



MATHEMATICAL LITERACY: PAPER II

Time: 3 hours

150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of:
 - A question paper of 12 pages
 - Four questions
 - An answer booklet of 4 pages
 - An appendix of 2 pages

Please check that your question paper is complete.

2. Answer all the questions.
 3. It is strongly suggested that all working details be shown.
 4. Where necessary round off all answers to two decimal places.
 5. Approved non-programmable calculators may be used in all questions.
 6. It is in your own interest to write legibly and present your work neatly.
 7. Maps and diagrams are not necessarily drawn to scale, unless otherwise stated.
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QUESTION 1

For Question 1.1 – 1.3 refer to **APPENDIX A**.

1.1

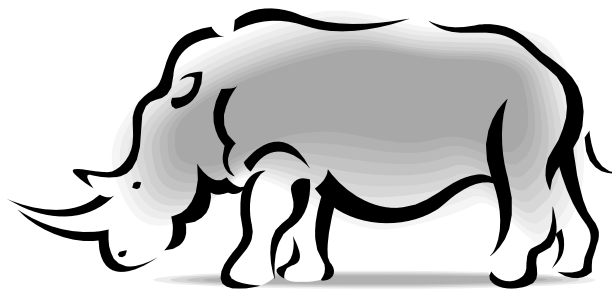
- 1.1.1 Sort the data given in Table A in the 2010 'Rhino Poaching Statistics' table from highest to lowest. Write down the area/province and the corresponding value. (3)
- 1.1.2 Give a reason why it would be better for SANParks to sort this data from highest to lowest, as opposed to sorted per province. (2)

1.2

- 1.2.1 (a) It is often difficult to identify trends in numbers that are organised in tables. Representing data graphically is helpful.

Hence, using the **ANSWER BOOKLET** provided, draw a **double bar** graph for 2011 showing a comparison between the 'Rhino Poaching' and 'Rhino Poaching Arrest' data.

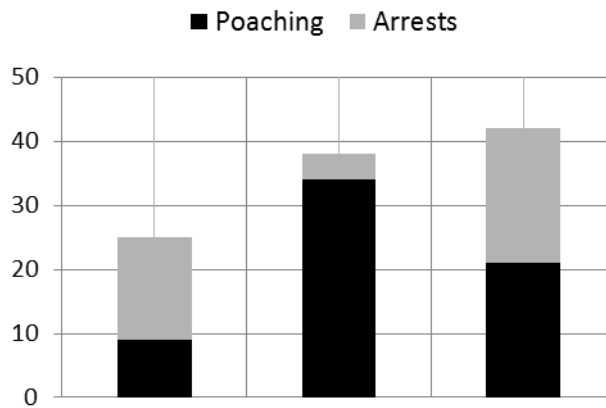
- Use only the data for the following provinces: Gauteng (GP); KwaZulu-Natal (KZN) and North West (NW). (8)
 - Make sure your graph is neatly drawn and clearly labelled.
- (b) Based on the graph you have drawn above, which of the 3 provinces (GP, KZN or NW) has the worst poaching versus arrest ratio? Explain your answer. (2)



- 1.2.2 Two Grade 12 Mathematical Literacy learners attempted to represent the data in Question 1.2.1 above using a stack/compound bar graph.

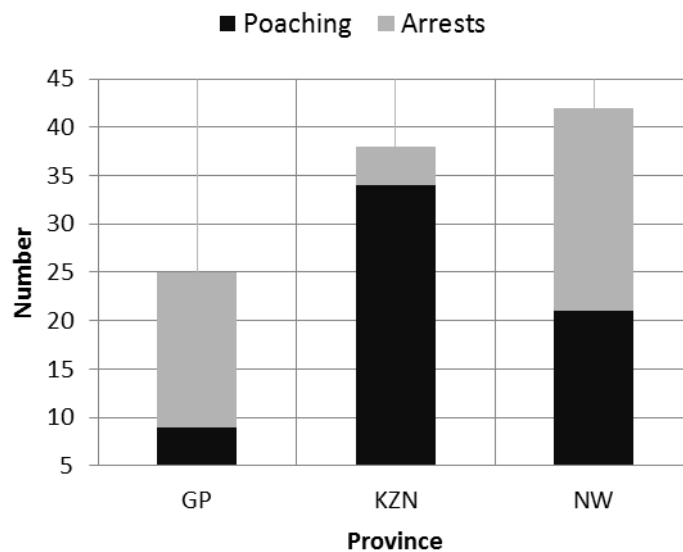
Learner A

Poaching vs Arrests



Learner B

Poaching vs Arrests



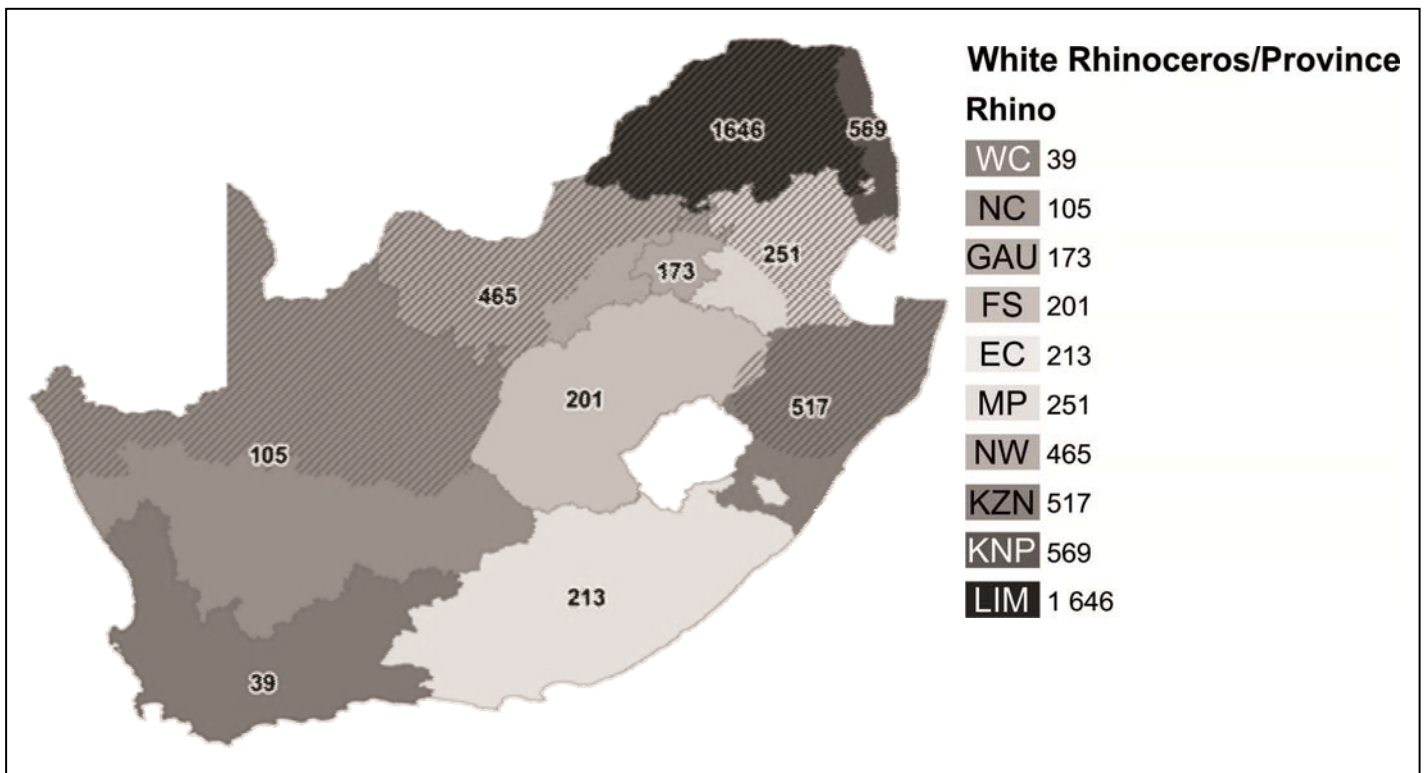
Each learner has misrepresented the data by making one mistake. Identify the mistake that each learner has made.

(4)

- 1.3 Compare the percentage increase in arrests for Rhino Poaching (Table B) in **Gauteng** from 2010 to 2011 versus 2011 to 2012. With the use of appropriate calculations which time period would you say was the most successful?

(7)

- 1.4 Analyse the map below which shows the distribution of white rhino on private land.



- 1.4.1 You decide to start your own security company which specialises in protecting white rhino on private land. If you have 500 security employees to deploy proportionally around the country, how many would you send to Limpopo (LIM)? (5)

- 1.4.2 You are interviewing someone for a security job in your company to work in Limpopo. He asks you 2 questions:

- How many private land rhino will I be responsible for?
- How many acres will I be responsible for?

Using your answer from Question 1.4.1, answer his questions by rounding all answers to the appropriate whole number.

Notes

- The area of the Limpopo Province is 125 754 km².
- 1 km² = 247,105 acres.
- Round off your answer to the nearest whole number.

(6)
[37]

QUESTION 2

- 2.1 One of the responsibilities of a town planner is to analyse population birth and death rates.

A town planner is analysing a small town in South Africa called Barrydale which has 7 000 residents as at 1st January 2012.

Compound Growth: $A = P(1 + i)^n$
Compound Depreciation: $A = P(1 - i)^n$

Where: A = Final Amount
 P = Initial Amount
 i = Interest per annum
 n = Number of Compounding Periods

- 2.1.1 The historical trend over the last 100 years shows that the birth rate in Barrydale is 0,883% per annum. How many people will have been born in Barrydale over the next 2 years since 1st January 2012? (5)
- 2.1.2 The historical trend over the last 100 years shows that the average 'mortality rate' (the rate at which people die) in Barrydale is 1,38% per annum. Determine how many people were living in Barrydale on 31st December 2013? (5)
- 2.1.3 If you had to predict what Barrydale would look like in another 100 years' time, what conclusion can you draw from the historical trend over the last 100 years when comparing the birth rate and mortality rate? (2)



- 2.2 You have recently purchased a cattle farm in Barrydale. There is a holiday resort on the farm, which brings in additional income for the farm.

Information about the farm:

- The total area of the farm is 150 km^2 .
- The holiday resort has a fenced off area with dimensions 500 m by 2,5 km.
- There are 2 dams which are artificially built as circles, each with a diameter of 500 m.
- A landing strip for small airplanes, measuring 250 m wide by 1,5 km long.
- You can accommodate $12\frac{1}{2}$ cattle per square kilometre of open farm.

You are required to:

- 2.2.1 Design your game farm, showing all labels and measurements on the **ANSWER BOOKLET** provided. Assume 1 block is 500 m by 500 m. (7)

- 2.2.2 Hence, show that farm can accommodate more than 1800 cattle. (10)

Area of Rectangle = length $\times$ breadth
 Area of Circle = $\pi \times (\text{radius})^2$
 Assume $\pi = 3,14$

- 2.3 In order to make your farm viable, you check out the financial records of a fellow farm owner, Pete.

He gives you a list of his accounts for the month of January 2013:

Accommodation Sales	R52 850
Telephone	R2 150
Farm Operation Licence	R2 500
Curio Shop Sales	R16 400
Water & Electricity	R3 800
Interest on Investment	R7 500
Insurance	R18 000
Petrol	R9 650
Rent received from J. Jones	R2 000
Salaries & Wages (<i>paid to employees*</i>)	R48 000
Stationery	R590

** Employees are people who work for Pete*

- Pete says he made a loss of R2 660 in January. Prove that he is incorrect by correctly filling in the Income and Expenses Statement on the **ANSWER BOOKLET** provided. The table has been started for you. (9)

- 2.4 The holiday resort on the farm is trying to attract guests and has some exciting activities on offer during the holiday season. Guests have a choice between the following options:

Morning Session

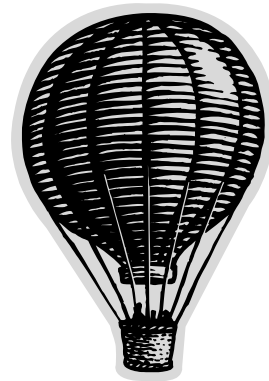
- Sunrise Game Drive (G)
- Champagne Breakfast (C)

Afternoon Session

- Walk in the Wild (W)
- Hot-Air Balloon Ride (H)
- Boat Trip across the Dam (B)

Evening Session

- Spit-braai (S)
- Nocturnal Animal Tour (N)



- 2.4.1 A guest can only do 1 activity per session in the day. Hence, write down all the possible combination of activities that a guest can do in one day. You need only write down the letter of the activity, in order (morning, afternoon then evening).

e.g. A Sunrise Game Drive, Walk in the Wild, and Spit-braai would be written as:

G W S

(6)

- 2.4.2 Hence, calculate the probability that a guest's day will include a spit-braai. Write your answer as a simplified fraction.

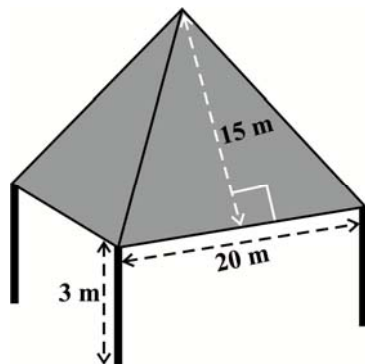
(3)

[47]

QUESTION 3

- 3.1 A new African restaurant, Chakula, is being built in the shape of a 'boma'. The **square** boma will be covered by a thatch roof (consisting of 4 identical triangles) held up by 4 pillars in each corner. The owner decides to place fairy lights (small coloured electric lights used for decoration) between the pillars on **three** sides of the boma.

A basic of model of what the boma will look like is as follows:

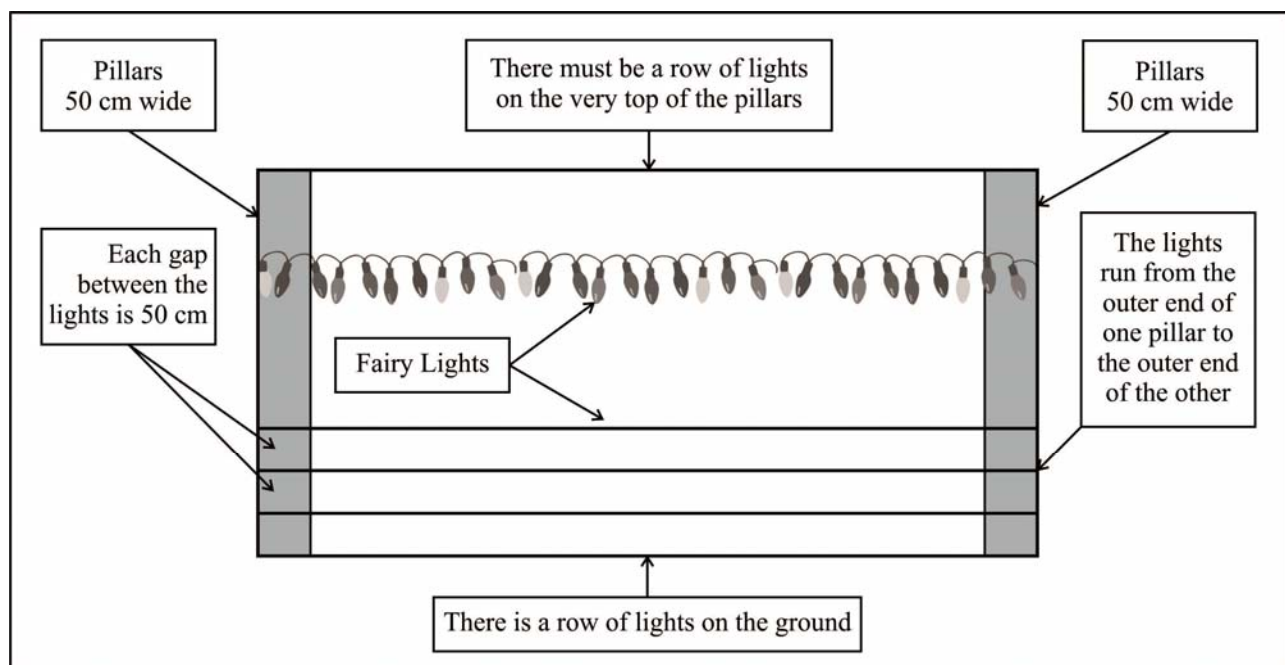


Measurements

Perpendicular height of one side of triangle roof = **15 m**
 Height of the pillar = **3 m**
 Distance between the pillars = **20 m**
 Width of the pillars = **50 cm**

- 3.1.1 The fairy lights are sold in 5 metre rolls at R55 per roll. The boma requires one row of fairy lights every 50cm to cover the entire 3m of the height of the boma.

The diagram below gives a side view of the boma:



Calculate the cost of the lighting if the lights are placed on **three** sides of the boma?

(10)

- 3.1.2 Imported thatching for a roof costs R670 per square metre. Calculate the cost of thatching the boma, by working out the total surface area of the roof. (4)

$$\text{Area of triangle} = \frac{1}{2} \times \text{base} \times \text{perpendicular height}$$

- 3.1.3 List 2 ways in which you can reduce the cost of the boma. (2)

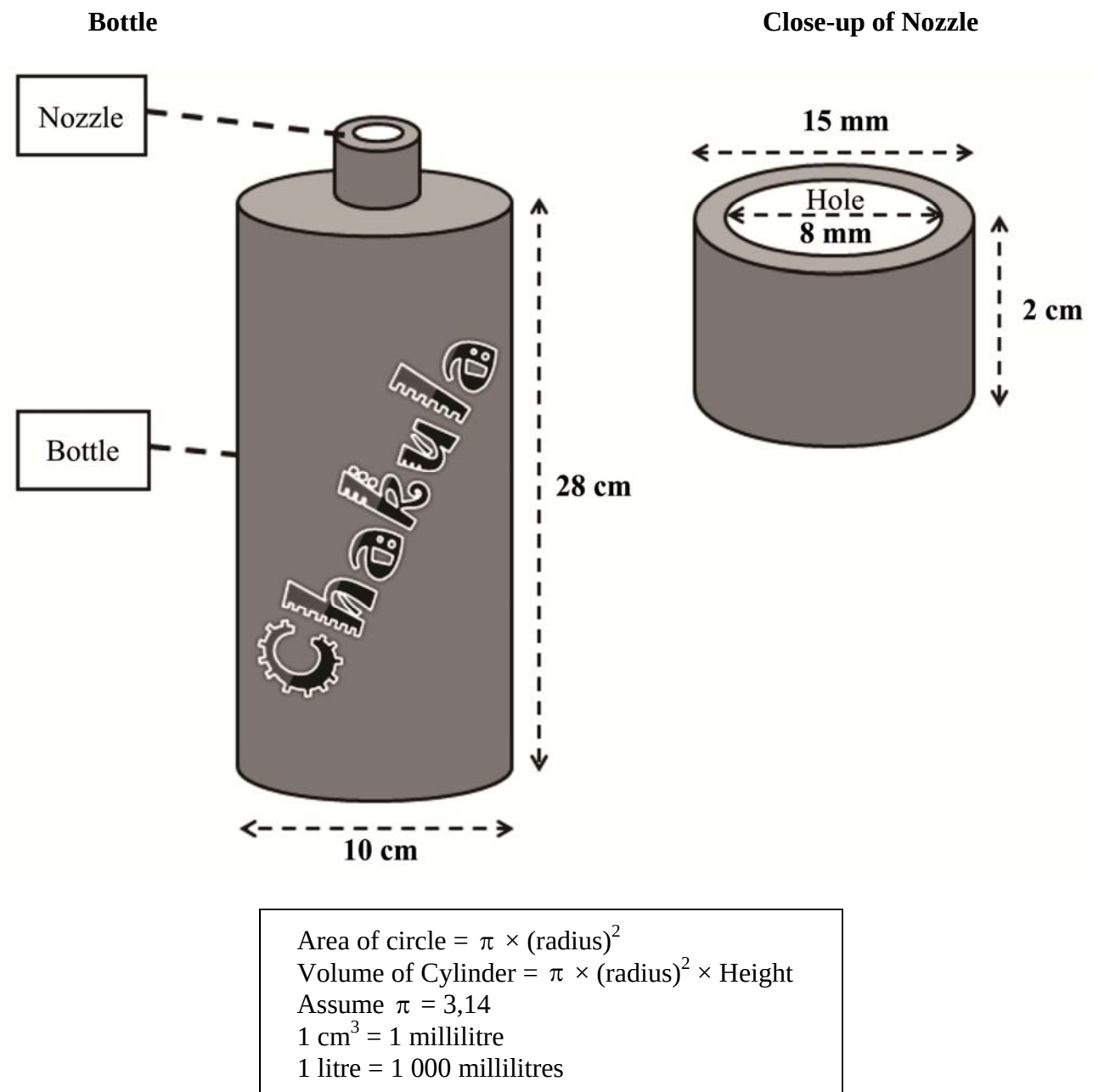
- 3.2 The restaurant hosts a 10 km fun run as a way of generating exposure and financial support. Runners are encouraged to raise sponsorships by getting friends and family to sponsor them for every kilometre that they run. Two fund-raising methods are described below:

- **Method 1**
A set sponsorship of R20 per kilometre.
- **Method 2**
A donation of R50 plus an additional R10 per kilometre.



- 3.2.1 There are 3 missing items from this graph. Identify 2 of them and provide the missing information. (2)
- 3.2.2 Which method of fundraising is represented (Method 1 or Method 2) by the graph above? Justify your answer. (2)
- 3.2.3 **Explain in words** a formula for each method of fundraising. (3)
- 3.2.4 On the set of axes in your **ANSWER BOOKLET**, draw the graph which illustrates the other method of fundraising. (4)
- 3.2.5 Which method is the better fund-raising option? Justify your answer. (2)

- 3.3 As part of their launch campaign, Chakula Restaurant gave their first 50 customers unique Chakula bottles filled with mango juice.
The bottle was designed as follows:



If all bottles were filled to the maximum, including the nozzle, show that the restaurant requires 110 litres of mango juice to fill all 50 bottles.

(9)
[38]

QUESTION 4

For Question 4 refer to **APPENDIX B**.

- 4.1 John says that if you had to fly directly from Dzundwzini (B3) towards the Pafuri Border Gate (C1), you will be flying in a South Easterly direction. Is John correct? If not, provide the correct direction. (2)
- 4.2 According to the scale given on the map, 1 cm = 8 km.

Two tour guides, Joseph and Petrus, are arguing about the real-life distance between Babalala Picnic Spot (C3) and Shingwedzi Restcamp (C4). They have written down their calculations and notes to try and prove that the other one is wrong.

Joseph

Incorrect writing of scale: 1 cm : 8 km
 Correct writing of scale : 1:800 000
 Distance on map: 3,1 cm
 Therefore: $800\,000 \div 3,1$
 $= 258\,064,52$ cm
 Real-life distance (convert) = 2,58 km

Petrus

Scale: 1 cm : 8 km
 Convert: 8 km = 80 000 cm
 Distance on Map: 3,1 cm
 Therefore: $80\,000 \times 3,1$
 $= 248\,000$
 Convert back to km: = 2,48 km

- 4.2.1 Both Joseph and Petrus are wrong. Identify and correct where they went wrong. (4)
- 4.2.2 Explain, showing your notes and calculations, how to correctly determine the real-life distance, if the distance on the map is 3,1 cm. (3)

- 4.3 A tourist from America, Bob, is having difficulty working with the map and his American GPS (navigation device). The map is in kilometres and his GPS works in miles. He knows the distance from Shingwedzi Restcamp (C4) to Bateleur Bushveld Camp (B5) is 10,4 km and his GPS says the speed limit on the road is 24,85 miles per hour.

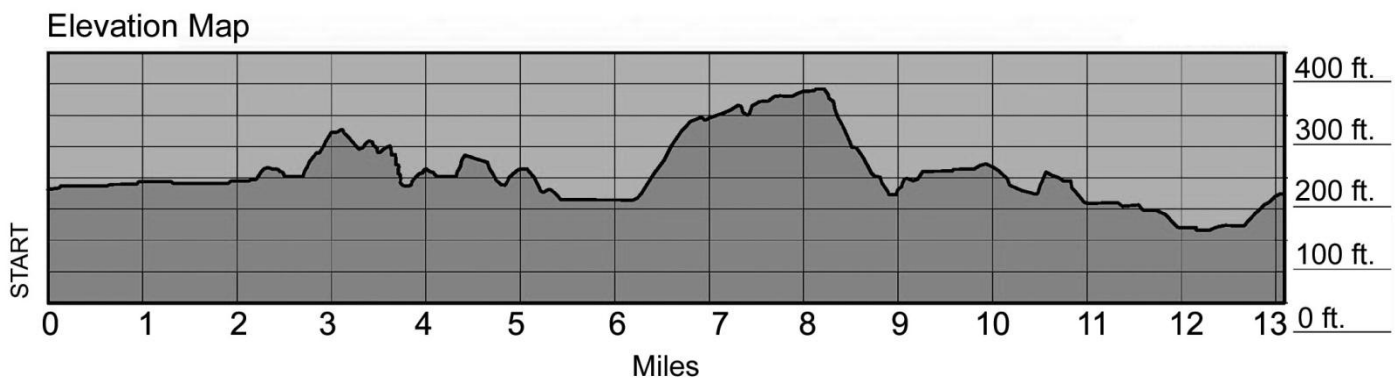
- 4.3.1 Determine the speed limit in km/hr, rounding your answer to the nearest whole number.

Note: 1 mile = 1,609344 km (2)

- 4.3.2 Bob wants to know how long it would take to get from Shingwedzi to Bateleur. Write your answer in minutes and seconds. (4)

- 4.3.3 If petrol costs R12,87 per litre, and your car's fuel efficiency is 9,2 kilometres per litre, how much would it cost you to travel from Shingwedzi Restcamp to Bateleur Bushveld Camp. (3)

- 4.4 Answer the following questions which are based on the elevation map of the Kruger Park Half-Marathon below:



- 4.4.1 Between which two miles is the greatest uphill part of the race? (1)
- 4.4.2 Based on the graph, do you think the runners started in the same place as they finished? Justify your answer. (2)
- 4.4.3 Bruce says the range of elevation is 215 ft.
 Josiah says the range of the elevation is 175 ft.
 Using appropriate calculations prove which person is correct. (4)
- 4.4.4 Prove that this elevation map shows a half marathon if a half-marathon is 21,1 km and 1 mile = 1,609344 km. (3)

[28]

Total: 150 marks