



**MATHEMATICAL LITERACY: PAPER II**

Time: 3 hours

150 marks

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**PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY**

1. This examination paper consists of:
  - a question paper of 12 pages
  - 5 questions
  - an Appendix, which consists of 2 Annexures
  - an Answer Sheet of 2 pages.















Please check that your examination paper is complete.








2. Answer all the questions.
  3. It is strongly suggested that all working details be shown.
  4. Round all the final answers off to TWO decimal places, unless stated otherwise OR where the context requires rounding up or down.
  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 stated otherwise.
  8. **Please start each question on a new page in the Answer Book.**
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**QUESTION 1**

The Smith family, who lives in the Unites States of America, would like to go on holiday. They have a budget of 1 300 US dollars.

1.1 The following exchange rate table as at Friday, 19 February 2016, shows the exchange rate for 7 countries.

<b>Forex – Major Rates</b>								Fri, Feb 19th, 2016	
	 USD	 AUD	 CAD	 EUR	 GBP	 JPY	 CHF		
 USD	1,0000	1,4056	1,37532	0,89929	0,69820	113,066	0,99194		
 AUD	0,71122	1,0000	0,97820	0,63952	0,49650	80,419	0,7055		
 CAD	0,72680	1,0221	1,0000	0,65410	0,50777	82,200	0,7212		
 EUR	1,11209	1,56344	1,52949	1,0000	0,77642	125,742	1,10306		
 GBP	1,43214	2,01327	1,96972	1,2878	1,0000	161,926	1,42057		
 JPY	0,008841	0,01242	0,01215	0,00795	0,00618	1,0000	0,87721		
 CHF	1,00787	1,4168	1,3862	0,90626	0,70331	113,969	1,0000		

 US Dollar  
  Australian Dollar  
  Canadian Dollar  
  Euro FX  
 British Pound  
  Japanese Yen  
  Swiss Franc

[Source: <<http://www.barchart.com/forex/ALL>>]

1.1.1 Which country will give the Smith family value for their dollars? (2)

1.1.2 Mr Smith's daughter has 750 British Pounds (GBP), which she would like to exchange for US Dollars (USD). However, a 4,5% commission of the value exchanged must be paid to the agency for the exchange. Determine the amount in dollars that she will receive if the 750 GBP must include the 4,5% commission. (5)

1.2 After much discussion, the family decides to come to South Africa for their holiday. Whilst in South Africa, the family goes on a sunset boat cruise. The sunset cruise includes a full, five-course meal.

Due to the expenses of running the boat, the cost per person of going on the cruise is dependent on how many people are on that cruise. The graph on **Annexure 1** illustrates the costs.

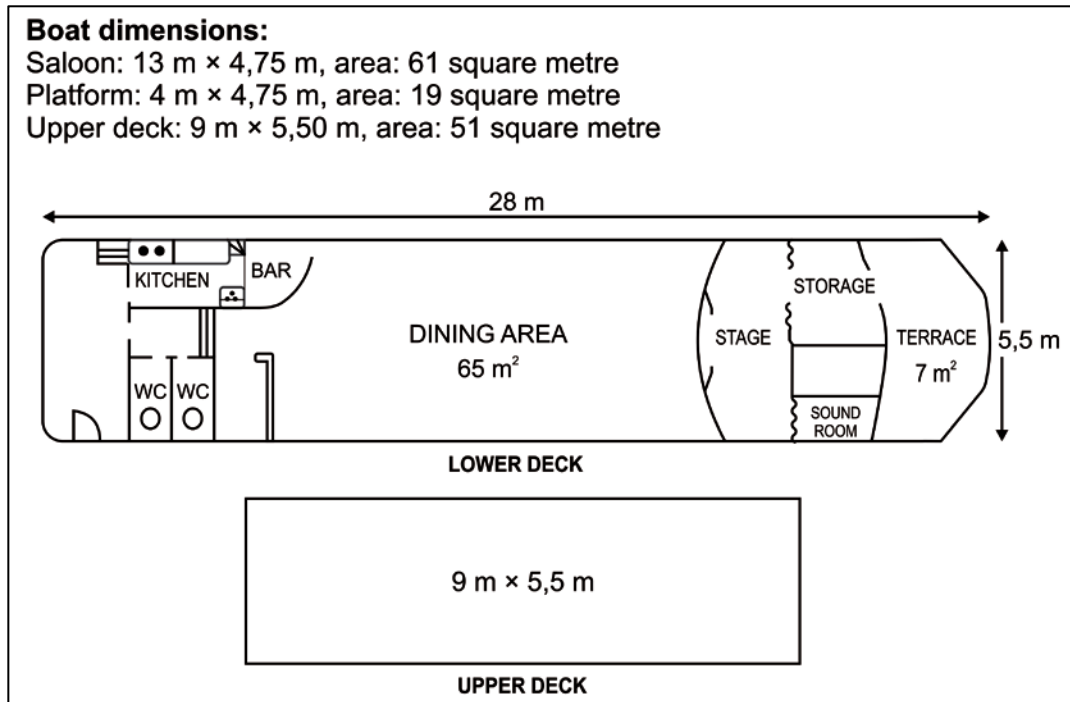
Use **Annexure 1** to answer the following questions:

1.2.1 If only two people go on the sunset cruise, state how much each person would pay. (2)

1.2.2 The Smiths are a family of five. There are also three other people on the cruise. Calculate the total cost for the Smith family to go on the cruise. (3)

1.2.3 If the total amount received for the cruise for one night was R12 000, determine the maximum number of people that went on the sunset cruise that night. (2)

1.3 The diagram below shows the deck plans of the sunset cruise boat. Refer to the plans when answering the questions that follow.



[Adapted from: Boat hire|Bateaux Vedettes du Pont Neuf: <vedettesdupontneuf.com>]

- 1.3.1 The width of the rectangular dining area is 5,5 m. Determine the approximate length of the dining area. (3)
- 1.3.2 The owner of the boat wishes to put a stronger railing around the perimeter of the upper deck. He is able to purchase 30 metres of railing at a very good price. Determine, showing all calculations, whether the 30 m of railing is adequate. (4)
- 1.3.3 By comparing the diagram of the upper deck with that of the lower deck, we are able to determine that they have not been drawn using the same scale. Explain how it is possible to substantiate that. (3)
- 1.3.4 Mr Smith is looking at the layout plan and notices two errors with the calculations given at the top of the plan. Explain the errors he may have noticed and correct them. (3)

1.4 The chef on the cruise is using the recipe below for one of the desserts.

<h2 style="margin: 0;">BROWNIES</h2> 	<p>1 h  16 servings  183 cals </p> <p><b>Ingredients</b></p> <ul style="list-style-type: none"> <li>• ½ cup butter</li> <li>• 1 cup white sugar</li> <li>• 2 eggs</li> <li>• 1 teaspoon vanilla extract</li> <li>• ⅓ cup unsweetened cocoa powder</li> <li>• ½ cup all-purpose flour</li> <li>• ¼ teaspoon salt</li> <li>• ¼ teaspoon baking powder</li> </ul> <p><b>Frosting:</b></p> <ul style="list-style-type: none"> <li>• 3 tablespoons butter, softened</li> <li>• 3 tablespoons unsweetened cocoa powder</li> <li>• 1 tablespoon honey</li> <li>• 1 teaspoon vanilla extract</li> <li>• 1 cup confectioner's sugar</li> </ul>
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[Source: <<http://allrecipes.com/recipe/10549/best-brownies>>]

The ingredients listed are enough for 16 servings, but the chef would like to make 60 servings.

The chef only has 2½ blocks of butter in stock. Using the information above and the table below, determine whether the butter he has is sufficient for 60 brownies.

<p><b>Butter:</b>                  1 tablespoon = 14 grams                  ½ cup = 113 grams                  250 g = 1 block</p>
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(8)

1.5 The owner of the boat has been hosting sunset cruises for two full years now. In his first year of business he had a taxable turnover (taxable income) of R275 000 and in his second year he had a taxable turnover of R740 000. By making use of the table below, calculate, showing all working, what percentage of his combined turnover he was left with once he had paid tax for the first two years of his business.

<b>TAX TABLE APPLICABLE FOR TURNOVER OF MICRO BUSINESSES</b>	
<b>Taxable Income (R)</b>	<b>Rate of Tax (R)</b>
R0–R335 000	0% of taxable turnover
R335 001–R500 000	1% of the taxable turnover above <b>R335 000</b>
R500 001–R750 000	R1 650 + 2% of the taxable turnover above <b>R500 000</b>
R750 001–R1 000 000	R6 650 + 3% of the taxable turnover above <b>R750 000</b>

(8)

1.6 One of the crew members on the boat borrowed R1 500 from the owner. After 18 months he paid back R1 837,50. Calculate the annual rate of simple interest he was charged by the owner. Show all your working.

(6)

1.7 The Smith family has really enjoyed their holiday in South Africa and have R13 500 left.

1.7.1 If they budget R1 700 a day for the family, determine how many full days they can still stay in South Africa.

(3)

1.7.2 They decide to stretch their budget and use the R13 500 to stay for 10 more nights. Accommodation is 60% of their daily budget. Calculate what their daily budget for accommodation would be.

(3)

[55]

**QUESTION 2**

Chichén Itzá was a Mayan city in what is now Mexico.

El Castillo (Castillo means castle in Spanish) looms at the centre of Chichén Itzá.

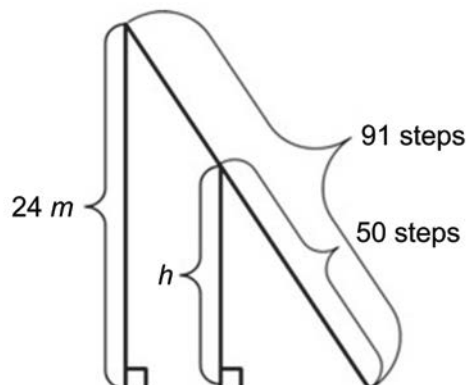
The Castillo is a monument in the shape of a pyramid, with a temple built on the top, and is probably the most famous image of Chichén Itzá.



- There are four staircases on the outside of the 79-foot pyramid of stone.
- Each staircase has 91 steps.
- The length of one of the sides of the square base of the temple is 55,3 meters.

[Source: <[http://www.softschools.com/facts/wonders\\_of\\_the\\_world/chichen\\_itza\\_facts/75/](http://www.softschools.com/facts/wonders_of_the_world/chichen_itza_facts/75/)>]

2.1 There are 91 steps leading up to the temple. Calculate how high above the ground ( $h$ ) you would be if you were standing on the 50th step.



(3)

2.2 You burn calories as you climb up and down steps as follows:

- 0,17 calories are burnt as you climb up every step
- 1 calorie is burnt for every 20 steps down

### Soft drink

A soft drink is a drink that typically contains carbonated water, a sweetener, and a natural or artificial flavoring. The sweetener may be sugar, high-fructose corn syrup, fruit juice, sugar substitutes, or some combination of these.

– Wikipedia

$$1 \text{ g} \approx 1 \text{ ml}$$

#### Nutrition Facts

Cola

**Amount per** 100 grams

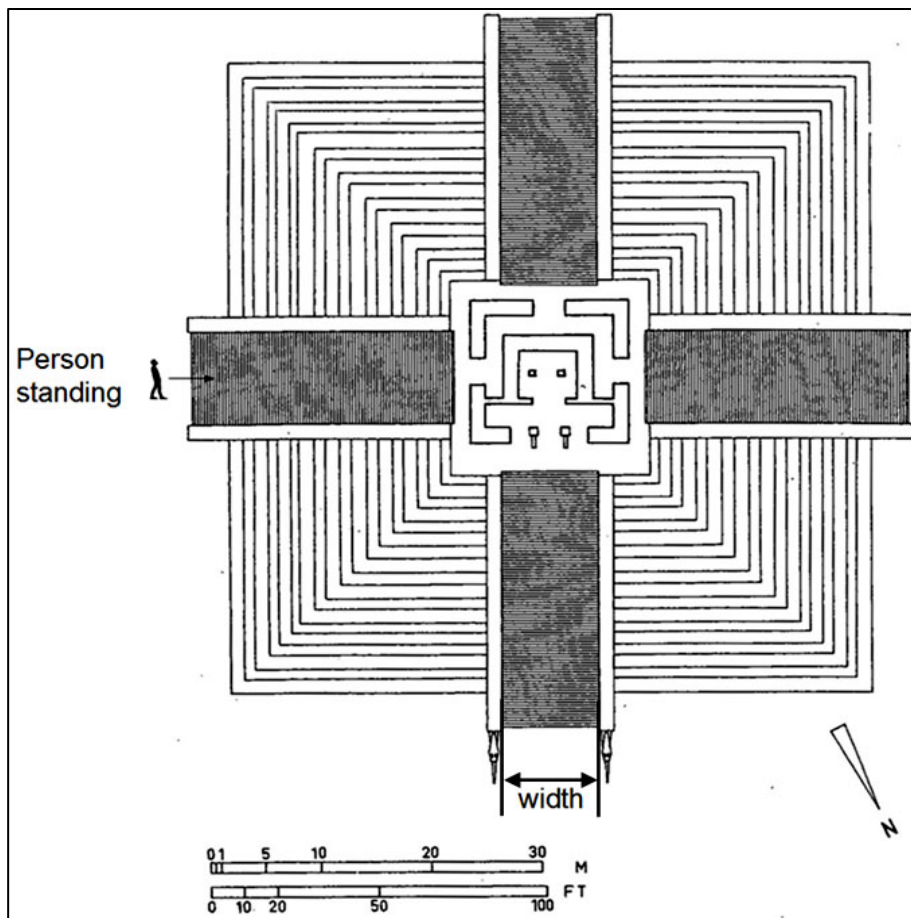
**Calories** 38

[Source: <www.wikipedia.com>]

Using the above information, show that a person will have to walk more than 5 times up and down the staircase to burn off the calories consumed from a 330 ml can of Coca-Cola.

(8)

2.3 By making use of the scale given on the plan shown below, determine the approximate width of the stairs in metres. Show all measurements and calculations.



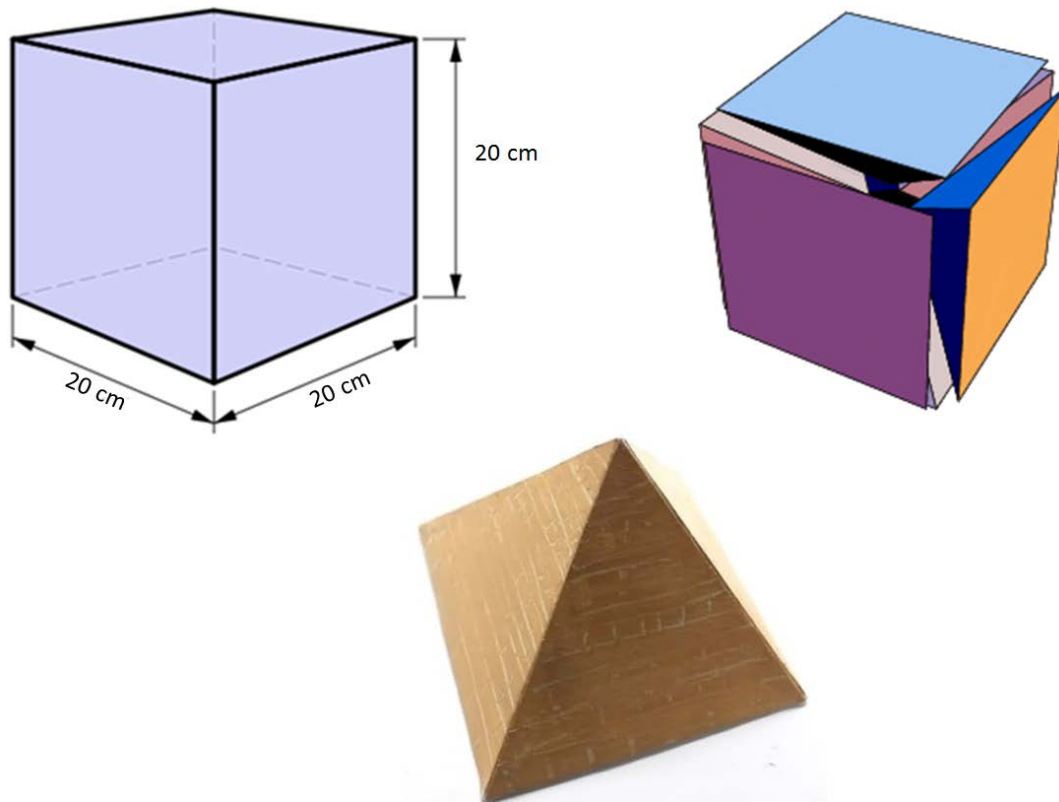
[Source: <www.quadralectics.wordpress.com>]

(4)

2.4 If you were standing as indicated on the plan above, in which direction would you walk to get to the temple? (2)

2.5 One of the many items on sale in the souvenir shop in Chichén Itzá is miniature pyramids.

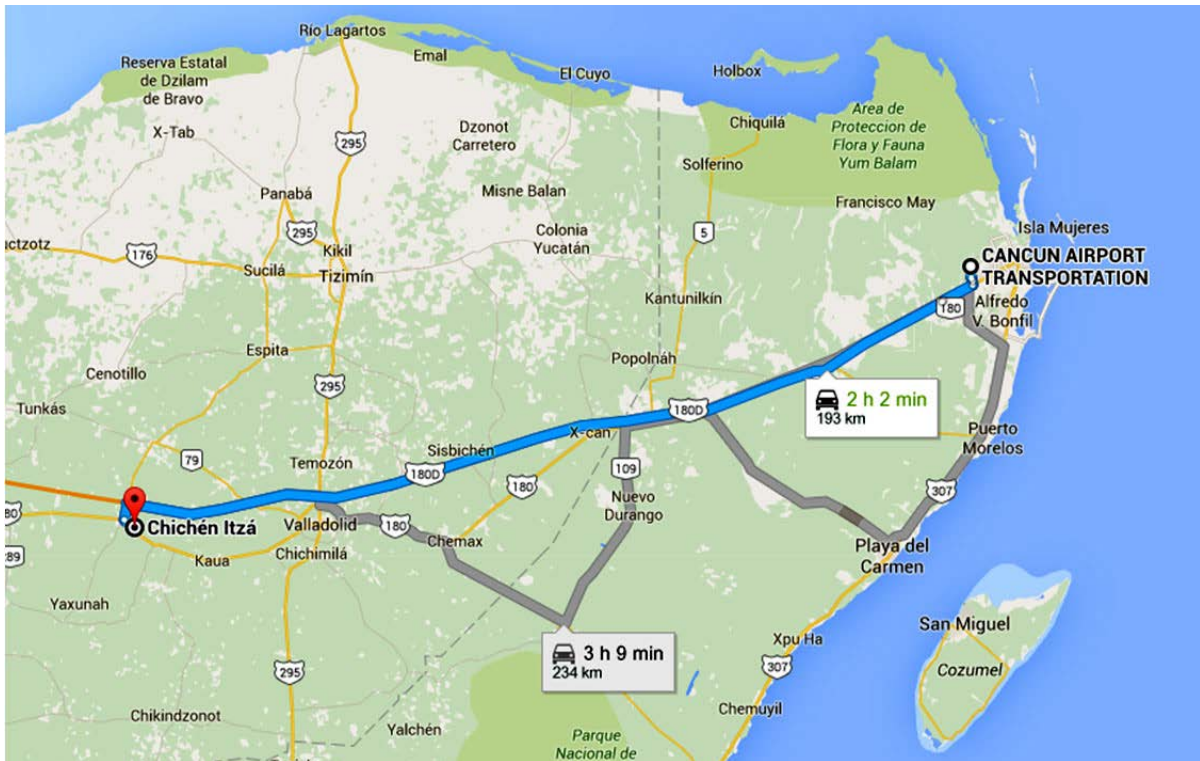
The basic pyramid, as shown below, is made from one solid cube cut into six square-based pyramids.



Calculate the volume of the cube and hence show that the volume of one pyramid, rounded to the nearest 100, is approximately 1 300 cm<sup>3</sup>. (3)



2.6 A tourist lands at Cancun Airport at 5.05 a.m. where he needs to wait for his connecting flight, which departs at 2.45 p.m. Instead of sitting in the airport, he decides to visit El Castillo located in Chichén Itzá. The map below shows two possible routes from the airport to El Castillo.



[Source: <www.discoverymundo.com>]

2.6.1 The quickest route (a total distance of 193 km) is estimated to take 2 hours and 2 minutes. Show that the predicted average speed of this one way trip is more than 90 km/h.

$$Distance = Speed \times Time \tag{3}$$

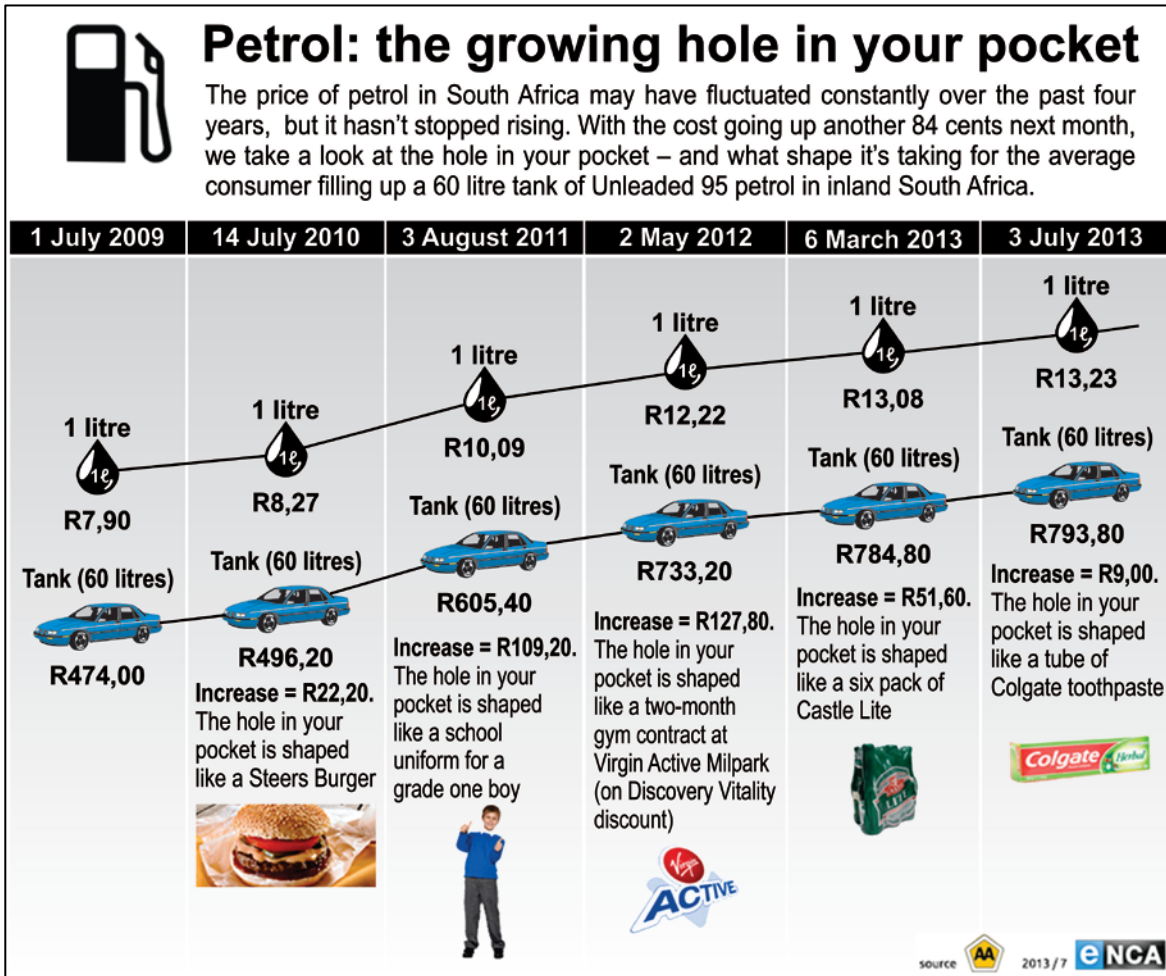
2.6.2 The tourist hires a scooter (type of motorcycle) that has a tank capacity of 11 litres for petrol. Determine if the tourist will need to stop for petrol on route from the airport to Chichén Itzá if the scooter can travel for 15,5 km on one litre of petrol. (3)

2.6.3 Due to traffic and unexpected delays, the tourist works on a travel time of 2 hours and 20 minutes to travel between the two locations. He wants to be back at the airport an hour and a half before his departure flight. Show that the tourist will be able to spend a maximum of 3½ hours at El Castillo. (7)

[33]



**QUESTION 3**



[Photo adapted from: eNCA/Douglas Simoes]

- 3.1 Explain what the amount of R793,80 represents. (2)
- 3.2 According to the information in the picture, the fuel tank capacity of 60 ℓ is constant. Explain why the graph is then not a straight line. (2)
- 3.3 The designers of the picture chose to use everyday items to illustrate the increase in petrol price. However, not everyone goes to gym or drinks beer or has a need to buy school uniforms. Everyone does, however, need to brush their teeth!

Calculate how many tubes of toothpaste would have illustrated the "hole in your pocket" on 2 May 2012. (3)

3.4 Ayanda needs to budget for university. She knows that she is able to drive 13 km on one litre of petrol and that one litre of petrol costs approximately R14.

She draws up a table to show her projected kilometres for a month.

Complete the table on the **Answer Sheet** to determine how much money Ayanda should budget for petrol per month. She always works on 4 weeks in a month.

<i>(All trips there and back)</i>		<b>Total km per month</b>	<b>≈ Litre used</b>	<b>Total rand value</b>
University	7 km per day × 5 days a week	___ km	≈ 10,8	R___
Gym	3 km × 3 days a week	36 km	≈ 2,8	R39,20
Socialising	_____ km per weekend	80 km	≈ 6,2	R86,80
Visiting home	1 × per month	70 km	≈ _____	R75,60
Shops	2 × per week	20 km	≈ 1,5	R___
Unforeseen		–	–	R100,00
<b>TOTAL</b>				<b>R___</b>

(6)  
[13]

**QUESTION 4**

Tasmiah investigates the amount of sugar found in various drinks.

Refer to **Annexure 2** in order to answer the questions that follow.

- 4.1 Besides being a pictograph, what other type of graph is this? (2)
- 4.2 Calculate the mean sugar content (in grams) of the five drinks that contain the highest quantities of sugar. (4)
- 4.3 There are 11 drinks that are 330 ml in capacity. Refer only to these 11 drinks when answering the following questions.
- 4.3.1 Calculate the median amount of sugar (in grams) contained in these 11 drinks. (3)
- 4.3.2 Is there a modal amount of sugar (in grams) contained in the 330 ml drinks? (2)
- 4.3.3 Calculate the range (in grams) of sugar for these 11 drinks. (3)
- 4.3.4 The mean content of sugar contained in all 11 drinks is 37,9 g. Which measure of central tendency, the mean, mode or median, would be the best to illustrate the amount of sugar contained in these drinks? Give a reason for your answer. (3)
- 4.4 According to the graph, a 250 ml bottle of Play energy drink contains 29,2 grams of sugar and a 330 ml can of Lemon Twist contains 39,2 grams of sugar. Determine which drink actually contains more sugar per 100 ml. Show all calculations. (5)
- 4.5 If a 330 ml can of Fanta Grape contains 44,1 g of sugar, would it be correct to say that just over 13% of a 1,25 ℓ bottle contains sugar? Show your working. (5)
- 4.6 Sugar costs on average R537,00 per ton. If  $1,2 \times 10^7$  cans of Sparletta Cream Soda are produced, then calculate the cost of the sugar in rand. (6)
- $1 \text{ ton} = 1\,000 \text{ kg}$
- 4.7 If Tasmiah drinks 4 ℓ of Coca-Cola a week, how many teaspoons, rounded up to the nearest teaspoon, of sugar is she consuming in a four-week month? (6)

**[39]**

**QUESTION 5**

**ANSWER THIS QUESTION ON THE ANSWER SHEET PROVIDED.**

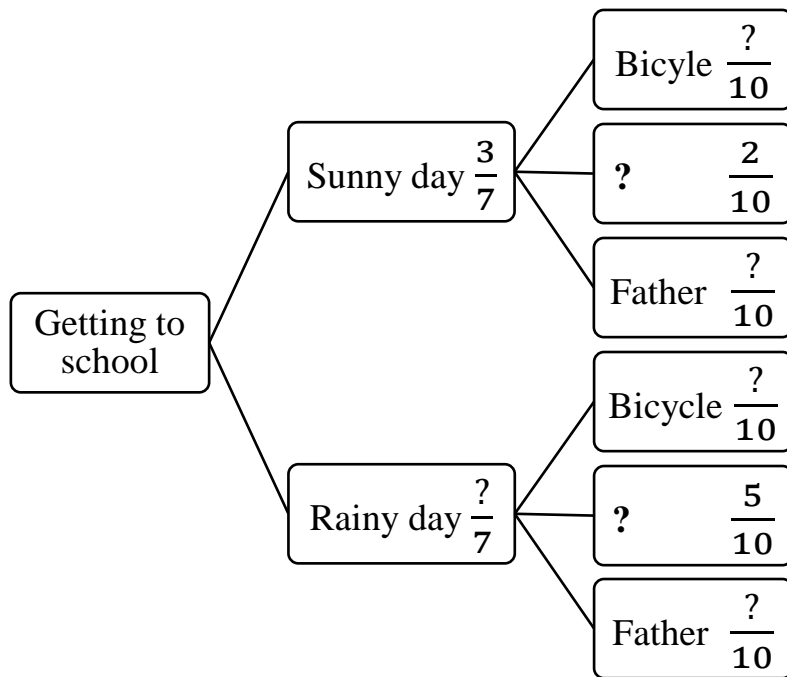
Luca has three options of getting to school. She can ride her bicycle, catch a taxi or wake up extra early to get a lift with her father. The weather plays a big role in her decision of how to get to school.

The probability of it being a sunny day is  $\frac{3}{7}$  and the probability of it being a rainy day is  $\frac{4}{7}$ .

If it is a sunny day, the probability of Luca riding her bicycle to school is 60%, while the probability of her catching a taxi is 20%.

If it is a rainy day, the probability of Luca catching a taxi is 0,5, and the probability of her getting up early to get a lift with her father is 0,4.

5.1 Complete the missing information on the tree diagram on the **Answer Sheet** provided.



(6)

5.2 Calculate the probability, as a fraction, that it will be a sunny day and that Luca will get up early to catch a lift with her father. Show all working.

(4)

[10]

**Total: 150 marks**