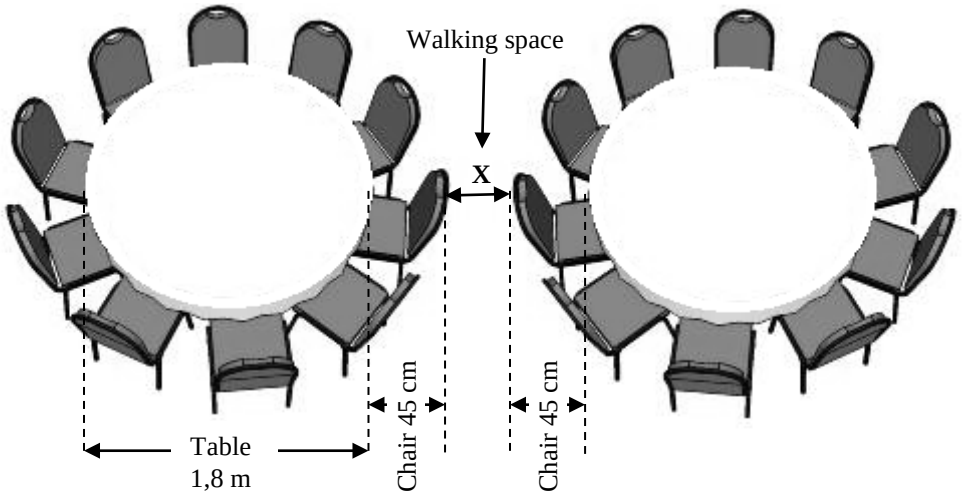
Kgothso claims that 30 of the round tables will fit into the remaining space.

(a) Verify Kgothso's claim that 30 tables will fit into the remaining space.

You may use the following formula:

Area of a rectangle = length × breadth (7)

(b) Calculate the amount of walking space between two tables at the point where they are the closest, if the space allowed per chair is 45 cm.



(5)

1.1.3 A graph showing the expenses for the Dinner and Dance evening is drawn on ANNEXURE A.

(a) Use the graph to identify the fixed expenses. (2)

(b) Explain how the fixed expenses were calculated. (4)

1.1.4 The committee decides to sell the tickets for the Dinner and Dance evening for R195 each.

A graph representing the income from ticket sales is also drawn on ANNEXURE A. Use the graphs drawn on ANNEXURE A to estimate how many tickets they would have to sell to break even. (2)

1.2 The second group reported that they found venue ABC that charges a flat rate for the evening:

- R30 000 (excluding VAT at 14%) which includes the meals served
- Compulsory R4 000 for the disk jockey at the venue
- The venue can only accommodate 250 persons.

1.2.1 Calculate the total cost to use this venue if they now only have to print 250 tickets. (5)

1.2.2 Draw the graph of the cost of using this second venue on ANNEXURE A. (3)

1.3 Calculate the difference in profit for both venues if all tickets are sold. (7)

1.4 Write down another reason, excluding the profit, why the committee decided to use venue ABC. (2)

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QUESTION 2

2.1 The Southern African Large Telescope (SALT) is the largest single optical telescope in the Southern Hemisphere and among the largest in the world.

It has a hexagonal primary mirror array of 11 metres across, comprising 91 individual 1,2 m hexagonal mirrors. Each mirror weighs about 100 kg.
SALT can detect the light from faint or distant objects in the universe, a billion times too faint to be seen with the unaided eye – as faint as a candle flame would appear at the distance of the moon.

Picture of the SALT

SALT is situated at Sutherland, a small town in the Northern Cape, South Africa.

2.1.1 A scientist from the United Kingdom claims that the total weight of the mirrors is 1 450 stone.

Verify this claim.

You may use the following conversions: **1 stone = 14 pound**s
1 pound = 0,45359 kg (6)

2.1.2 The ring wall of the telescope on which the dome is supported, is 17 m high with a diameter of 26 m. This ring wall has a steel structure covered with insulation panels, with 61 rectangular louvers that open at night. The louvers are each 2,25 m wide and 98 cm high.

(a) Calculate the surface area of the ring wall that is covered with insulation panels.

You may use the following formula:

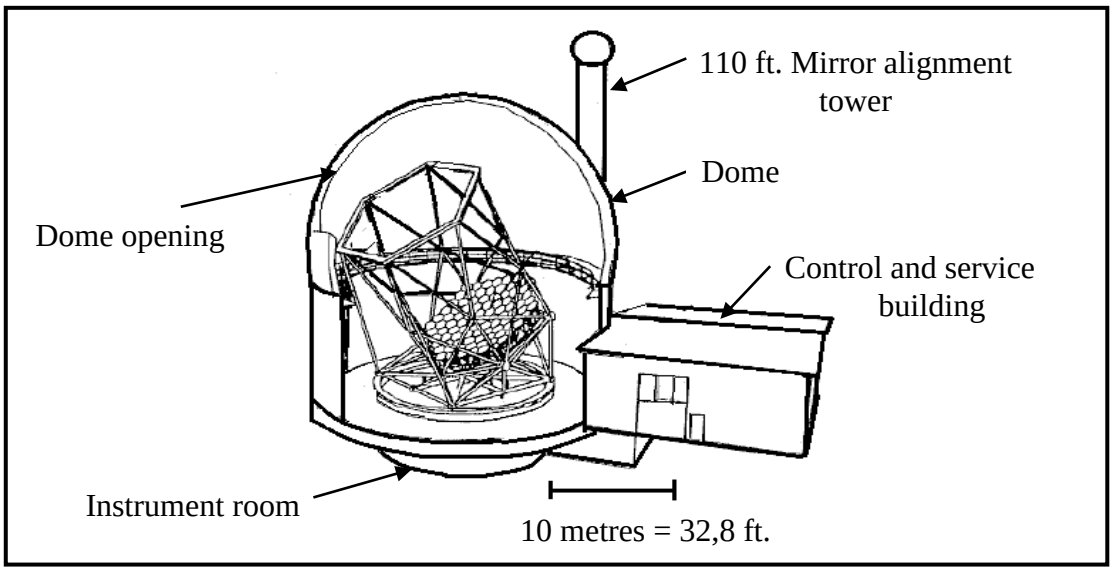
Surface area of a cylinder = $2 \times \pi \times$ radius $\times$ height
where π = 3,142 (7)

(b) If each insulation panel is 5,1 m wide, how many sides does the polygon, which is formed by the steel structure and the insulation panels, have?

You may use the following formula:

Circumference of a cylinder = $2 \times \pi \times$ radius
where π = 3,142 (4)

2.1.3 The following is a diagram of the SALT.



(a) The photograph on the previous page shows the northern view (elevation) of the SALT. Which view does the diagram above show? (2)

(b) Use the scale indicated on the diagram and calculate the height to the top of the mirror alignment tower. (2)

2.2 Mr Vargese is on his way to do research at the SALT. He flew to Cape Town International Airport. He then rented a car and drove as far as Worcester.

2.2.1 Use the map and other information on ANNEXURE B. Mark on the map the places where Mr Vargese should turn. Clearly write 1, 2 and 3 et cetera on the map. (4)

2.2.2 Calculate the distance from Laingsburg to the R453 turn-off. (4)

2.2.3 It took Mr Vargese 2 hours 56 minutes to reach his destination. Calculate his average speed in km/h.

You may use the following formula:

Total distance = average speed × time (5)

2.2.4 On his return from Sutherland he wants to visit a friend living in Ceres, before continuing to Worcester.

He was given the following driving instructions:

- Go back on the same route with which you came to Sutherland.
- Just after Touws River, turn right onto the R46 and continue until you get to a T-junction.
- Turn left on the R46 and continue to Ceres.
- Continue driving on the R46.
- Turn left on the R43, which will take you to Worcester.

Use the map on ANNEXURE B to indicate which roads are the R46 and R43. (3)

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QUESTION 3

3.1 Megan investigated the price of pre-owned Smart cars. She summarised the data in a table with the age of the car and the selling price.

Table 1: Age and price of pre-owned Smart car

Age in years	3	7	8	4	1	2	5	2	2	1	1	4
Price in thousand rand	115	68	64,9	100	130	120	88	110	130	135	170	110

3.1.1 Calculate the mean selling price of a pre-owned Smart car to the nearest thousand rand. (4)

3.1.2 In what year was the car that is selling for R88 000 manufactured, if a 1-year-old car was manufactured in 2013? (2)

3.1.3 Megan noticed that even within the same age the price differs.

(a) Determine the age of the car that has the biggest range of prices. Show all calculations. (3)

(b) Write down a possible reason why prices within the same age differ so much. (2)

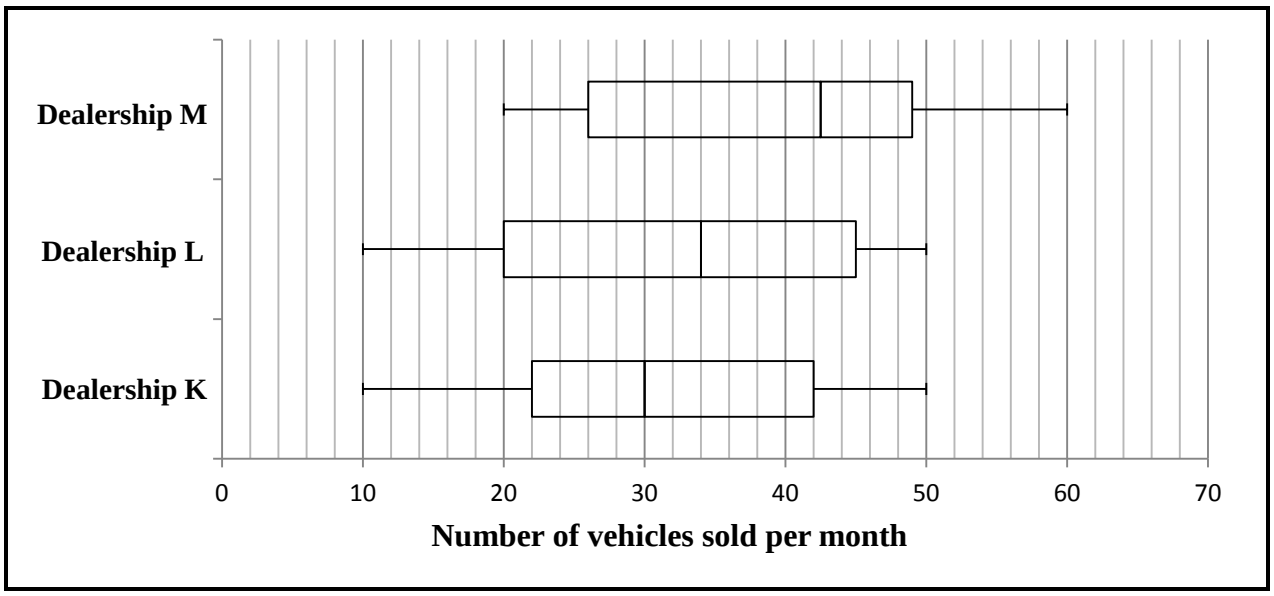
3.1.4 One of the graphs used to make sense of data like that in TABLE 1 is a scatter plot.

(a) Use the grid on ANNEXURE C to draw a scatter plot of the age versus the price of a pre-owned Smart car. (4)

(b) Use the scatter plot to describe the trend in the price of a pre-owned Smart car as it becomes older. (2)

(c) Justify Megan's claim that the price of a 9-year-old pre-owned Smart car could be R50 000. (2)

3.2 Megan went to three different car dealerships that sell pre-owned vehicles to find out how many vehicles they sell every month. She summarised the data for one year in the box-and-whisker plots below.



3.2.1 Estimate the upper quartile value of the number of vehicles Dealership M sold per month. (2)

3.2.2 For how many months were the number of vehicles sold at Dealership M more than 26? (2)

3.2.3 Explain, with reasons, whether the data represented in these box-and-whisker plots are DISCRETE or CONTINUOUS. (2)

3.2.4 Explain what it means if the median number of vehicles sold per month at Dealership L is more than that of Dealership K. (4)

3.2.5 Give FOUR reasons that Megan could give to justify that Dealership M is selling more vehicles per month. (8)
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QUESTION 4

Ms Springbok runs a small tuckshop from her house. She sells sweets, chips, cans of cooldrink and vetkoek. Once a week she buys 6 cases of cooldrink for R137,50 each. A case of cooldrink consist of 4 six-packs. Each can contains 330 mℓ of cooldrink. At the end of the week all her cooldrinks are sold out.

4.1 If she sells the cooldrink in her tuckshop for R8,00 a can, what percentage does she add to the cost price per can to determine her selling price? (7)

4.2 A new 330 mℓ bottle of cooldrink is available. The sales representative of the cooldrink company wants Ms Springbok to sell the bottles instead of the cans. The new bottles must be sold for R5,00 each. Ms Springbok finds out that the new bottles will cost her R4,20 each.

4.2.1 The sales representative's argument is that the new R5,00 bottle costs less, therefore more people will buy it. Does she have a valid argument? (2)

4.2.2 Calculate how many bottles Ms Springbok must sell per week to make the same profit as for the cans. (5)

4.2.3 Calculate the percentage increase in sales.

You may use the following formula:

Percentage increase in sales

$$= \frac{\textbf{Increased number sold per week}}{\textbf{Original number sold per week}} \times \textbf{100\%}$$

(3)

4.2.4 Explain how Ms Springbok can use this percentage increase in sales as a reason why she doesn't want to sell the bottles in her tuckshop. (3)

4.3 Ms Springbok surveyed a group of her customers to find out what they bought at the tuckshop. She summarised the results in TABLE 2 alongside.

She decided to use the data in TABLE 2 to make predictions.

TABLE 2: Survey results

Product	Number
Vetkoek	6
Chips	3
Sweets	4
Cooldrink	5

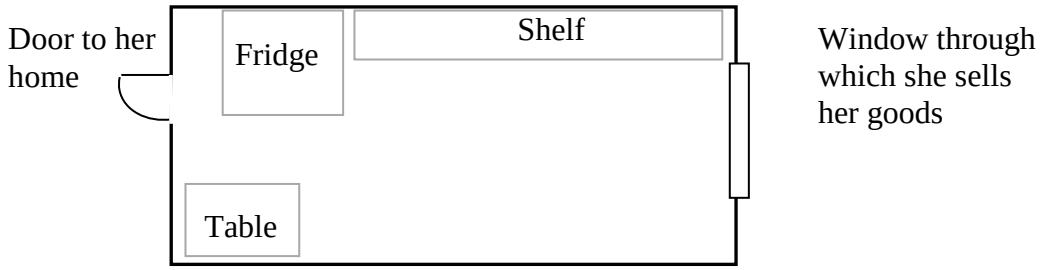
4.3.1 If she surveys 12 more customers, how many customers could she expect to pick vetkoek, based on the data from TABLE 2? (4)

4.3.2 Write, in simplified form, the probability that the next customer coming to her tuckshop will buy sweets or cooldrink. (3)

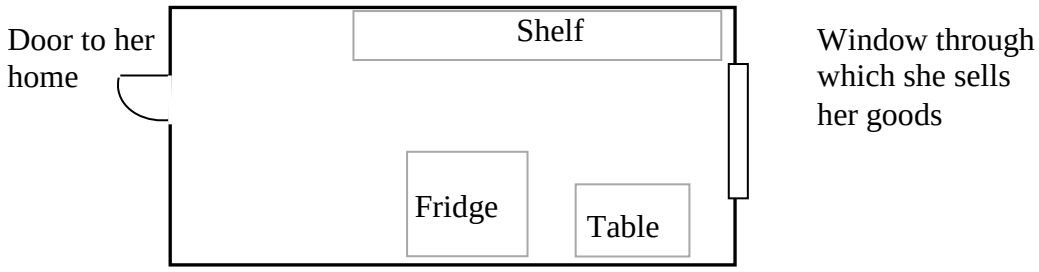
4.3.3 Based on the number of cooldrinks sold per week, use the survey and calculate how many customers buy at the tuckshop per week. (4)

4.4 Ms Springbok has a fridge for cooldrinks, shelves for sweets and chips and a table for vetkoek in her tuckshop.

Layout A



Layout B



Compare the two possible layout plans of the tuckshop in the diagram above and advise Ms Springbok which one she should use. (5)
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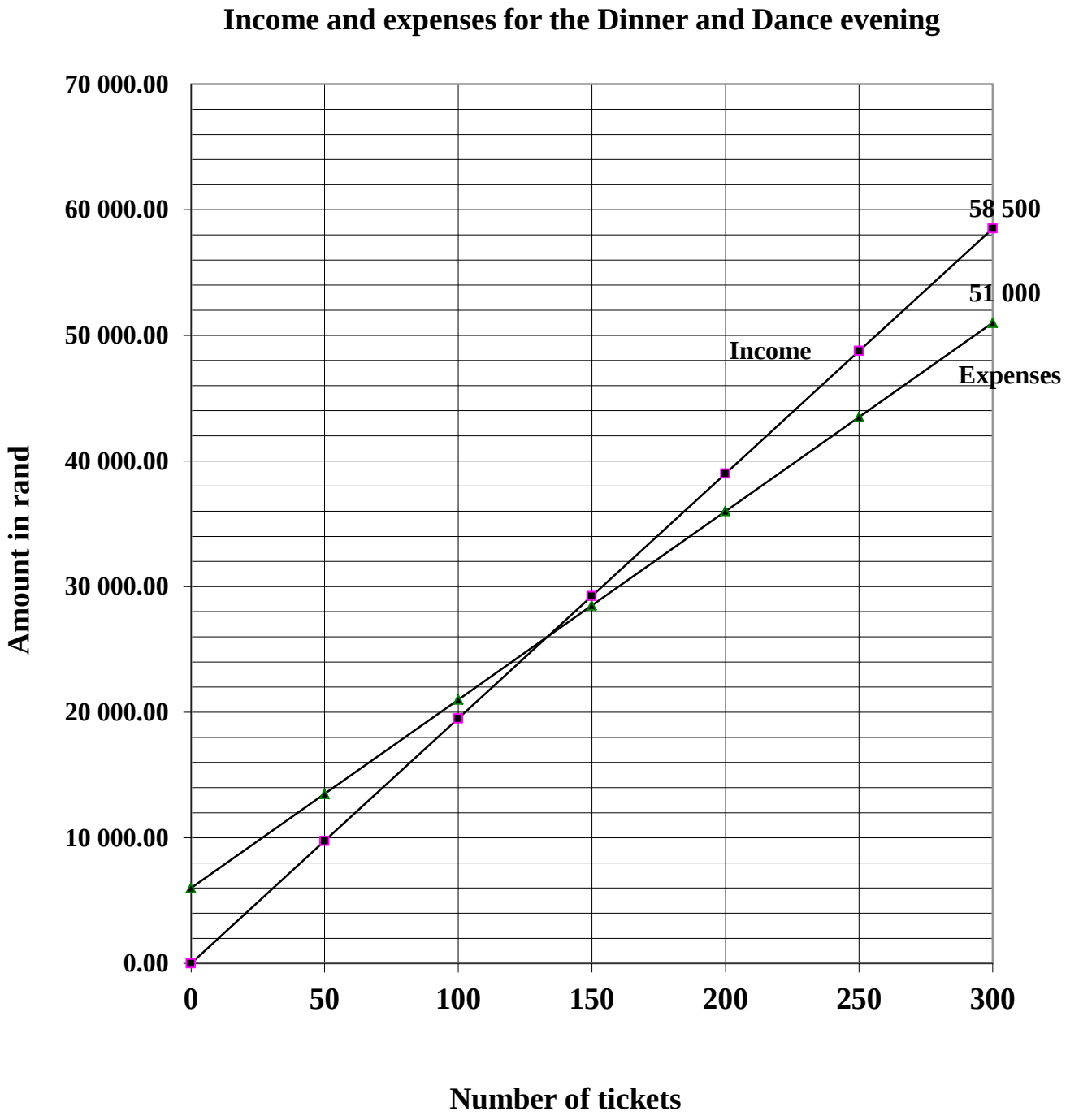
TOTAL: 150

CENTRE NUMBER:
EXAMINATION NUMBER:

ANNEXURE A

QUESTION 1.1.3 (a) and QUESTION 1.2.2



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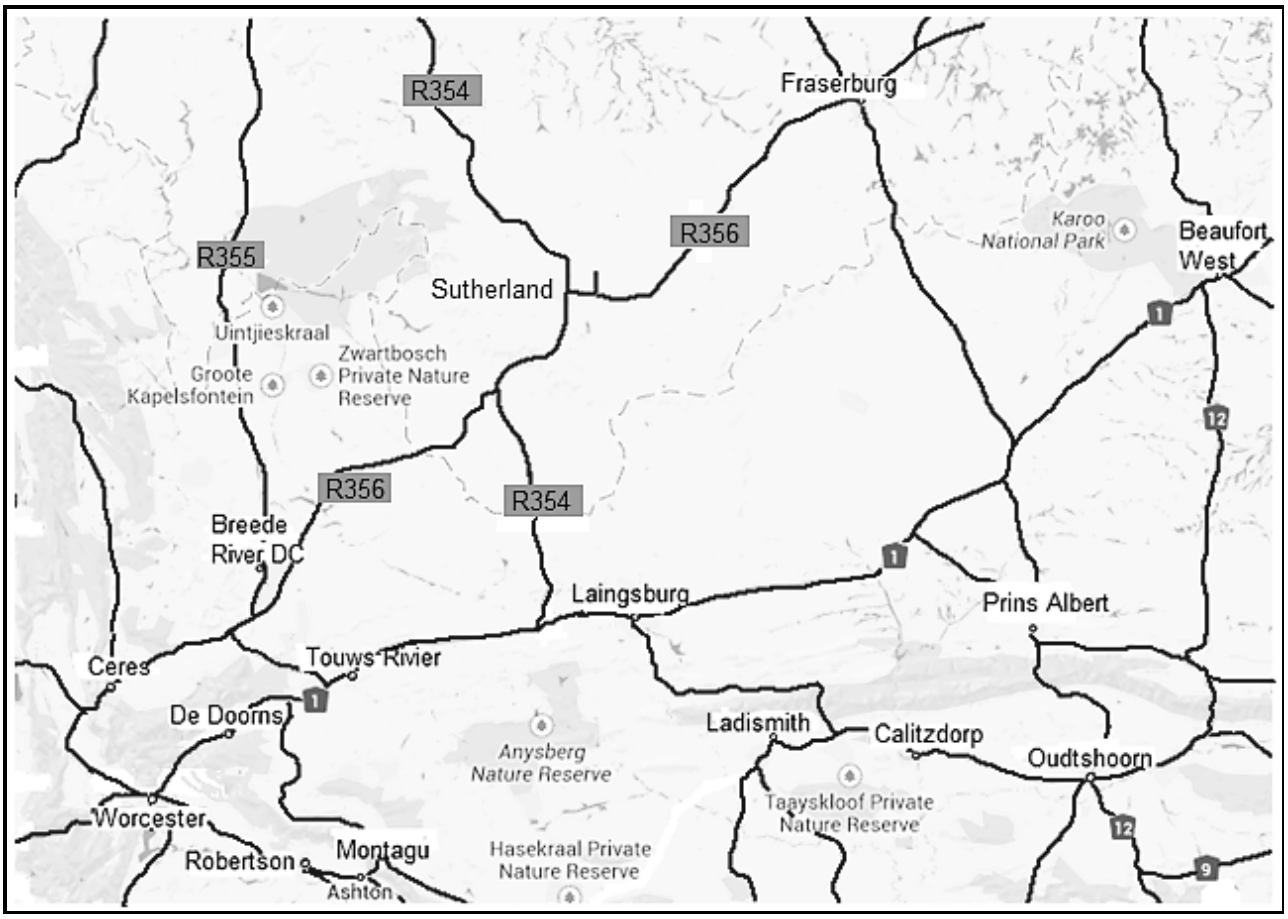
ANNEXURE B

QUESTION 2.2.1 and QUESTION 2.2.4



INFORMATION:

1. Turn right onto the **N1** 125 km
2. Turn left onto the R354 110 km
3. Turn right onto the R356 13,7 km
4. Turn left 4,9 km

The destination will be on your right.

FROM	TO	DISTANCE
Worcester	De Doorns	29 km
De Doorns	Touws River	42 km
Touws River	Laingsburg	89 km
Touws River	Sutherland	166 km
Sutherland	Fraserburg	108 km

CENTRE NUMBER:
EXAMINATION NUMBER:

ANNEXURE C

QUESTION 3.1.4