basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL
SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P1

NOVEMBER 2012

MARKS: 150

TIME: 3 hours

This question paper consists of 16 pages and 3 annexures.

INSTRUCTIONS AND INFORMATION

1.   This question paper consists of SIX questions. Answer ALL the questions.

2.   Answer QUESTION 4.1.7, QUESTION 6.3.3 and QUESTION 6.4.1 on the attached ANNEXURES. Write your centre number and examination number in the spaces 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 the calculations clearly.

7.   Round off ALL the 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　　1.1.1　　Simplify: $1\,441,62 - \sqrt{8,7^2 - 13,26}$　　　　　　　　　　　　(2)

　　　　1.1.2　　Write $0,0528$ as a common fraction in simplified form.　　　(2)

　　　　1.1.3　　Convert $23,005$ litres to millilitres.　　　　　　　　　　(2)

　　　　1.1.4　　Determine the total price of 2,5 kilograms of meat costing R63,99 per kilogram.　　　　　　　　　　　　　　　　　　　　(2)

　　　　1.1.5　　Shameeg had to attend a meeting that was scheduled to start at 13:15. At what time did he arrive at the meeting if he arrived 1 hour 18 minutes early?　　　　　　　　　　　　　　　　　　　(2)

　　　　1.1.6　　Convert R3 850 to euros (€) if the exchange rate is €1 = R10,2584.　　(2)

　　　　1.1.7　　State whether the following event is CERTAIN, MOST LIKELY or IMPOSSIBLE:

　　　　　　　　Christmas Day is on 25 December in South Africa.　　　　　(2)

　　　　1.1.8　　The price per litre of diesel at nine different garages is:

　　　　　　　　R9,97　　　　R9,97　　　　R10,12
　　　　　　　　R10,17　　　　R10,29　　　　R10,79
　　　　　　　　R10,79　　　　R10,79　　　　R10,95

　　　　　　　　Determine the median price per litre of diesel.　　　　　　(2)

1.2　　Miss Lena asked all the learners in her class what their favourite fruit juice was. She illustrated the data in the bar graph below.

FAVOURITE FRUIT JUICE
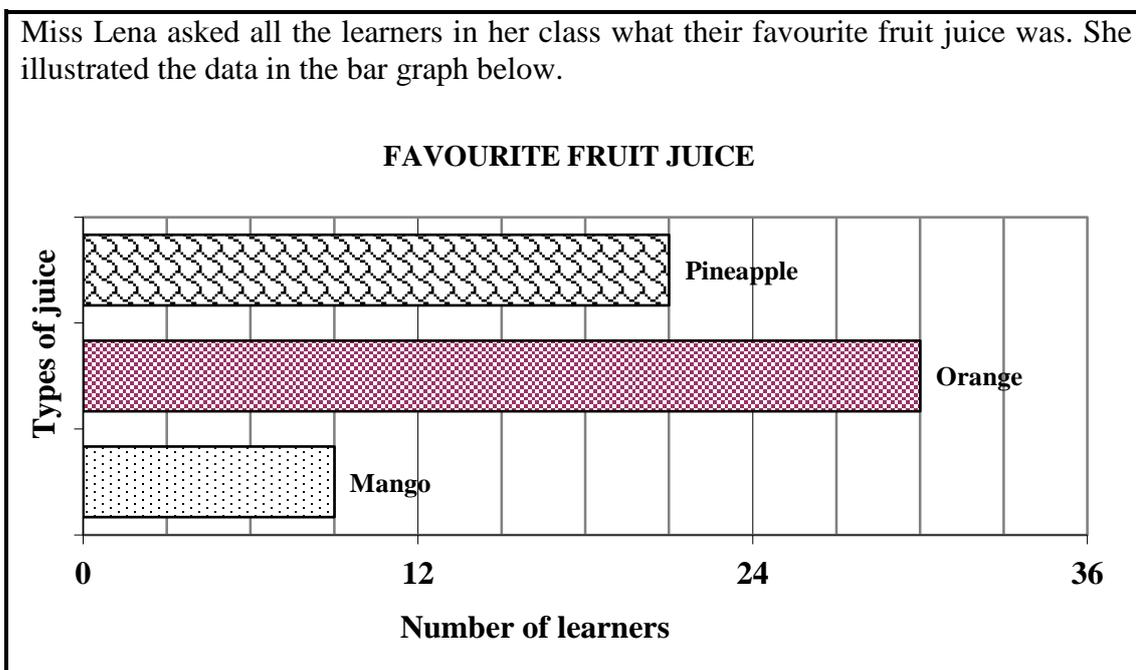
How many learners does she have in her class?　　　　　　　　　　　(3)

　　　　　　　　　　　　　　　　　　　　Please turn over

1.3 Mrs Rose received a cash-sale slip after she bought some goods at CT-Haven at the Cape Town International Airport.

Below is a copy of the cash-sale slip with some of the details omitted.

```
                    CT-HAVEN

            Cape Town International Airport
           Domestic Departures, Opposite Gate 8
                  Tel: (+2721) 1234567
                  VAT Reg# 461010565
                    TAX INVOICE

     1705359 Reg 1 ID 41  14:54  01/11/11

     CHOCOLATE SLAB      3  @   14,95      …
     BANGLES            ...  @   13,95    97,65
     JOY MAGAZINE        1  @   24,95    24,95
     SUBTOTAL                           167,45

     TOTAL (EXCLUDING VAT)                ...

     TOTAL (INCLUDING VAT)              167,45
     CASH PAYMENT                       167,45
     AMOUNT TENDERED                    200,00
     CHANGE                              32,55

          Receipt total includes 14% VAT
         RETAIN AS PROOF OF PURCHASE
```

NOTE: VAT is value-added tax.

1.3.1 How much did Mrs Rose pay in total for the THREE slabs of chocolate? (2)

1.3.2 How many bangles did Mrs Rose buy? (2)

1.3.3 A *Joy* magazine costs R21,89 excluding VAT. Calculate the amount of VAT paid on the *Joy* magazine. (2)

1.3.4 Calculate the total (excluding VAT) for the goods bought. (3)

1.4   South Africa imports crude oil from different countries. TABLE 1 below shows crude oil imports during 2010 and 2011.

TABLE 1: Crude oil imports during 2010 and 2011

COUNTRY	AMOUNT OF CRUDE OIL (IN MILLIONS OF TONS)	
	2010	**2011**
Angola	3,409	1,948
Iran	5,528	4,874
Nigeria	3,594	3,755
Saudi Arabia	4,584	4,793
Other countries	2,139	2,264

[Source: *Business Times*, 1 April 2012]

1.4.1   Calculate the total amount of crude oil imported during 2011.   (2)

1.4.2   From which country did South Africa import most of its crude oil during 2010 and 2011?   (2)

1.4.3   Which country showed the largest increase in the amount of crude oil exported to South Africa between 2010 and 2011?   (2)

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QUESTION 2

2.1 Didi is a contestant in a game show where they spin a wheel. She can win a prize if the arrow points to a specific colour after she spins the wheel and it stops.

The diagram below shows a spin wheel that is divided into 24 equal parts called sectors. When someone spins the wheel, it is equally likely for the arrow to point to any one of the sectors when the wheel stops.

One half of the sectors are grey, one third of the sectors are white, $\frac{1}{8}$ of the sectors are black and $\frac{1}{24}$ of the sectors are spotted.

Pointer (arrow)
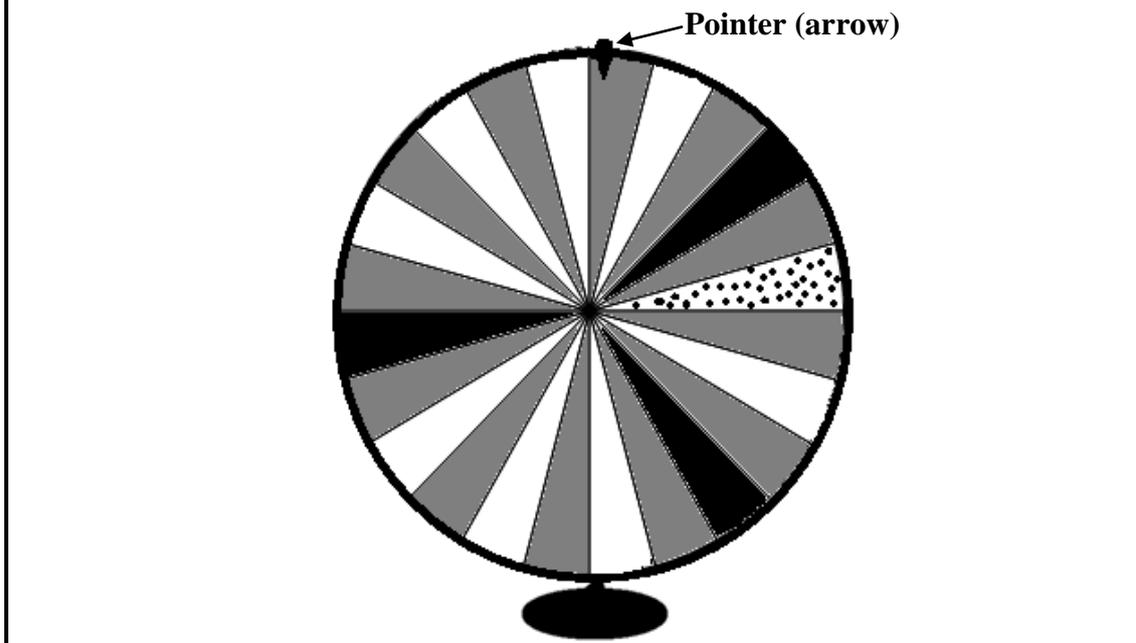
2.1.1 How many white sectors are there on the spin wheel? (2)

2.1.2 Didi spins the wheel. Which sector is the arrow LEAST likely to be pointing at when the wheel stops? (2)

2.1.3 The wheel has a radius of 60 cm.

(a) Calculate the circumference of the wheel.

Use the formula:

Circumference of a circle = 2 × π × radius, using π = 3,14 (2)

(b) Calculate the area of ONE of the sectors of the wheel.

Use the formula:

Area of a sector of a circle $= \dfrac{\pi \times (\textbf{radius})^2}{\textbf{\textit{n}}}$

where π = 3,14 and n = number of sectors (3)

2.2 | South Africa's Road Traffic Management Corporation reported that sending an SMS (short message service) from a cellphone while driving, increases the reaction time needed to stop a vehicle in an emergency from 1,2 seconds to 1,56 seconds.

2.2.1 Calculate the percentage increase in the reaction time it takes to stop a vehicle when sending an SMS while driving.

Use the formula:

Percentage increase in reaction time = $\dfrac{\textbf{difference in time}}{\textbf{original time}} \times \textbf{100\%}$ (3)
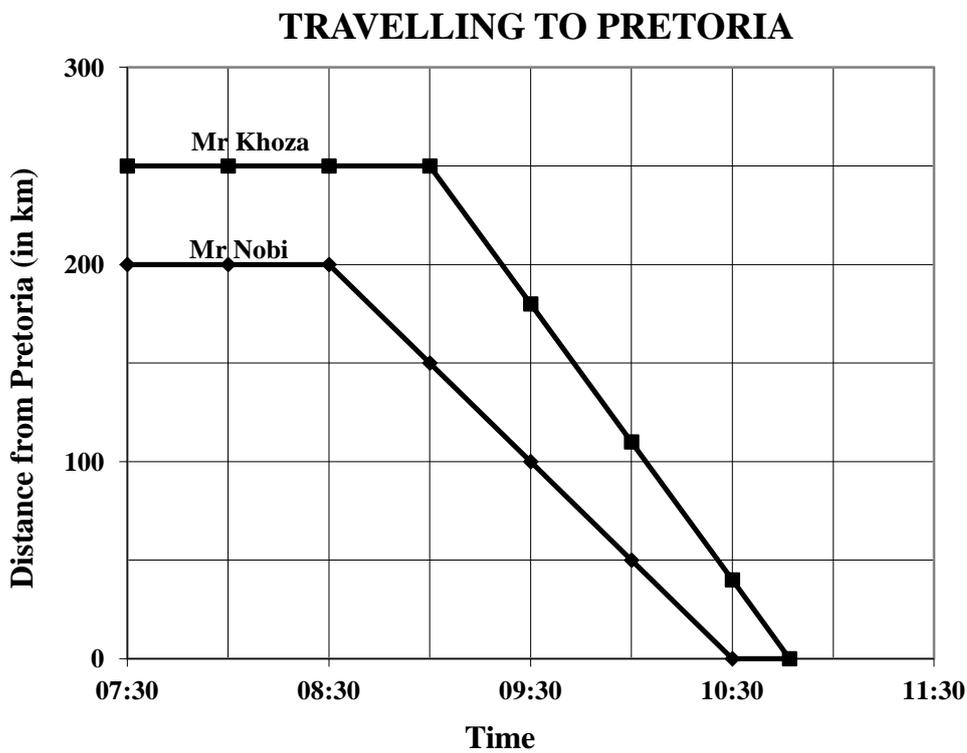
2.2.2 Calculate the distance (in metres) that a car will travel in 1,36 seconds if it is travelling at an average speed of 27,95 m/s.

Use the formula:

Distance = average speed $\times$ time (2)

2.3 | Two businessmen, Mr Nobi and Mr Khoza, travel from their home towns to Pretoria. The distance from Pretoria and the time is indicated in the graph below:

TRAVELLING TO PRETORIA

2.3.1 At what time did Mr Khoza leave his home town? (2)

2.3.2 Which ONE of the two businessmen lives closer to Pretoria? (1)

2.3.3 How long did Mr Nobi take to travel to Pretoria? (2)

2.3.4 Estimate Mr Khoza's arrival time in Pretoria. (2)

2.3.5 At what time were the two businessmen exactly 100 km apart? (2)

2.4 | Kedibone has a cheque account with Iziko Bank. The bank charges a service fee up to a maximum of R31,50 (VAT included) on all transaction amounts.

TABLE 2 below shows five different transactions on Kedibone's cheque account.

TABLE 2: Transactions on Kedibone's cheque account

NO.	DESCRIPTION OF TRANSACTION	TRANSACTION AMOUNT (IN R)	SERVICE FEE (IN R)
1	Debit order for car repayment	4 250,00	31,50
2	Debit order for cellphone contract	344,50	**A**
3	Personal loan repayment	924,00	14,59
4	Vehicle and household insurance	**B**	11,85
5	Cheque payment	403,46	8,34

2.4.1 Calculate the missing value **A**, using the following formula:

Service fee (in rand) = 3,50 + 1,20% of the transaction amount   (3)

2.4.2 Calculate the missing value **B**, using the following formula:

$$\textbf{Amount (in rand)} = \frac{\textbf{service fee} - \textbf{3,50}}{\textbf{1,20\%}}$$

(3)

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QUESTION 3

3.1

Mr De Haan and his family live in Mossel Bay and he intends buying a new car. He sees the advertisement below for one of the cars that he is interested in.

R199 000 cash

or

R19 900 deposit + **R3 599,85** × 60 months on hire purchase

3.1.1	Calculate the total cost of the car in the advertisement if it is bought on hire purchase.	(2)

3.1.2	Mr De Haan decides to buy a new car in two years' time instead. He will then sell his current car and use that money as the deposit for the new car. Currently the value of his car is R51 600. The value of the car depreciates at a rate of 13,5% per annum.

Calculate (rounded off to the nearest R100) the depreciated value of his car in TWO years' time.

Use the formula: $A = P(1 - i)^n$

where A = depreciated value
P = current value
i = annual depreciation rate
n = number of years	(3)

3.2

Petrol consumption can be calculated using the following formula:

Petrol consumption (in litres per 100 km) $= \dfrac{\textbf{distance covered}}{\textbf{100}} \times \textbf{12,5}$

3.2.1	How many litres of petrol will Mr De Haan's car use to travel 100 km?	(1)

3.2.2	Calculate the petrol consumption (in litres per 100 km) if Mr De Haan covered a distance of 325 km.	(2)

3.3   Below is a street map of a part of the area where Mr De Haan lives.
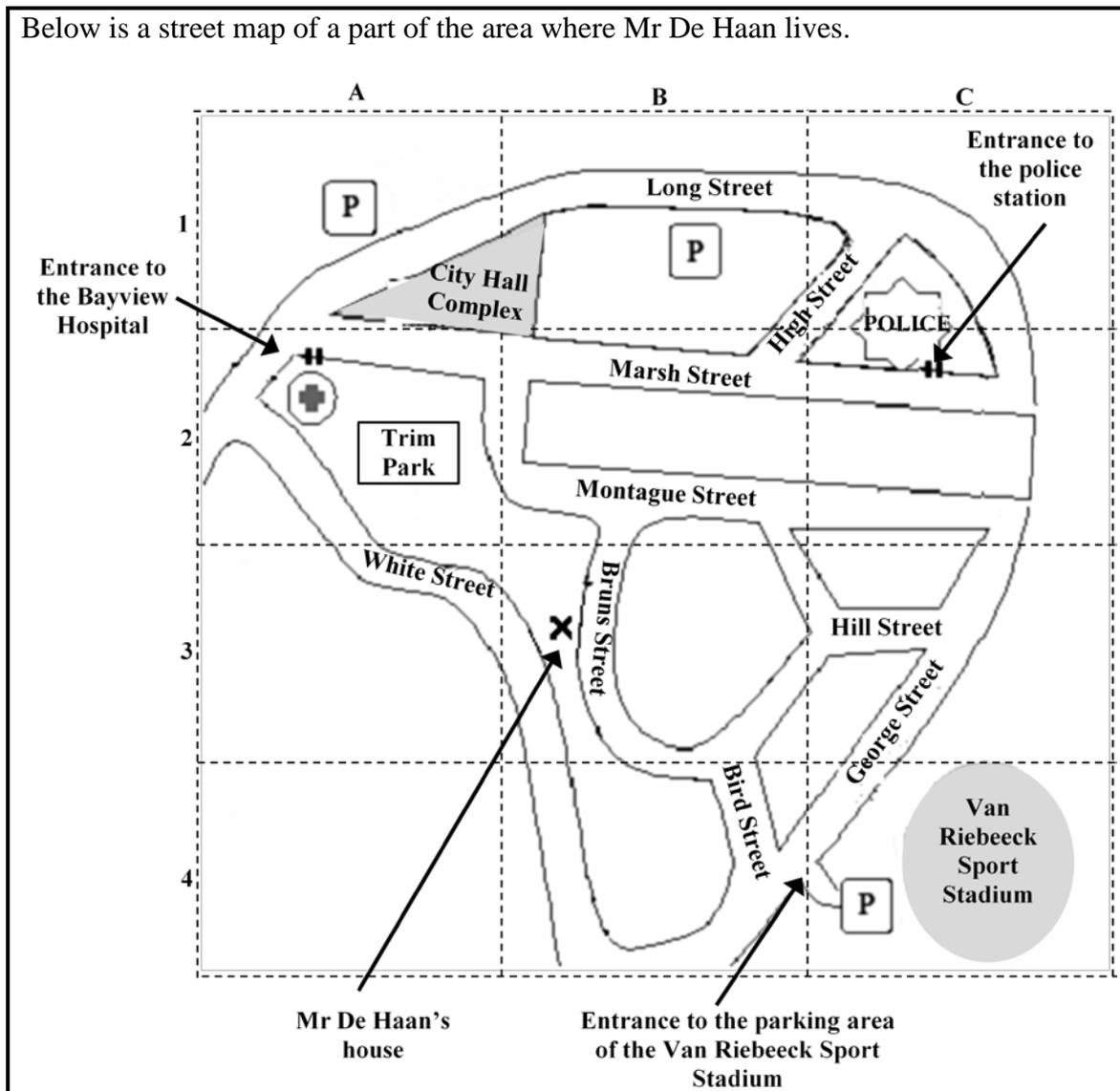
3.3.1   Give the grid reference of the Van Riebeeck Sport Stadium.   (2)

3.3.2   Write down the names of the streets on either side of the City Hall
         Complex.   (2)

3.3.3   Mr De Haan drives out of the parking area of the Van Riebeeck Sports
         Stadium and then turns right into George Street. He then turns left into
         Montague Street and continues driving until he reaches Marsh Street.

         In which direction must he turn if he wants to go directly to the entrance
         of the police station?   (2)

3.3.4   The distance measured on the map from Mr De Haan's house to the
         entrance of the Bayview Hospital is 8,9 cm.

         Calculate the actual distance (in km) if 1 cm on the map represents
         0,3 km.   (2)

                                                                                      [16]

QUESTION 4

4.1   Lunje's dog gave birth to 9 puppies (6 males and 3 females).

Lunje's dog with her puppies

Lunje collected data from 10 of his friends whose dogs had puppies and summarised the data (including his own) in the table below.

TABLE 3: Number of puppies in a litter*

	NAME OF DOG										
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
Litter size	14	6	7	9	14	12	11	8	14	8	11
Number of males	13	5	6	6	10	8	9	1	6	0	2
Number of females	1	1	1	3	4	4	2	7	8	8	9

*A **litter** is the number of puppies born at one birth.

4.1.1   Arrange the litter sizes in ascending order.   (2)

4.1.2   Which dog had seven more females than males?   (2)

4.1.3   Give the modal litter size.   (2)

4.1.4   Determine the range of the number of females.   (2)

4.1.5   Calculate the mean (average) number of males.   (3)

4.1.6   Determine the ratio (in simplified form) of males to females for dog **E**.   (2)

4.1.7   Use the information in TABLE 3 to complete the compound bar graph on ANNEXURE A.   (7)

4.2   Lunje made a rectangular box for his dog to sleep in. This helps to keep the puppies safe and comfortable.

The dimensions of the box are as follows:

- The width is the same as the length of the dog.
- The length is 125% of the length of the dog.
- The height is 6 inches.

Lunje's dog is 105 centimetres long.
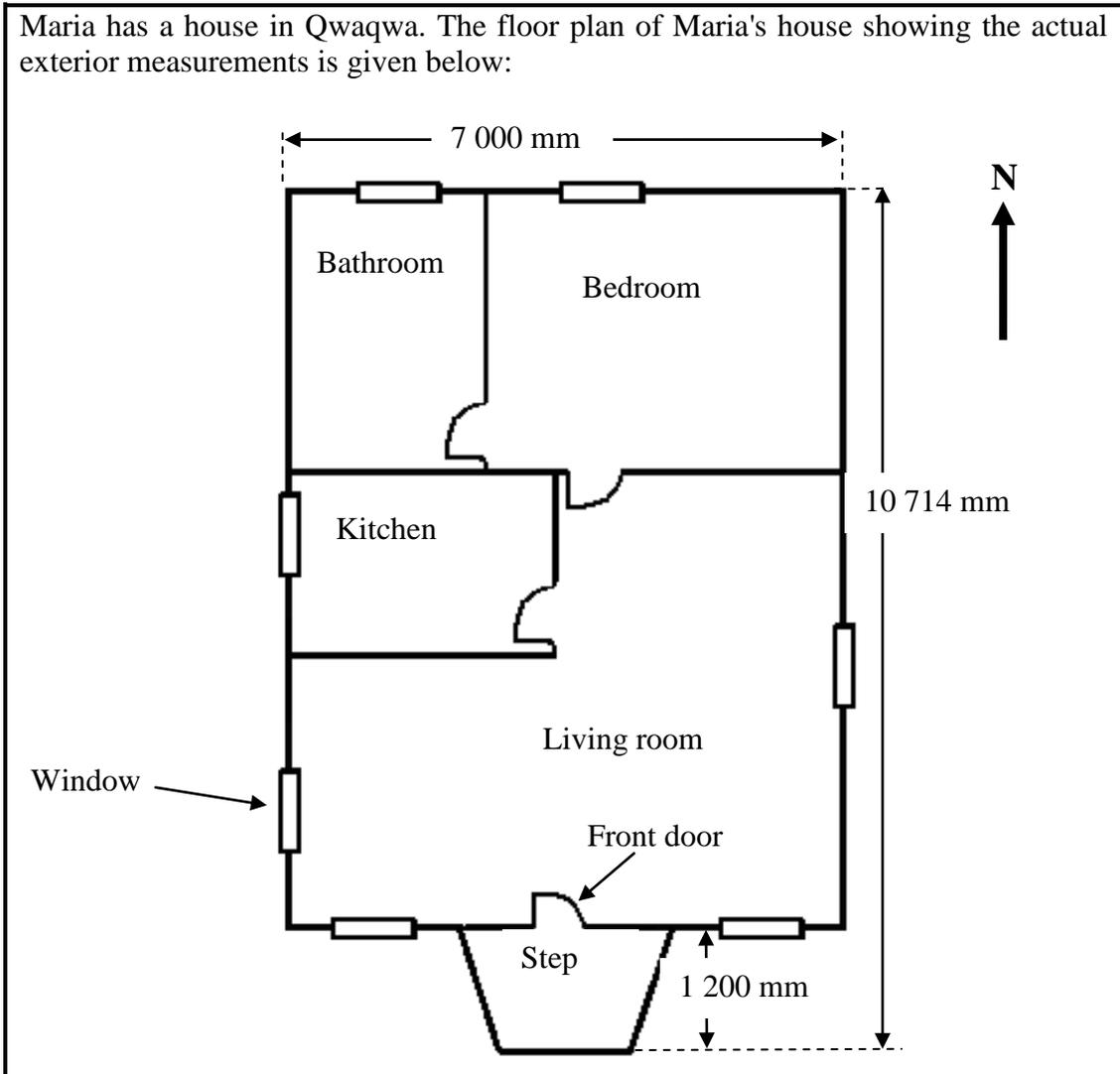
Give the following dimensions in centimetres:

4.2.1   The length of the box   (2)

4.2.2   The height of the box if 1 inch = 2,5 cm   (2)

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QUESTION 5

5.1   Maria has a house in Qwaqwa. The floor plan of Maria's house showing the actual exterior measurements is given below:

5.1.1   How many windows does Maria's house have?   (1)

5.1.2   On the floor plan the exterior length of the northern wall is 70 mm. Determine the scale of the floor plan in the form 1 : ...   (2)

5.1.3   Calculate the exterior side length of the house excluding the step section.   (2)

5.1.4   The area of the kitchen is 72% less than the area of the living room.

Calculate the area (in m^2) of the kitchen if the area of the living room is 39,54 m^2.   (3)

5.2 | The step at the front door of Maria's house is in the shape of a symmetrical trapezium based prism as shown below. The step is made of concrete. The top (**A**) and sides (**B** and **C**) will be tiled.
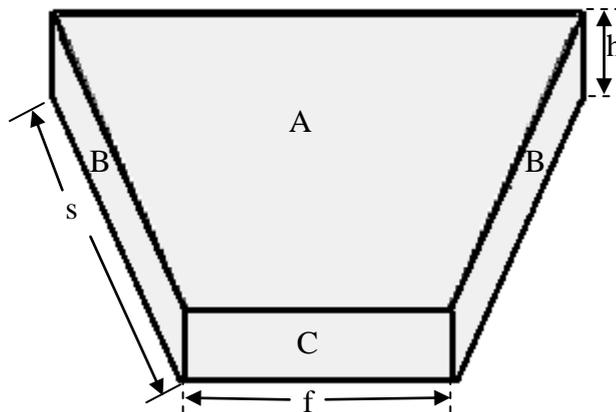
The dimensions of the step are as follows:

f = length of the front of the step = 1,3 m   **A** = Area of the trapezium = 2,52 m^2
s = length of the slanting side = 1,6 m   **B** = Area of the slanting side of the step
h = height of the step = 0,12 m   **C** = Area of the front of the step

5.2.1 Concrete is made by adding water to a mixture of cement, sand and stone in the ratio:

cement : sand : stone = 1 : 2 : 4

How many wheelbarrows of stone will Maria need for $1\frac{1}{2}$ bags of cement if one bag of cement equals one wheelbarrow of cement? (3)

5.2.2 Calculate the volume of concrete (in m^3) required for the step.

Use the formula:

Volume of the step = area of the trapezium × height of the step (2)

5.2.3 Maria wants to tile the top and side surfaces of the step. Calculate, rounded off to ONE decimal place, the total area that will be tiled.

Use the formula:

Total tiled area (in m^2) of the step = A + (2s + f) × h (4)

5.2.4 Maria decides to put a metal strip on the top edge of the step. Calculate the length of the strip.

Use the formula:

Total length of the strip = f + 2s (2)

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QUESTION 6

6.1 | Gracia is an athlete and is training for a 42,2 km standard marathon to be held in four weeks' time. She wants to finish the race in less than 3 hours.
Gracia's training schedule involves endurance training and speed training. To build muscle strength she does strength exercises and long-distance running at a slow pace.

Gracia runs 450 metres in 4 minutes at a constant pace. Calculate the distance she will cover in 9 minutes if she runs at the same constant pace. (2)

6.2 | Other preparation for the race involves 'carbo-loading'. Carbo-loading means following a special diet that will increase the amount of glycogen in your muscles so that the muscles can endure long periods of physical strain/activity.
According to the *Tips For Endurance Athletes* (www.beginnertriathlete.com), an athlete requires between 1,4 and 2,27 grams of carbohydrates per kilogram of body mass per meal.

Calculate the MAXIMUM number of grams of carbohydrates Gracia requires per meal if she weighs 65 kg. (3)

6.3 | Gracia is sure that her training will allow her to finish the race in less than 3 hours. She doesn't want to start the race too fast and fade (grow tired and run slowly) at the end or start too slowly and then finish later than her targeted time.
In order to plan her race, Gracia constructed a table showing the time (in minutes) and the required distance (in km) she needs to cover during the race.

TABLE 4: Gracia's plan for the race

Time after start of race (in minutes)	15	30	45	60	75	90	105	120	135	150	165
Distance she needs to cover (in km)	3	6	9	13	17	21	26	31	35	39	42,2

6.3.1 Gracia managed to complete the race in her planned time. How many minutes did she take to finish the race? (1)

6.3.2 Calculate the average pace (in kilometres per minute) she needs to maintain from the 60th to the 90th minute of the race.

Use the formula:

$$\textbf{Average pace (in km per minute)} = \frac{\textbf{change in distance}}{\textbf{change in time}}$$
$$= \frac{\textbf{difference between the two distances}}{\textbf{difference between the two times}}$$

(4)

6.3.3 Use TABLE 4 to draw a line graph on ANNEXURE B representing Gracia's plan for the race. (8)

6.4 Titus, who was a marshal at the race, was stationed at the halfway point.

6.4.1

Titus kept the following record of the athletics clubs of the first 20 athletes who ran past him.

Athletics Clubs:

Liberty	Striders	Harmony	Ramblers
Striders	Harmony	Striders	Ramblers
Ramblers	Harmony	Liberty	Harmony
Liberty	Liberty	Striders	Liberty
Harmony	Ramblers	Striders	Harmony

Complete, on ANNEXURE C, the frequency table representing the athletic clubs of the first 20 athletes. (4)

6.4.2

The data of the club membership of the top 300 athletes that finished the race is represented in the pie chart below.

Club membership of the top 300 athletes

Key to the chart

A	Other
B	Striders
C	Harmony
D	Ramblers
E	Liberty
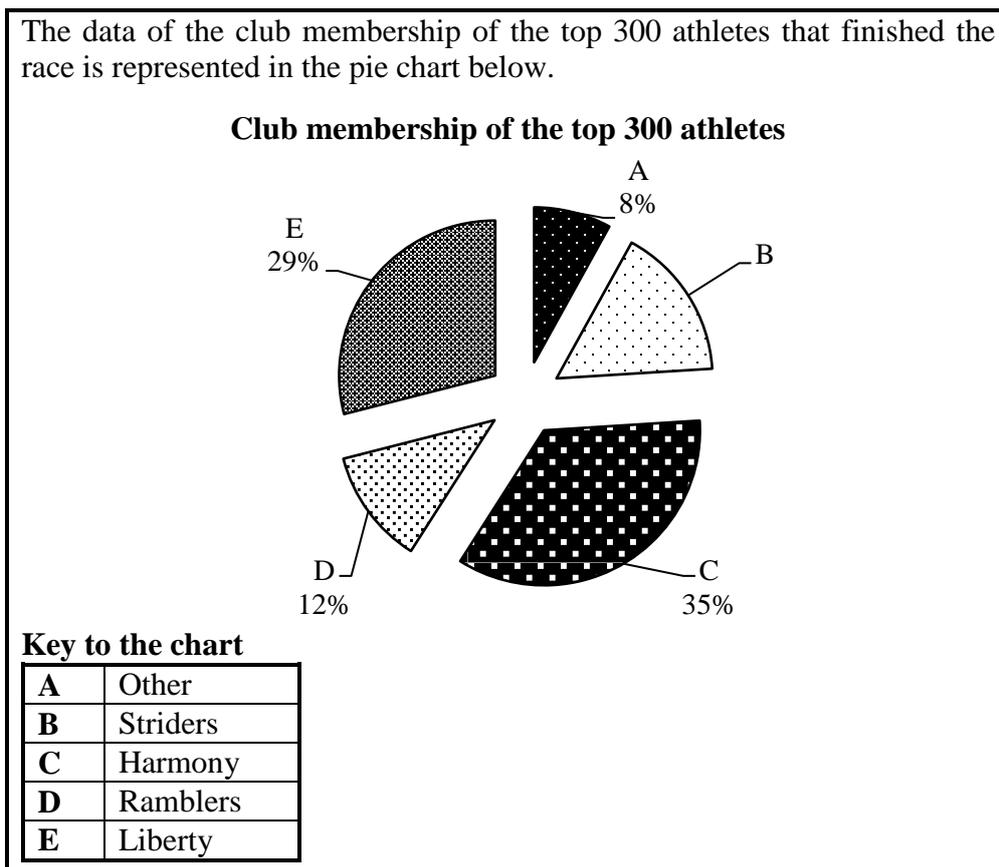
(a) What percentage of the top 300 athletes belonged to the Striders Club? (2)

(b) Which club had the second largest number of athletes in the top 300? (2)

(c) Calculate the actual number of Ramblers athletes that finished in the top 300. (2)

[28]

TOTAL: 150

CENTRE NUMBER:

EXAMINATION NUMBER:

ANNEXURE A

QUESTION 4.1.7

TABLE 3: Number of puppies in a litter

	NAME OF DOG										
	A	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**	**K**
Litter size	14	6	7	9	14	12	11	8	14	8	11
Number of males	13	5	6	6	10	8	9	1	6	0	2
Number of females	1	1	1	3	4	4	2	7	8	8	9

THE LITTER SIZE OF 11 DOGS
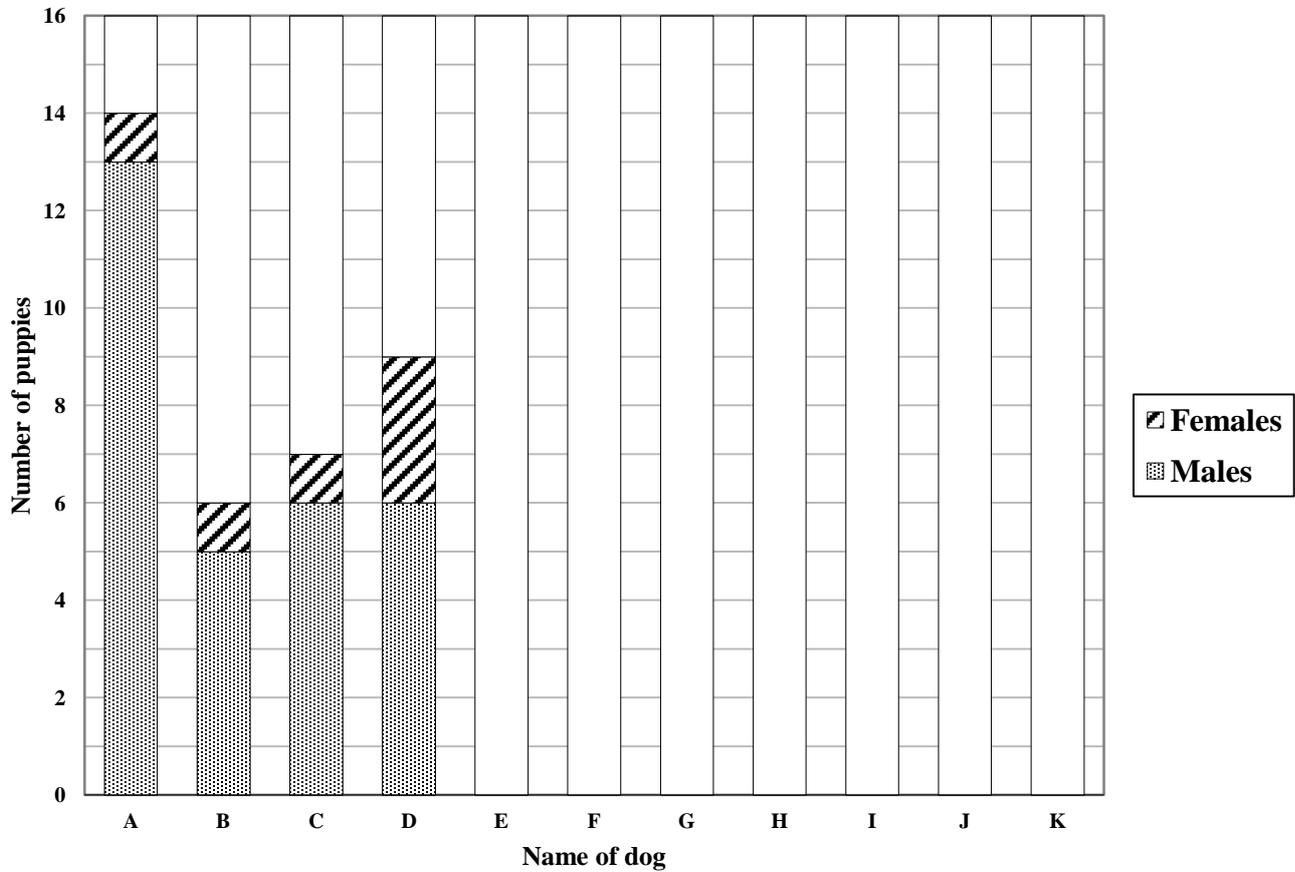
CENTRE NUMBER:

EXAMINATION NUMBER:

ANNEXURE B

QUESTION 6.3.3

TABLE 4: Gracia's plan for the race

Time after start of race (in minutes)	15	30	45	60	75	90	105	120	135	150	165
Distance she needs to cover (in km)	3	6	9	13	17	21	26	31	35	39	42,2

GRACIA'S PLAN FOR THE RACE
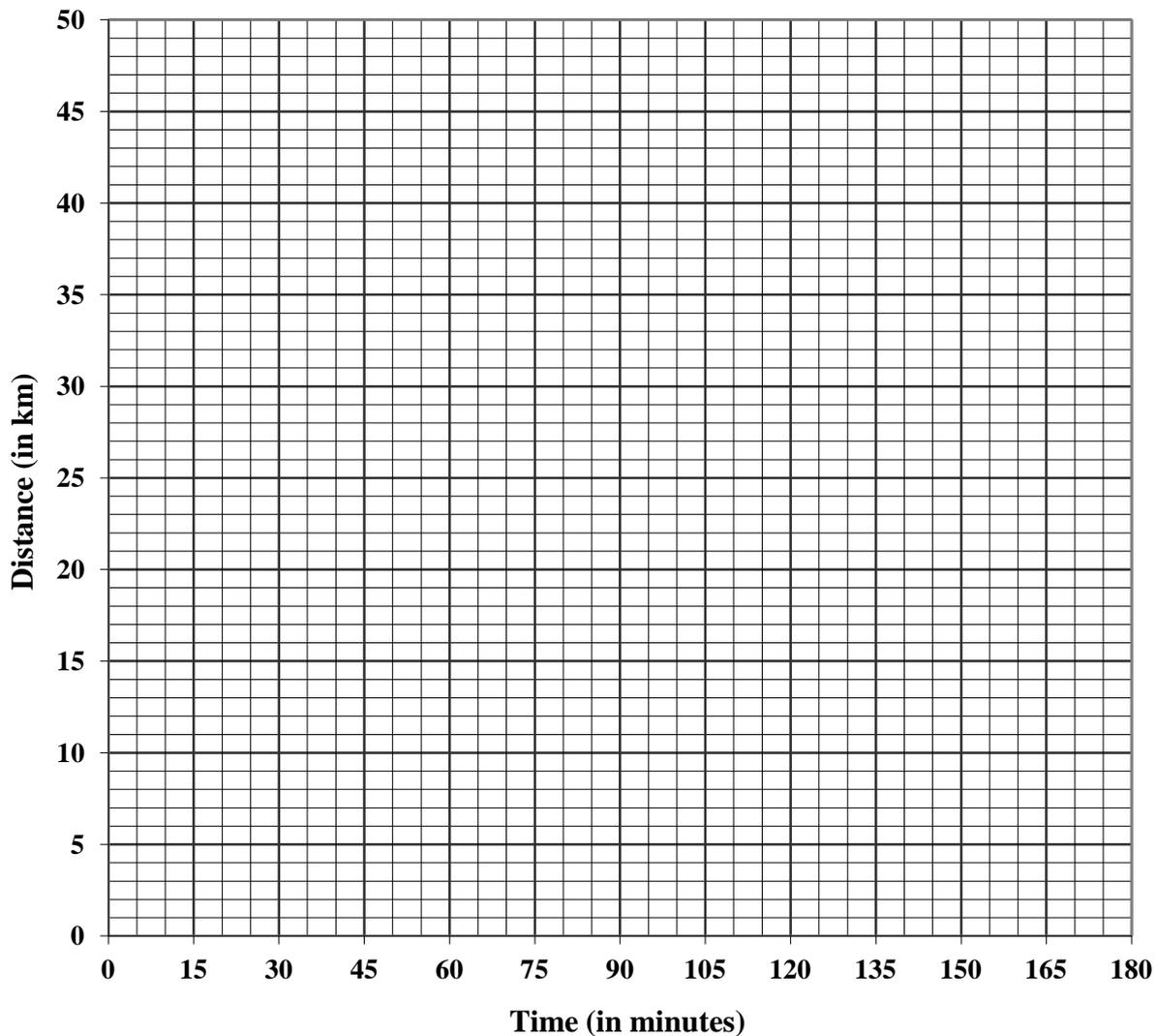
CENTRE NUMBER:

EXAMINATION NUMBER:

ANNEXURE C

QUESTION 6.4.1

ATHLETICS CLUB	FREQUENCY
Liberty	
Striders	
Ramblers	
Harmony	