

basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

MATHEMATICAL LITERACY P2

NOVEMBER 2016

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

MARKS: 150

TIME: 3 hours

**This question paper consists of 11 pages and
an addendum with 4 annexures (5 pages).**



INSTRUCTIONS AND INFORMATION

1. This question paper consists of FOUR questions. Answer ALL the questions.
2. Use the ADDENDUM with ANNEXURES to answer the following questions:

ANNEXURE A for QUESTION 2.1
ANNEXURE B for QUESTION 2.2
ANNEXURE C for QUESTION 3.2
ANNEXURE D for QUESTION 4.2
3. Number the answers correctly according to the numbering system used in this question paper.
4. Start EACH question on a NEW page.
5. 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 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.



QUESTION 1

- 1.1. A company installed computers at a computer centre in October 2015. The manager used a bank account to pay the employees' wages for the project.

Below is a comparison of the cash-withdrawal fee structures of two banks in 2015 and the percentage changes in fees from 2014, as well as the calendar for October 2015.

TABLE 1: CASH-WITHDRAWAL FEE STRUCTURE OF TWO BANKS

BANK	2015 FEE	FEE PER R1 000	% CHANGE IN FEES FROM 2014
X	R3,95 + R1,30 per R100	...	3,0
Y	R4,00 + 1,15% of withdrawal amount	R15,50	A

[Source: <http://businesstech.co.za/news/banking/south-african-banking-fees-2015>]

CALENDAR FOR OCTOBER 2015						
Sun.	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

NOTE: Employees did not work over weekends.

Use TABLE 1 and the calendar above to answer the following questions.

- 1.1.1 Determine the probability of randomly selecting a workday in October 2015 with a date that is an even number. (3)
- 1.1.2 Give ONE valid reason why a company will not necessarily use a bank offering the lowest bank charges. (2)
- 1.1.3 Determine the missing value of A (rounded off to ONE decimal place) if the 2014 withdrawal fee was equal to:

$$(R3,50 + 1,1\% \text{ of the withdrawal amount})$$

You may use the following formula:

$$\text{Percentage change in fees} = \left(\frac{\text{2015 fee per R1 000}}{\text{2014 fee per R1 000}} - 1 \right) \times 100\% \quad (5)$$

- 1.1.4 The company withdrew R15 000 for the weekly wages every Friday. The financial officer stated that the company would have saved more than R90 in withdrawal fees if they had used Bank Y rather than Bank X for the four withdrawals. (7)
- Verify whether this statement is valid.
- 1.1.5 Calculate an employee's total monthly wage if he earned R2 142,85 per week in October 2015. Assume that the employee was not absent and did not work overtime in this month. (4)



1.2

Since 2012 there has been a decrease in the number of computers shipped globally.

TABLE 2 below shows the changes in the number of computers shipped globally by the five largest computer manufacturers worldwide in the first quarter of 2012 and the first quarter of 2013.

TABLE 2: GLOBAL SHIPMENT OF COMPUTERS BY THE FIVE LARGEST COMPUTER MANUFACTURERS

COMPUTER MANUFACTURERS	NUMBER OF COMPUTERS (IN MILLIONS) SHIPPED	
	FIRST QUARTER 2012	FIRST QUARTER 2013
A	15,7	12,0
B	11,7	11,7
C	10,1	9,0
D	9,0	6,2
E	5,4	4,4

[Source: www.slate.com]

Use the information in TABLE 2 above to answer the following questions.

1.2.1 Give and explain TWO possible factors that could have led to the decrease in the global shipment of computers since 2012. (4)

1.2.2 Determine the difference between the total number of computers shipped globally by the five manufacturers in the first quarter of 2012 and the first quarter of 2013. (4)

1.2.3 It was stated that in this period, manufacturer A showed a greater percentage decrease in the shipment of computers compared with manufacturer D.

Verify (showing ALL calculations) whether this statement is valid. (7)
[36]



QUESTION 2

2.1

A representative of the Department of Tourism gave an overview of the spending by all tourists (domestic and international) in 2013.

The total amount spent by all tourists in 2013 showed an annual growth of 9,7% from the previous year.

The impact of tourism on the South African economy is represented graphically in ANNEXURE A.

Use the information above and ANNEXURE A to answer the following questions.

- 2.1.1 (a) Calculate the total amount spent by all tourists in 2012. (3)
- (b) Explain whether it is more appropriate to round off the rand value of the total amount spent in billions to one decimal place, rather than rounding off the rand value of the total amount spent in billions to the nearest whole number. (3)
- 2.1.2 The average amount spent by international tourists in 2013 was exactly R6 580.
- Verify, showing ALL calculations, whether this amount is CORRECT. (6)
- 2.1.3 Identify the item(s) on which international tourists spent the least money. (2)
- 2.1.4 Give ONE suitable example of a 'tourism-related item'. (2)
- 2.1.5 The tourism industry's direct contribution to the gross domestic product (GDP) was R103,6 billion in 2013.
- The tourism industry's annual contribution to the GDP remained constant at an annual compound interest rate of 2,9% for the next three years.
- Determine the total amount (rounded off to the nearest million) that the tourism industry contributed to the GDP in 2016. (6)



2.2

Tourists can travel by train as one of the modes of transport in South Africa.

A South African tourist took a trip on the Shosholoza Meyl from Johannesburg to East London.

The tourist was accompanied by her father (born in 1959), her husband and her two children (aged 3 years and 6 years).

The family departed from Johannesburg on 27 January 2016 and returned on 7 February 2016.

The information about the train schedules and fares for 2016 is shown in ANNEXURE B.

Use ANNEXURE B to answer the following questions.

- 2.2.1 (a) Calculate the total stopover time at all the railway stations between Johannesburg and East London. (5)
- (b) Hence, determine the modal stopover time at the railway stations. (2)
- (c) Determine the average speed at which the train travelled from Johannesburg to East London.

You may use the following formula:

$$D = S \times T \quad \text{where}$$

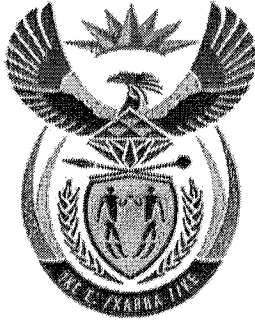
D = distance (in km)

S = average speed (in km/h)

T = time in hours (h), excluding stopover times at railway stations (7)

- 2.2.2 Calculate the total cost of the return train trip for the family. (11)
[47]





basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

MATHEMATICAL LITERACY P2

ADDENDUM

NOVEMBER 2016

This addendum consists of 5 pages with 4 annexures.

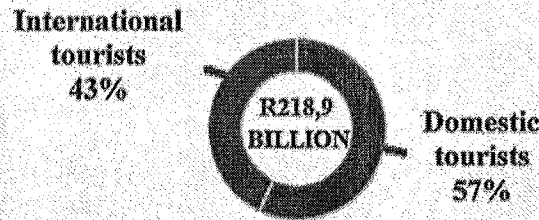


ANNEXURE A

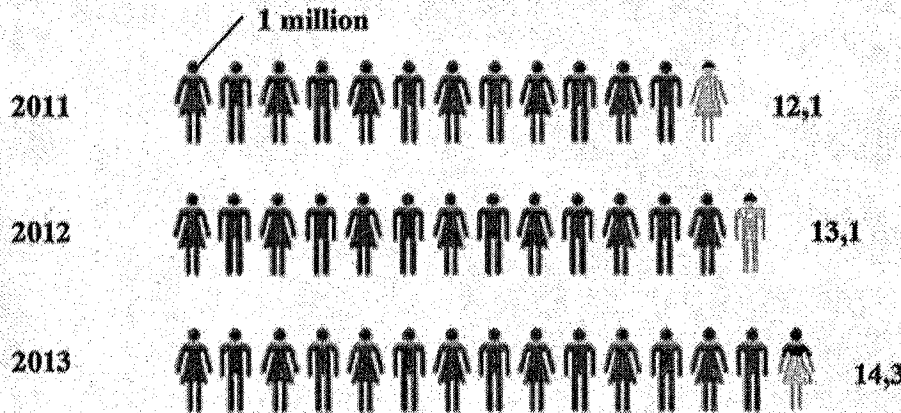
QUESTION 2.1

GRAPHICAL REPRESENTATION OF TOURIST SPENDING IN SOUTH AFRICA IN 2013

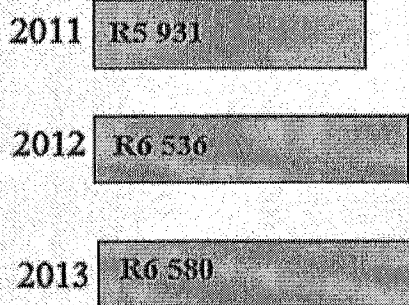
AMOUNT SPENT BY TOURISTS: 2013



NUMBER OF INTERNATIONAL TOURISTS (2011–2013)

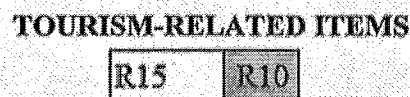
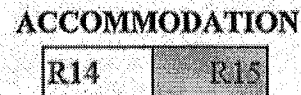
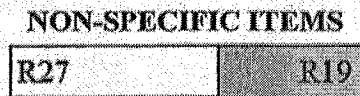


AVERAGE SPENDING PER INTERNATIONAL TOURIST (2011–2013)



TOURIST SPENDING PER R100 FOR DIFFERENT ITEMS

□ INTERNATIONAL ■ DOMESTIC



[Source: Tourism Satellite Account for SA, <http://www.statssa.gov.za>]



ANNEXURE B

QUESTION 2.2

Johannesburg to East London = 992 km		
RAILWAY STATION	ARRIVAL	DEPARTURE
Johannesburg to ...		17:30 day 1
Germiston	17:53 day 1	17:58 day 1
Vereeniging	19:00 day 1	19:20 day 1
Sasolburg	19:43 day 1	19:48 day 1
Koppies	20:34 day 1	20:36 day 1
Kroonstad	21:42 day 1	21:50 day 1
Hennenman	22:26 day 1	22:28 day 1
Virginia	22:44 day 1	22:46 day 1
Theunissen	23:14 day 1	23:16 day 1
Bloemfontein	00:32 day 2	00:55 day 2
Springfontein	03:49 day 2	04:15 day 2
Bethulie	05:00 day 2	05:03 day 2
Burgersdorp	06:17 day 2	06:34 day 2
Molteno	07:25 day 2	07:28 day 2
Queenstown	08:58 day 2	09:12 day 2
Stutterheim	11:43 day 2	11:46 day 2
Berlin	12:39 day 2	12:42 day 2
East London	13:24 day 2	

ADULT SINGLE FARE				
MONTH	JANUARY	FEBRUARY	MARCH	APRIL
FARES	R560	R490	R490	R490

NOTE:

- Peak season: November to January
- Children aged 3 to 9 years:
 - 50% of adult fare during off-peak season
 - 80% of adult fare during peak season
- South African senior citizens (55+ years) qualify for 25% discount.

[Adapted from www.southafricanrailways.co.za]

ANNEXURE C

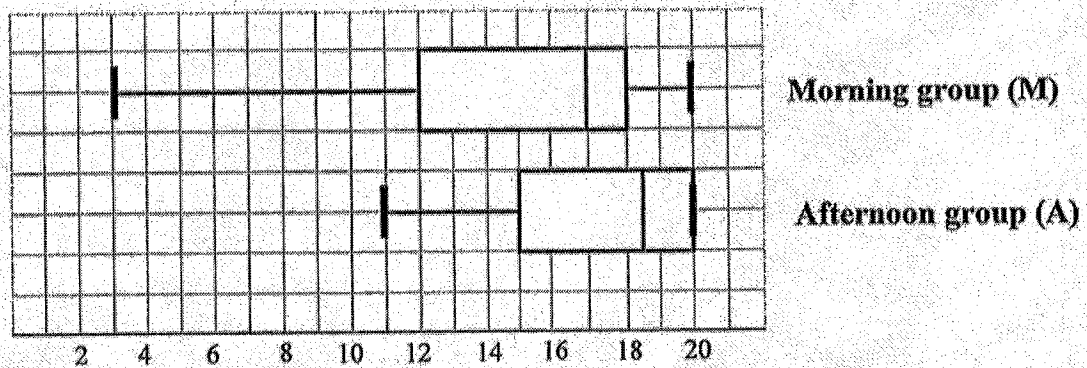
QUESTION 3.2

**RECORDS OF ATTENDANCE FOR THREE GROUPS
OVER A PERIOD OF 18 DAYS (D1–D18)**

Morning Group (M)																	
D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16	D17	D18
20	18	9	10	12	3	15	15	14	8	18	x	19	20	17	x	20	18
Afternoon Group (A)																	
D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16	D17	D18
14	12	20	20	16	15	19	20	18	20	19	15	20	11	18	12	20	19
Evening Group (E)																	
D1	D2	D3	D4	D5	D6	D7	D8	D9	D10	D11	D12	D13	D14	D15	D16	D17	D18
8	7	8	6	8	6	7	8	8	6	6	7	8	8	8	8	7	8

[Source: www.emorycommunityswimming.com]

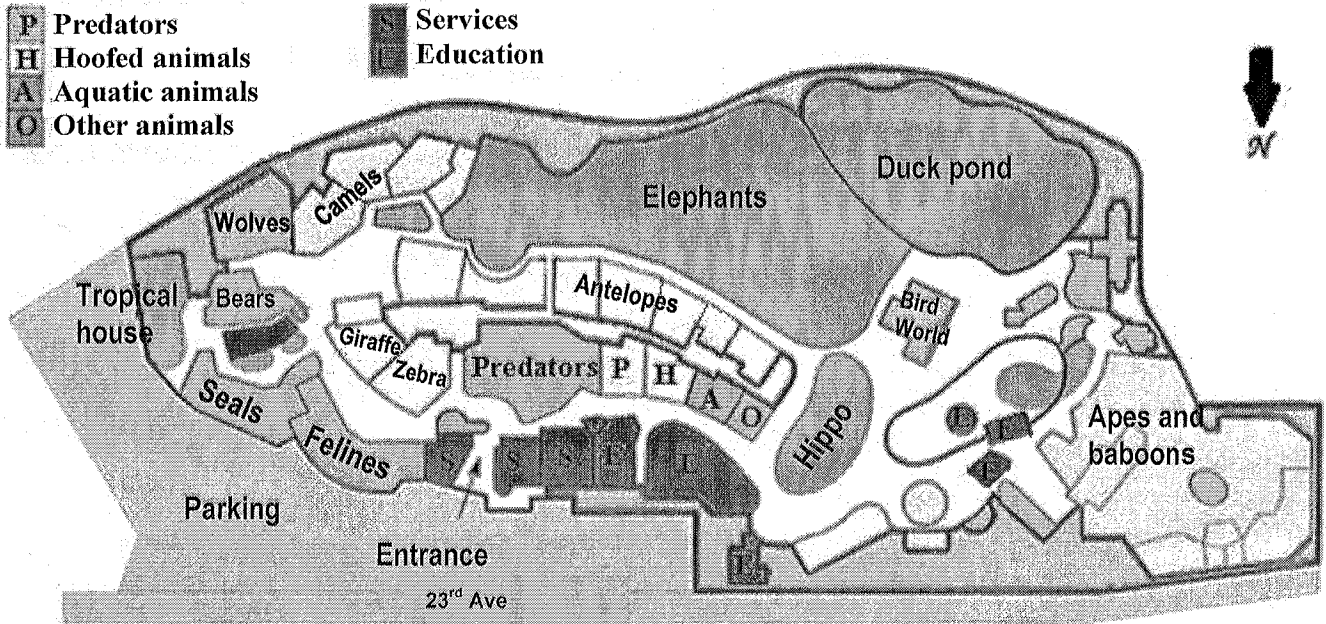
**BOX AND WHISKER PLOTS REPRESENTING ATTENDANCE FOR
MORNING AND AFTERNOON GROUPS OVER A PERIOD OF 18 DAYS**



ANNEXURE D

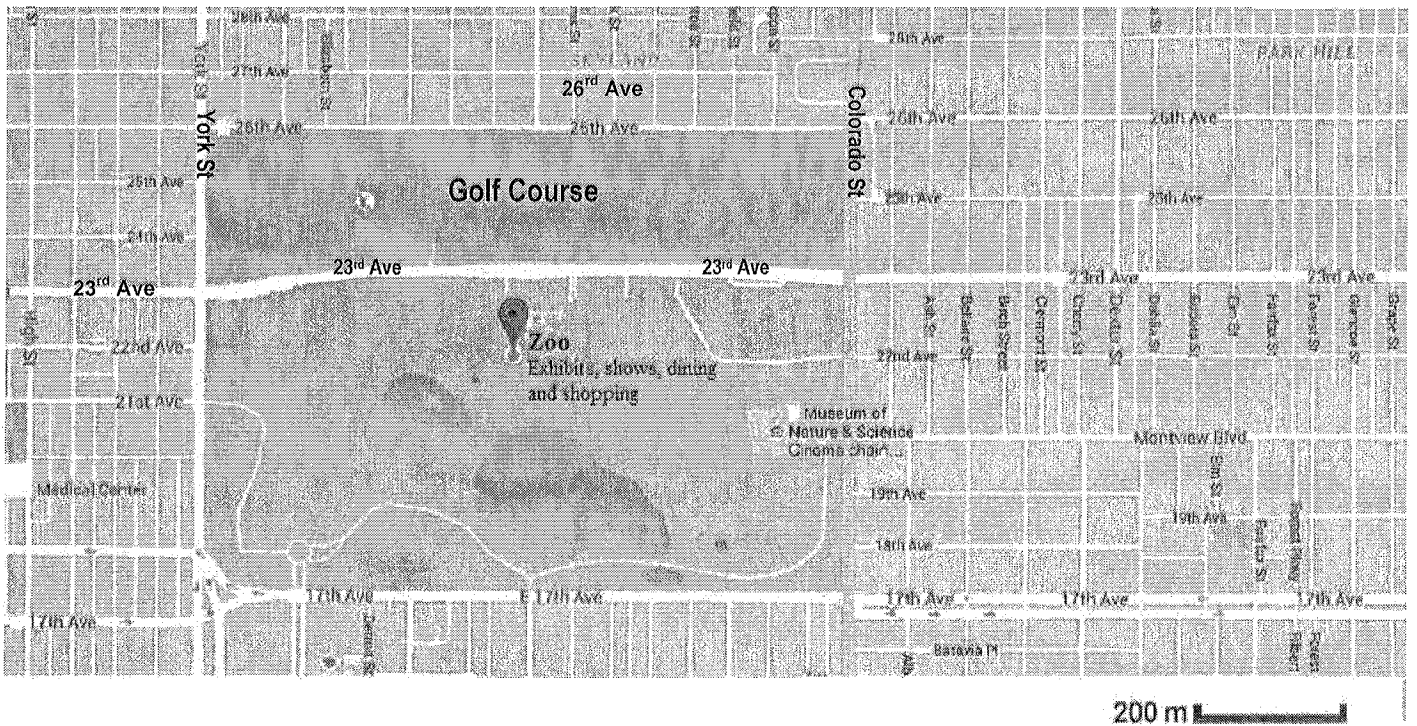
QUESTION 4.2

LAYOUT PLAN OF THE ZOO



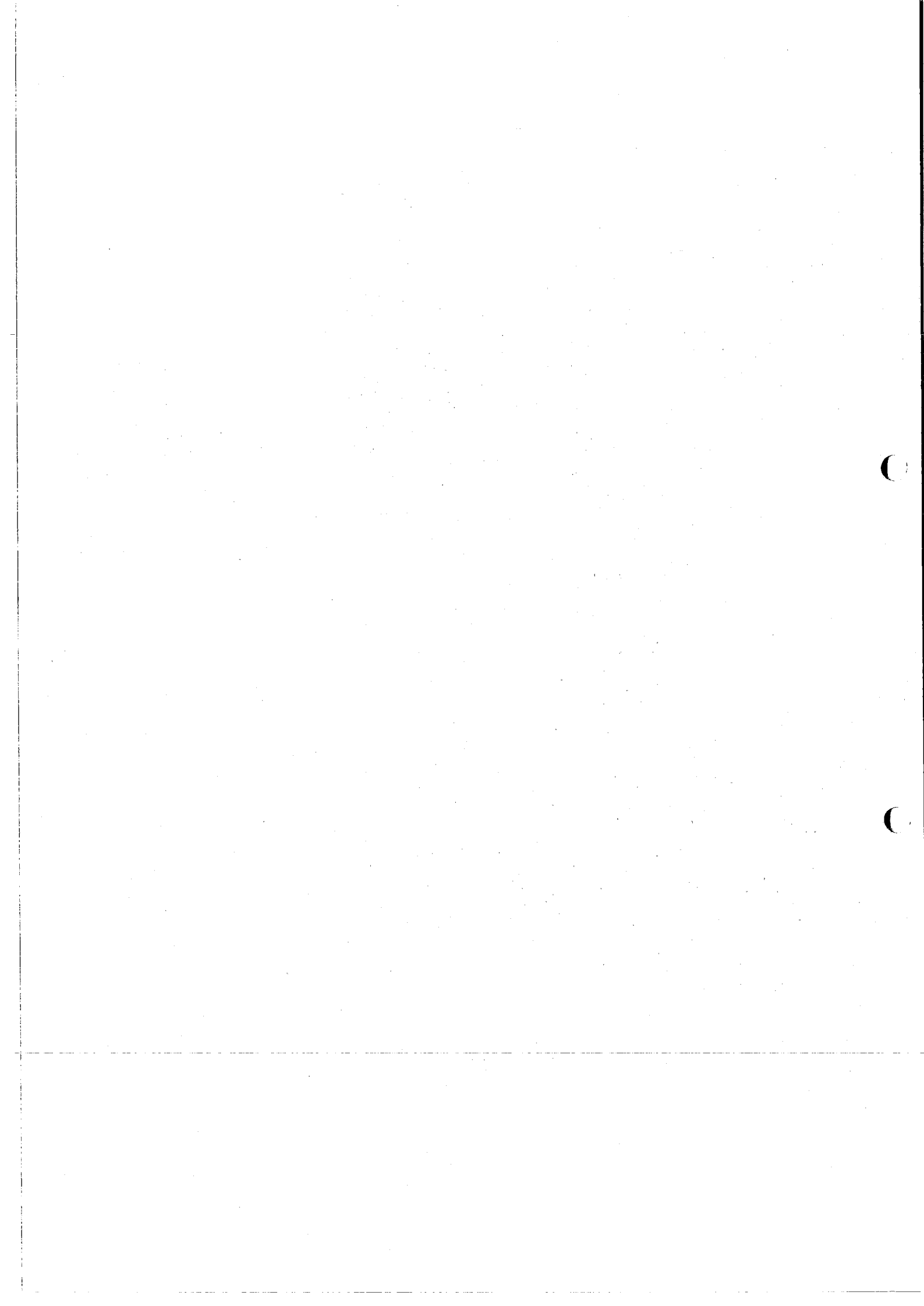
[Source: Wikipedia/Denver Zoo]

MAP OF THE SURROUNDING AREA OF THE ZOO



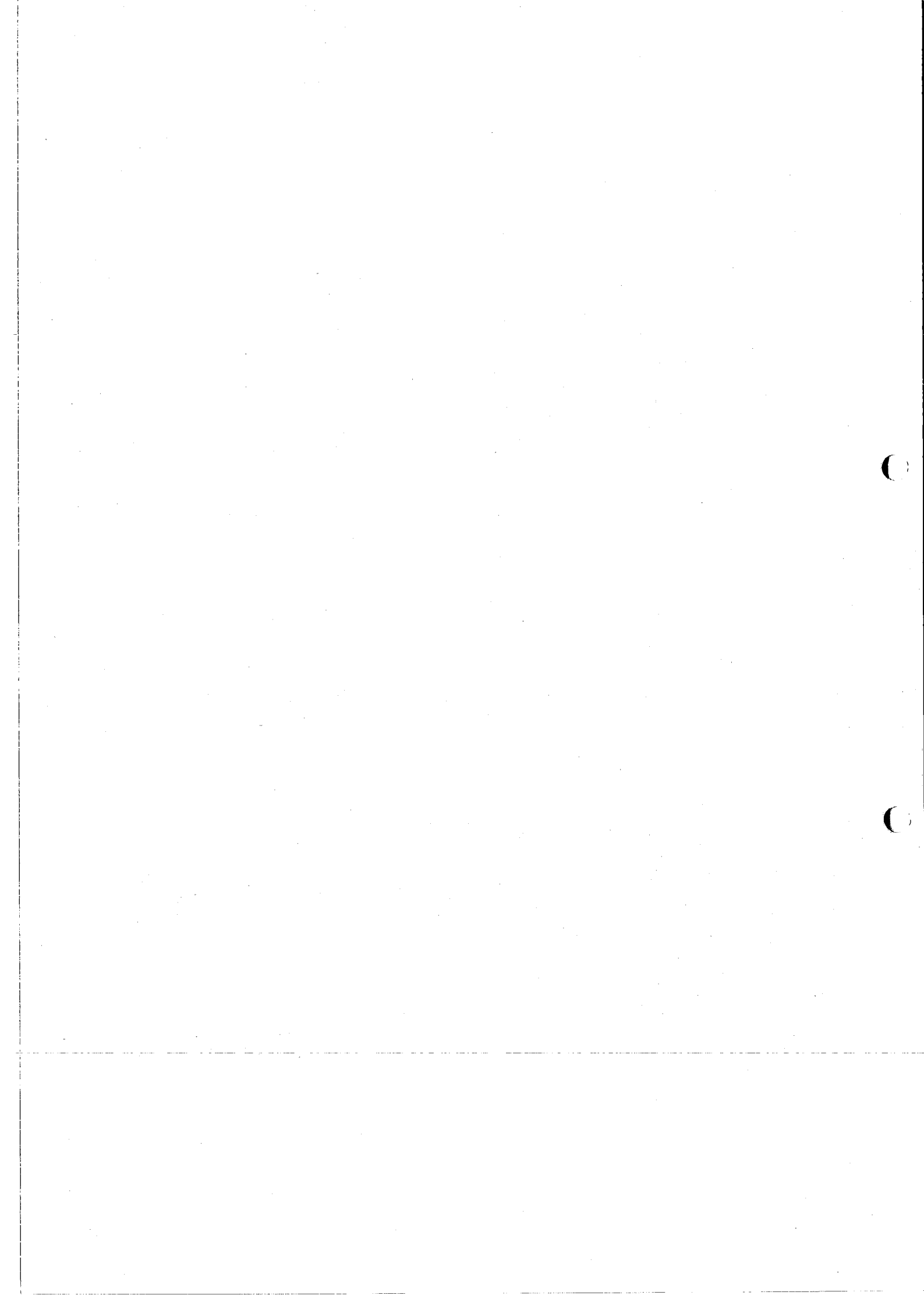
[Adapted from Google Maps/Denver Zoo]





○

○



QUESTION 3

3.1

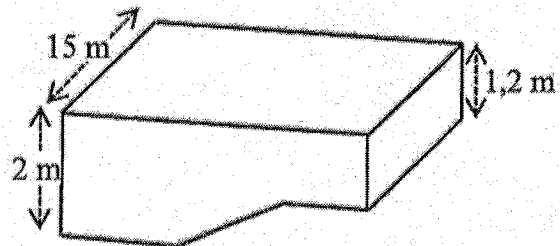
Simone uses the local swimming pool to give swimming lessons.

The rectangular pool has a shallow section, C, a deep end, A, and a sloping section, B, as shown in the various views below.

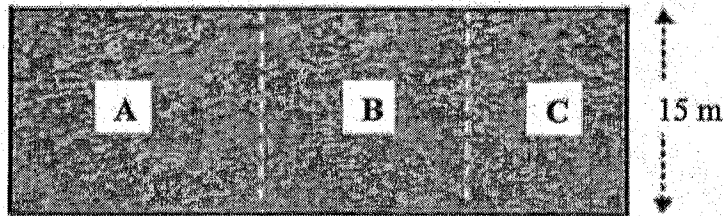
Picture of the swimming pool



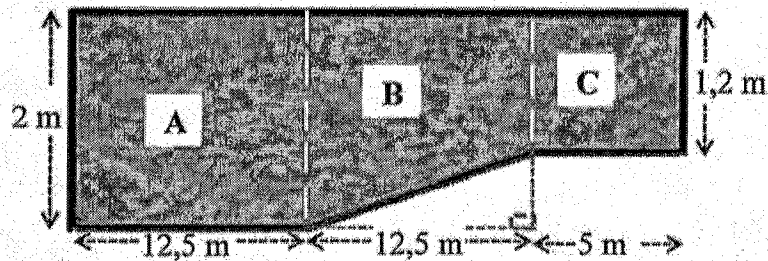
3D view



Top view of the swimming pool



Below ground-level side view of the swimming pool



The capacity of section B of the swimming pool is 300 m^3 .

You may use the following formula:

Volume of a rectangular prism = length \times width \times height

NOTE:

- 1 gallon = 3,785 litres
- $1 \text{ m}^3 = 1\,000 \text{ } \ell$

3.1.1 Show, with calculations, that the maximum capacity of the swimming pool is 765 m^3 . (5)

3.1.2 Calculate the volume of water (in gallons) required to fill the swimming pool to 94% of its capacity. (4)

3.1.3 The pool must be topped up with 135 000 ℓ of water due to water loss. The pool is filled with water at a constant rate of 2 350 litres per hour.

Simone says that it will take exactly $2\frac{1}{2}$ days to top up the pool.

Verify, showing ALL calculations, if her statement is valid. (5)



3.2

Swimming lessons are offered four times a week to three different groups.

The morning group (M) and afternoon group (A) each has 20 registered participants. The evening group (E) has 8 registered participants.

ANNEXURE C shows the attendance records for the three groups over a period of 18 days, as well as corresponding box and whisker plots representing the attendance of groups M and A.

Use ANNEXURE C to answer the following questions.

- 3.2.1 Determine missing value x if the mean attendance for M is 15. (4)
- 3.2.2 Determine the interquartile range for A. (4)
- 3.2.3 Give a possible reason why E has full attendance on more days than M. (2)
- 3.2.4 Determine the probability (expressed as a whole percentage) of randomly choosing a day on which A has full attendance. (3)
- 3.2.5 Give TWO reasons why the attendance of A is considered to be better than that of M by using the box and whisker plots. (4)

[31]



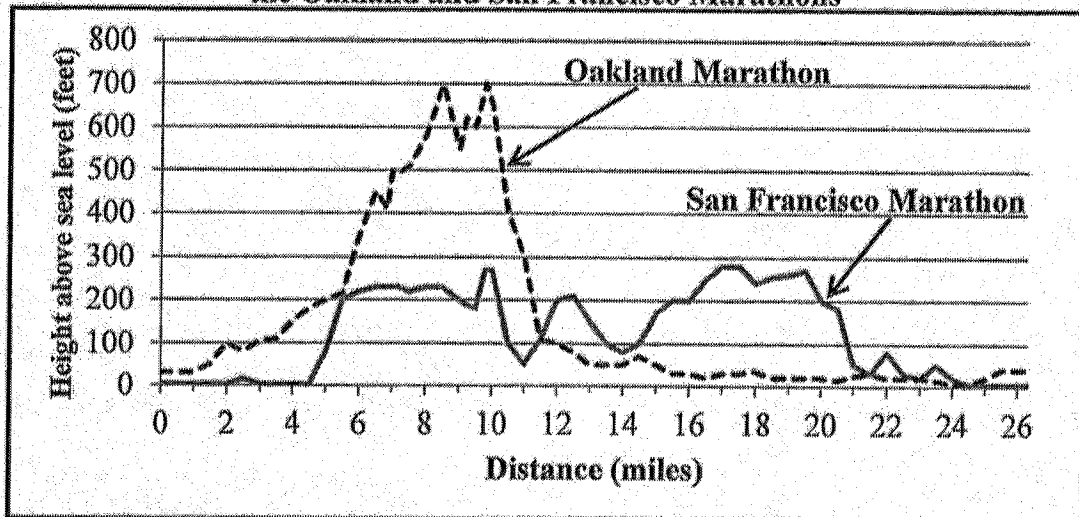
QUESTION 4

4.1

In 2015 Keitumetse participated in the Oakland Marathon and the San Francisco Marathon.

The graphs indicating the height above sea level of the Oakland and San Francisco Marathons are shown below.

Graphs showing the height above sea level of the Oakland and San Francisco Marathons

**NOTE:**

- 26,21875 miles = 26 miles + 385 yards
- 1 foot = 0,3038 m

Use the graphs above to answer the following questions.

- 4.1.1 Show by calculation that one mile is equivalent to 1 760 yards. (2)
- 4.1.2 Determine the approximate distance (in miles) from the start of the San Francisco Marathon to where the height above sea level rises steeply for the first time. (2)
- 4.1.3 Calculate the maximum height above sea level (in metres) for the Oakland Marathon. (3)
- 4.1.4 An Oakland Marathon participant stated that the first 10 miles had been the most difficult, but thereafter it was much easier. (2)
- Give a possible reason for this participant's statement.



4.2

Keitumetse also visited the Denver Zoo during his stay in America. The layout plan of the zoo, showing some animal enclosures and a map of the surrounding area, is given in ANNEXURE D.

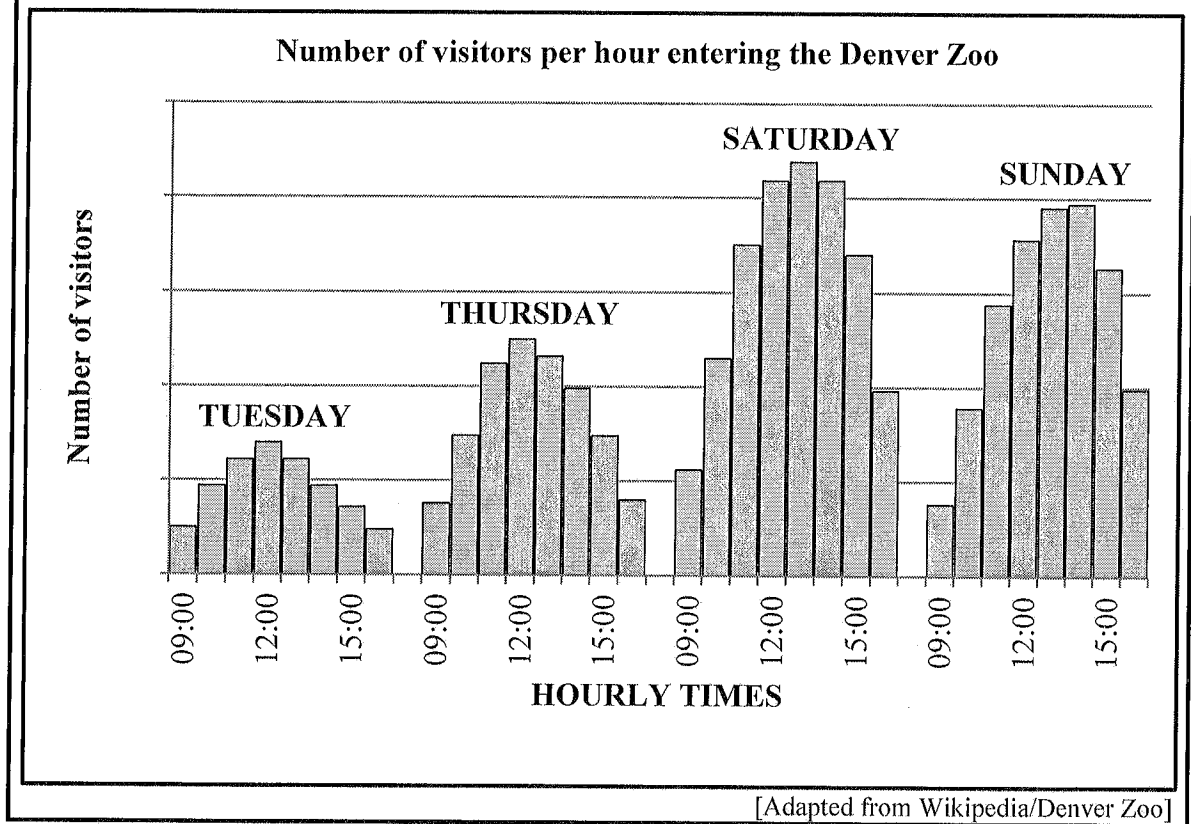
Use ANNEXURE D to answer the following questions.

- 4.2.1 Determine the total number of venues that are available for services and education. (2)
- 4.2.2 Keitumetse entered the zoo, passed the predator enclosure and continued walking in a westerly direction.
Name the next major animal enclosure that he will encounter. (2)
- 4.2.3 If the area of the elephant enclosure is approximately the size of the area of four football fields, estimate the area of the entire zoo in terms of the area of football fields. (4)
- 4.2.4 The shortest distance between York Street and Colorado Street is 1,6 km.
Verify (showing ALL calculations) whether the bar scale on the map is correct. (7)



4.3

The bar graphs below show the number of visitors per hour entering the Denver Zoo on four days of the week.



Use the graph above to answer the following questions.

- 4.3.1 According to the graph, on which day do most people visit the zoo? (2)
- 4.3.2 Give ONE reason why it cannot be said with certainty that 12:00 on a Monday is NOT a very popular time for visitors to enter the zoo. (2)
- 4.3.3 Describe TWO possible trends that relate to the number of visitors and the hourly times visitors enter the zoo. (4)
- 4.3.4 Keitumetse states that at 09:00 on Saturdays the number of visitors entering the gates is nearly double the number of visitors at 09:00 on Tuesdays. (4)

Give TWO reasons to justify this statement.

(4)
[36]

TOTAL: 150





EA516LF2K0069163