



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

MATHEMATICAL LITERACY P1

NOVEMBER 2008

MARKS: 150

TIME: 3 hours

This question paper consists of 15 pages and 3 annexures.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of SEVEN questions. Answer ALL the questions.
2. Parts of QUESTIONS 4 and 5 must be answered on the attached ANNEXURES. Write your examination number in the space 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. An approved calculator (non-programmable and non-graphical), may be used, unless stated otherwise.
5. ALL the calculations must be clearly shown.
6. ALL the final answers must be rounded off to TWO decimal places, unless stated otherwise.
7. Start EACH question on a NEW page.
8. Write neatly and legibly.

QUESTION 1

- 1.1 1.1.1 Write 20% as a common fraction in simplified form. (2)
- 1.1.2 Write $\frac{136}{200}$ as a percentage. (2)
- 1.1.3 Simplify 120 : 150 (1)
- 1.1.4 Decrease 500 kg by 12%. (3)
- 1.2 Calculate the following:
- 1.2.1 R450 – R32,40 × 10 (2)
- 1.2.2 $5^2 - \sqrt{36}$ (2)
- 1.2.3 34% of 450 km (2)
- 1.3 Marie would like to use an old recipe of her grandmother to bake coconut tarts for the school bazaar.
- The coconut tarts have to be baked at 350 °F for 20 minutes.
- Coconut Tarts**
(Makes 3 dozen)

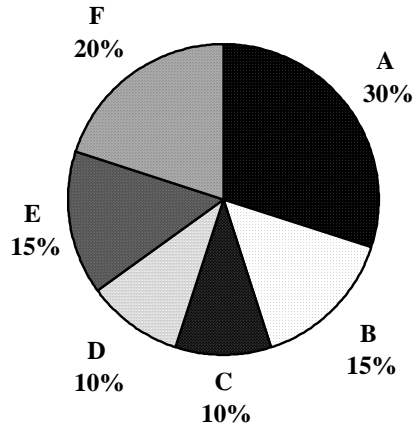
INGREDIENTS

1 lb self-raising flour
9 oz margarine
 $\frac{3}{4}$ cup of sugar
4 eggs
10 oz coconut
 $\frac{1}{2}$ lb apricot jam
1 teaspoon vanilla essence
- 1.3.1 Convert $\frac{1}{2}$ lb to grams. (1 lb = 450 g) (2)
- 1.3.2 Convert 9 oz to grams. (1 oz = 30 g) (2)
- 1.3.3 One cup of sugar is equal to 250 ml. How many ml of sugar are needed for this recipe? (2)
- 1.3.4 Convert 350 °F (degrees Fahrenheit) to °C (degrees Celsius) using the following formula:

$$\text{Temperature in } ^\circ\text{C} = (\text{Temperature in } ^\circ\text{F} - 32^\circ) \times \frac{5}{9}$$
Round off the answer to the nearest 10°. (3)
- 1.3.5 How many eggs does Marie need to bake 72 tarts? (2)

1.4 Nabila has moved to the city and bought her own house. She decides to compare her monthly budget to her parents' monthly budget, as illustrated in the charts below.

Nabila's parents' budget with monthly income of R20 000



Nabila's budget with monthly income of R15 000

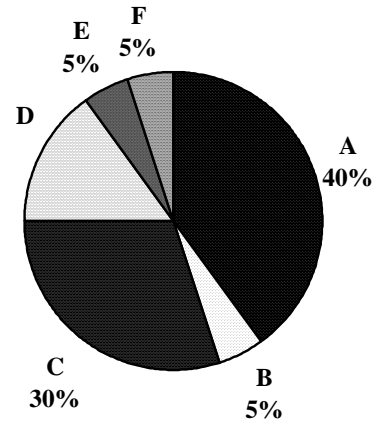


TABLE 1: Key for the pie charts

A	Food, bond, electricity
B	Insurance, medical aid
C	Clothing and personal care
D	Communication (cellphone, computer, internet service)
E	Savings
F	Other

- 1.4.1 Write down TWO examples of monthly expenses that could be considered as 'Other' expenses. (2)
- 1.4.2 Calculate the percentage of Nabila's monthly income that she spends on communication. (2)
- 1.4.3 Calculate the actual amount that Nabila's parents save each month. (3)
- 1.4.4 Calculate the actual amount that Nabila spends on clothing and personal care each month. (3)

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QUESTION 2

2.1

A survey of 1 000 households was undertaken during 2001 to determine how many households used various electronic appliances. A survey of the same number of households was repeated during 2007.

The graph below shows the results of the two surveys.

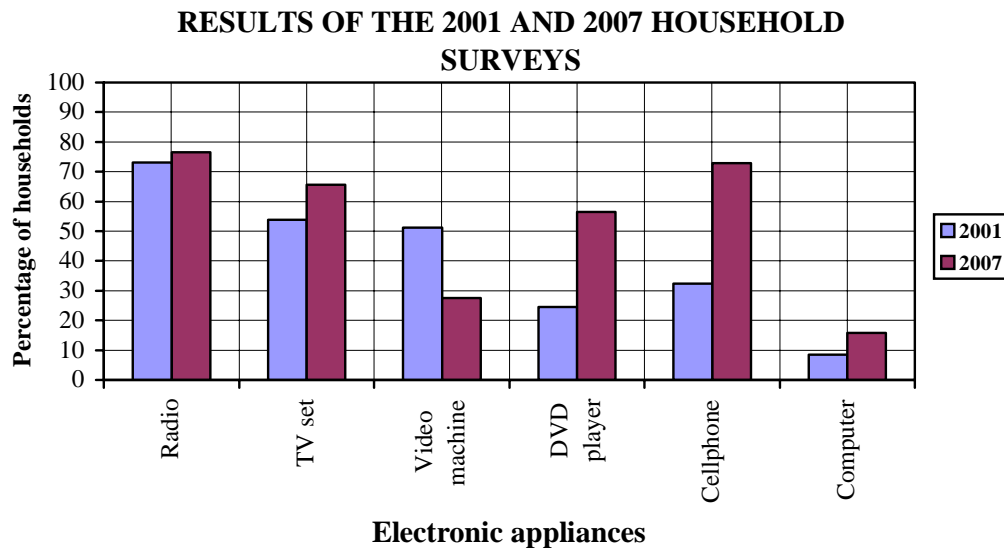


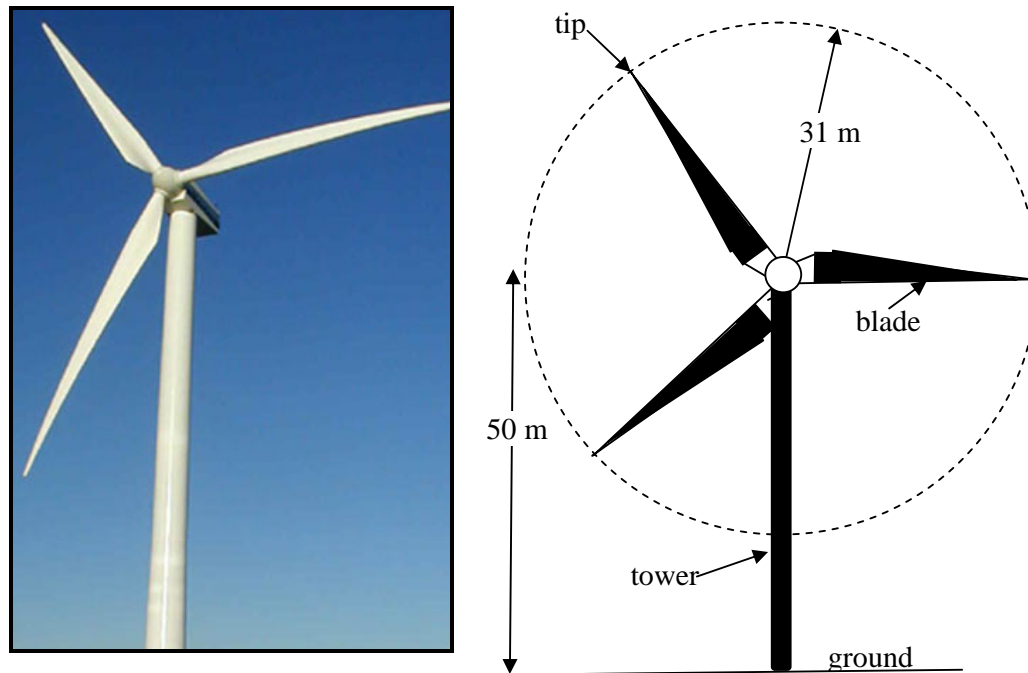
TABLE 2: Percentage of households using the various electronic appliances

Year	Radio	TV set	Video machine	DVD player	Cellphone	Computer
2001	73,0	53,8	51,2	24,4	32,3	8,8
2007	76,6	65,6	27,6	56,4	72,9	15,7

- 2.1.1 What was the percentage increase in usage of TV sets between 2001 and 2007? (1)
- 2.1.2 Which appliance was used in most households during both 2001 and 2007? (1)
- 2.1.3 Which appliance showed a decrease in usage in 2007 compared to 2001? (1)
- 2.1.4 How many of the 1 000 households surveyed used cellphones during 2007? (2)
- 2.1.5 Calculate the difference in usage during 2001 between TV sets and DVD players. (3)

2.2

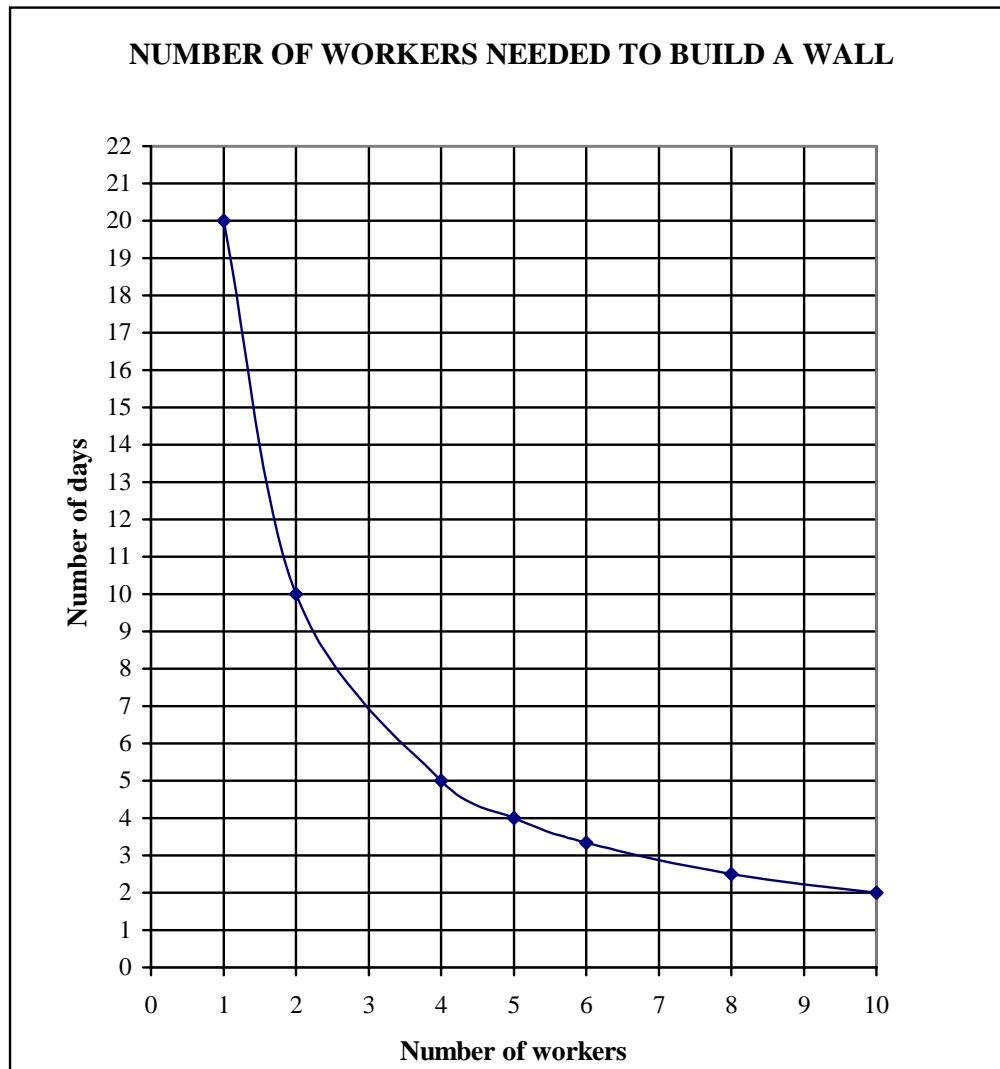
Electricity has become a scarce resource in South Africa. As a result the country is investigating alternative sources of generating electricity. One alternative source of generating electricity is a wind turbine using rotating blades as shown in the picture and diagram below.



The wind turbine is mounted on the top of a 50 m high tower.
The length of each blade is 31 m.

- 2.2.1 What is the length of the diameter of the circle that the blades create as they rotate? (1)
- 2.2.2 Calculate the maximum height from the ground that the tip of a blade will be, if the turbine is rotating. (2)
- 2.2.3 Calculate the circumference of the circle made by the blades when they rotate.
(**Circumference** = $2 \times \pi \times \text{radius}$), using $\pi = 3,14$ (2)
- 2.2.4 Calculate the area of the circle made by the blades when they rotate.
(**Area** = $\pi \times (\text{radius})^2$), using $\pi = 3,14$ (3)
- 2.2.5 Suppose each household requires 25 kW of electricity daily.
If one wind turbine produces 1 750 kW of electricity daily, calculate how many households could be provided daily with electricity from one such turbine. (2)

- 2.3 Mr Ndlovu uses a graph to illustrate the number of days it would take a number of workers to build a wall.



Use the graph to answer the following questions:

- 2.3.1 How many days would it take for the wall to be built by only 1 worker? (1)
- 2.3.2 Estimate how many days it would take for the wall to be built by only 6 workers. (2)
- 2.3.3 Calculate the minimum number of workers Mr Ndlovu should employ to build the wall:
- (a) In exactly 5 days (2)
- (b) In exactly 8 days (3)

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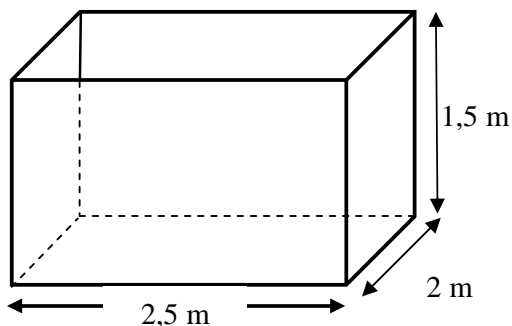
QUESTION 3

An aquarium is a place where collections of fish and other aquatic animals are displayed. The fish are kept in open rectangular glass tanks. A water pump is used to circulate and refresh the water in the tanks.

An open-top fish tank has the following dimensions:

length = 2,5 m; breadth = 2 m; height = 1,5 m

Sketch of a fish tank



Fish in an aquarium



- 3.1 Determine the volume of the fish tank in kilolitres if $1 \text{ m}^3 = 1 \text{ k}\ell$,
where **volume** = **length** \times **breadth** \times **height**. (3)
- 3.2 Determine the total surface area (in m^2) of glass used for the open-top fish tank,
where **surface area** = $(l \times b) + 2 \times (l \times h) + 2 \times (h \times b)$
and l = length, b = breadth and h = height. (4)
- 3.3 Calculate the cost of 20 m^2 of special glass for the fish tank @ R480,00 per m^2 . (3)
- 3.4 The water pump costs R3 999,00. The suppliers gave the aquarium a 15% discount.
Calculate how much the aquarium paid for the pump. (3)
- 3.5 The tank is filled with $6\,900 \ell$ of water at a rate of $2\,300 \ell$ of water per hour.
Calculate the time taken to fill the tank. (2)

3.6 The aquarium charges an entrance fee.

ENTRANT	ENTRANCE FEE PER INDIVIDUAL
Adult	R7,50
Pensioner	R4,00
Children under 12 years	R4,00

900 adults, 1 380 children under 12 years and 300 pensioners visited the aquarium during the first week of December 2007.

Calculate the aquarium's income from entrance fees, for this week, using the formula below:

$$\text{Income} = (\text{number of adults}) \times \text{R7,50} + (\text{number of children and pensioners}) \times \text{R4,00} \quad (3)$$

[18]

QUESTION 4

The Lighthouse Foundation provides food parcels, uniforms and clothing to needy children in Limpopo.

Each year the Lighthouse Foundation presents a financial report to all its stakeholders (see TABLE 3).

**TABLE 3: Lighthouse Foundation Financial Report for
1 March 2006 to 28 February 2007**

INCOME		EXPENSES	
Item	Amount (in rand)	Item	Amount (in rand)
Private donations		Administration costs	
Local	78 240	Salaries for part-time employees	128 833
Overseas	57 120	Telephone	15 571
Subsidy		Stationery/Postage	2 379
Local municipality	308 160	Bank charges	2 899
		Services rendered to children	
		Food parcels	178 200
		Vegetable gardens (seedlings, fertiliser, et cetera)	5 812
		School uniforms	10 047
		Clothing	30 456
		Transport costs	22 822
TOTAL INCOME	443 520	TOTAL EXPENSES	397 019

- 4.1 Use the information in TABLE 3 to answer the following questions:
- 4.1.1 Write down the period of time covered by the financial report. (1)
- 4.1.2 Name the Lighthouse Foundation's main source of income. (1)
- 4.1.3 Express the subsidy from the local municipality as a percentage of the total income. (Round off the answer to ONE decimal place.) (4)
- 4.1.4 Calculate the average cost of ONE school uniform if 48 children received school uniforms. (3)
- 4.1.5 The overseas donations are from Japanese businessmen. Determine the amount in yen that the Foundation received from overseas donations if 1 Japanese yen (¥) = 0,08 South African rand (R). (3)

4.1.6 The Lighthouse Foundation uses a vehicle to deliver the food parcels and for transporting the children.

(a) Give an example of ONE type of transport cost. (1)

(b) Calculate the cost per kilometre if 18 554 km were covered during the given period of the report. (3)

4.2 The children who receive food are divided into four different categories. TABLE 4 below shows the percentage of children in each category.

**TABLE 4: Lighthouse Foundation beneficiaries for the period
1 March 2006 to 28 February 2007**

CATEGORY OF CHILDREN		PERCENTAGE
A	Terminally ill parents	13
B	Orphans living with relatives	48
C	Child-headed households	29
D	Living in foster homes	10

4.2.1 1 712 children benefited from this project during the period of the report.

Calculate exactly how many orphans living with relatives benefited from this project. (2)

4.2.2 Draw a vertical bar graph representing the data in TABLE 4 on the grid provided on ANNEXURE A. (6)

[24]

QUESTION 5

Sipho and Sandile are twin boys who are both good middle-distance athletes.

Their athletics coach gave them the following 40 minute training programme:

- Jog for 5 minutes at a pace of 80 m per minute
- Run for 10 minutes at a pace of 100 m per minute
- Take a 5 minute rest
- Walk for 5 minutes at a pace of 50 m per minute
- Run for 15 minutes at a pace of 100 m per minute

The table below indicates the total distance covered by each twin during the daily training programme.

TABLE 5: Total distance covered by each twin during the daily programme

Time elapsed (in min.)	0	5	15	20	25	40
Total distance (in m)	0	400	1 400	1 400	1 650	3 150

- 5.1 Use the data in TABLE 5 and the grid provided on ANNEXURE B to draw a line graph representing the time elapsed and the total distance covered. (5)
- 5.2 Sipho and Sandile recorded their times in minutes for a number of 7 km trial runs.

TABLE 6: Times taken for a 7 km trial run

Sandile (in minutes)	35	32	31	32	32	31	30	29	32	30	
Sipho (in minutes)	30	31	32	33	33	34	34	35	35	35	37

- 5.2.1 Write down Sipho's **median** time. (1)
- 5.2.2 Calculate Sandile's **median** time. (3)
- 5.2.3 Determine the **range** of Sipho's time. (2)
- 5.2.4 Calculate Sandile's **mean** time, rounded off to TWO decimal places. (3)
- 5.2.5 Determine the **mode** of the times taken by Sandile. (2)
- 5.2.6 Use Sipho's times for his eleven trial runs to determine the probability that his next trial run will be less than 35 minutes. (2)

[18]

QUESTION 6

Detach the map of part of Boksburg on ANNEXURE C from the question paper and use it to answer the questions below.

Sheldon lives in Boksburg and goes to Boksburg High School. He earns some pocket money after school by delivering newspapers.

- 6.1 Write down the grid reference for the Tambo Memorial Hospital. (1)
- 6.2 Sheldon lives on the corner of Bloem Street and Montagu Drive.
- 6.2.1 His friend, Mark, lives in East Street between Frere Street and Voortrekker Street. Describe ONE of the routes from his home to Mark's home. (2)
- 6.2.2 Boksburg High School has its entrance in Albu Street. On the map the distance Sheldon walks from his home to school is 0,029 m.
Use the scale 1:16 000 to determine the actual distance he walks. (2)
- 6.2.3 In which general direction does the school lie from Sheldon's house? (1)
- 6.2.4 Give the relative position of Boksburg Lake with respect to Boksburg High School on the map. (1)
- 6.3 Every day Sheldon cycles around the area delivering newspapers.
- 6.3.1 Sheldon covers a distance of 2,4 km in 9,5 minutes. Calculate the average speed in km/h at which he cycles.
Use the formula: **Average speed** = $\frac{\text{distance}}{\text{time}}$ (3)
- 6.3.2 Sheldon is paid a basic salary of R50 per week and 10 cents for each newspaper delivered. His weekly wage can be calculated using the following formula:
Weekly wage = R50,00 + (number of papers delivered) × R0,10
Calculate his weekly wage if he delivers 150 newspapers each week. (3)

[13]

QUESTION 7

South Africa is a country with a low average rainfall. Water is a scarce resource and needs to be saved.

One way of saving water is to ensure that all taps are closed when not in use.



Please close when not in use!

7.1 Most people either shower or take a bath daily.

7.1.1 A shower uses approximately 11 litres of water per minute. Calculate the amount of water Mandla uses if he takes a shower for FOUR minutes. (2)

7.1.2 Susan prefers to take a bath and usually uses approximately 150 litres of water. In order to save water Susan decides to reduce the amount of water by a third. Calculate the amount of water she now uses when taking a bath. (3)

7.2 A certain municipality charges a monthly tariff on a sliding scale as shown in TABLE 7 below.

TABLE 7: Water tariff

WATER USAGE	FIXED CHARGE	RATE PER KILOLITRE
0 to 6 kl	Nil	Nil
More than 6 kl up to 12 kl	R44,82	R8,22
More than 12 kl up to 30 kl	R44,82	R9,16

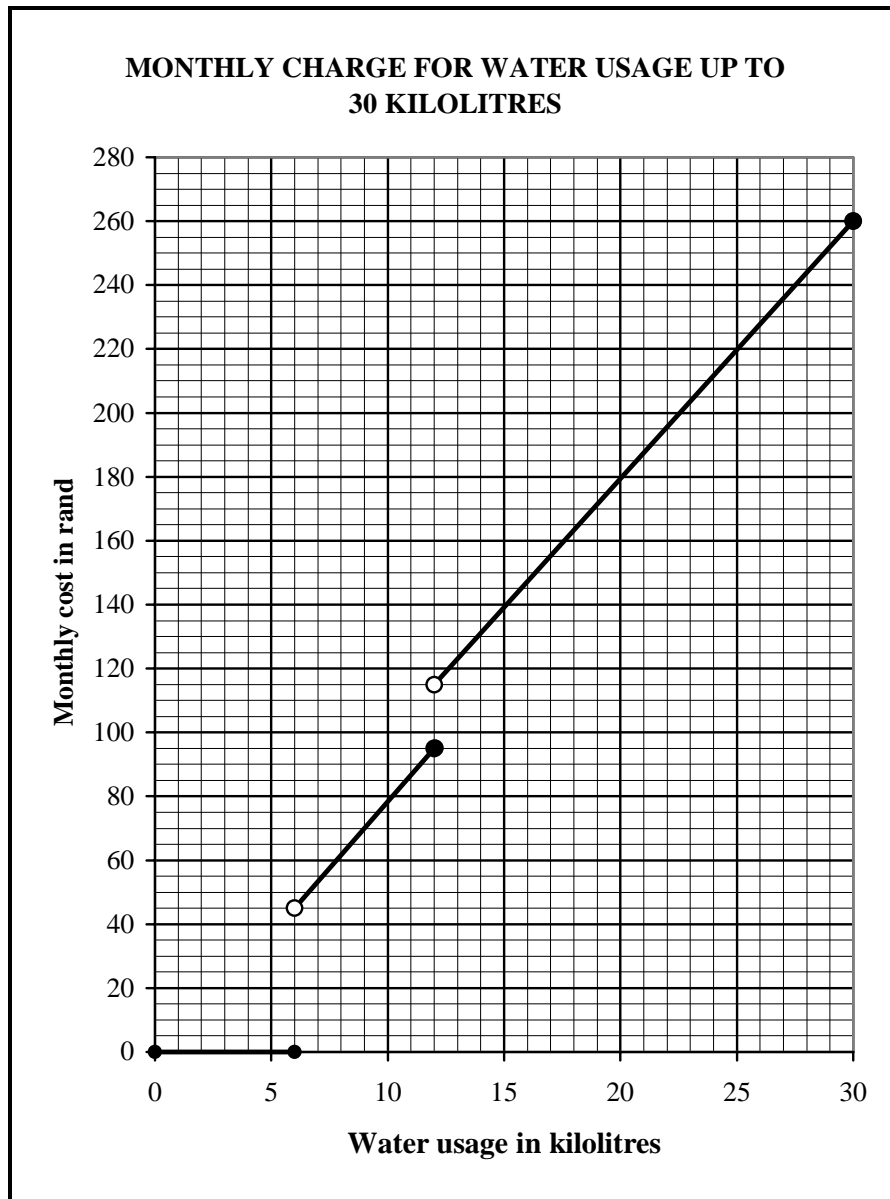
7.2.1 Mr Van der Merwe calculates the cost of using 8 kl of water per month as follows:

$$\text{Cost} = \text{Fixed charge per month} + (2 \times \text{rate per kilolitre})$$

Calculate the cost paid by Mr Van der Merwe this month. (2)

7.2.2 Suppose this fixed charge is increased by 15%. Calculate the new fixed charge. (3)

7.3 The graph below shows the cost of water usage up to 30 kl.



Use the graph above to read off the following:

- 7.3.1 The water bill if 5,5 kl per month is used (1)
- 7.3.2 The amount of water used if the monthly water bill is exactly R200,00 (2)
- 7.3.3 The water bill if 12 kl per month is used (3)

[16]

TOTAL: 150

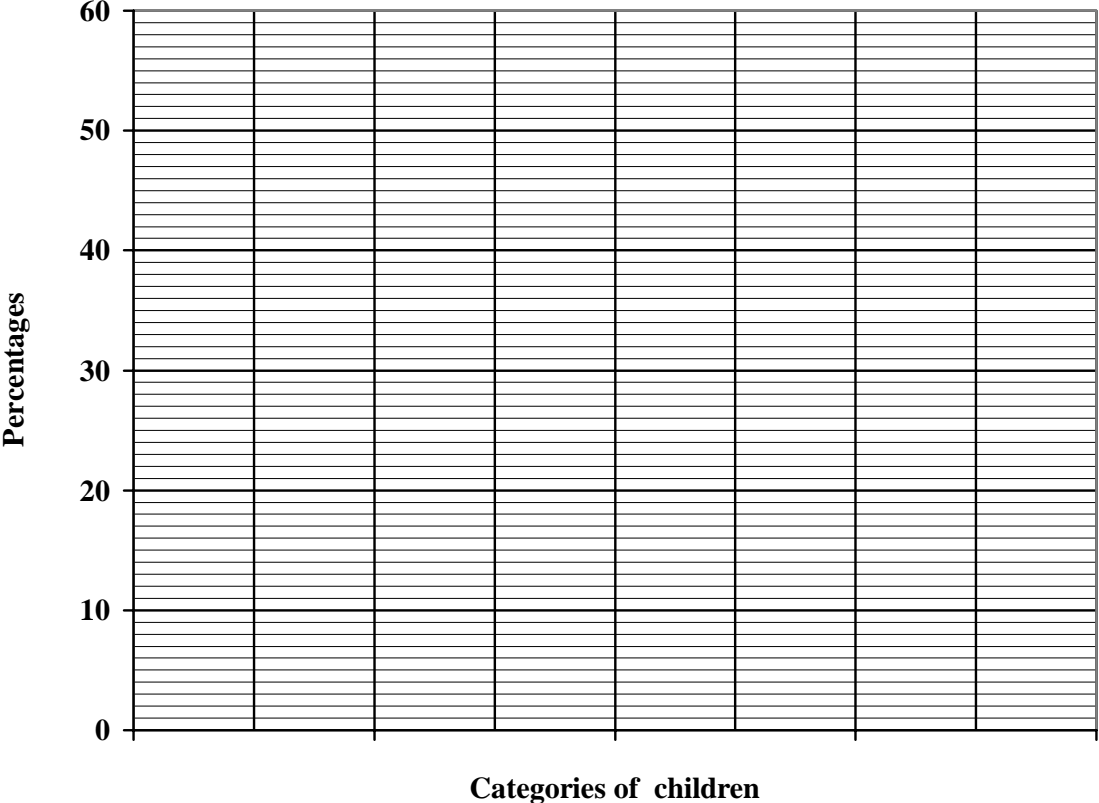
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ANNEXURE A

QUESTION 4.2.2

**LIGHTHOUSE FOUNDATION BENEFICIARIES FOR THE PERIOD
1 MARCH 2006 TO 28 FEBRUARY 2007**



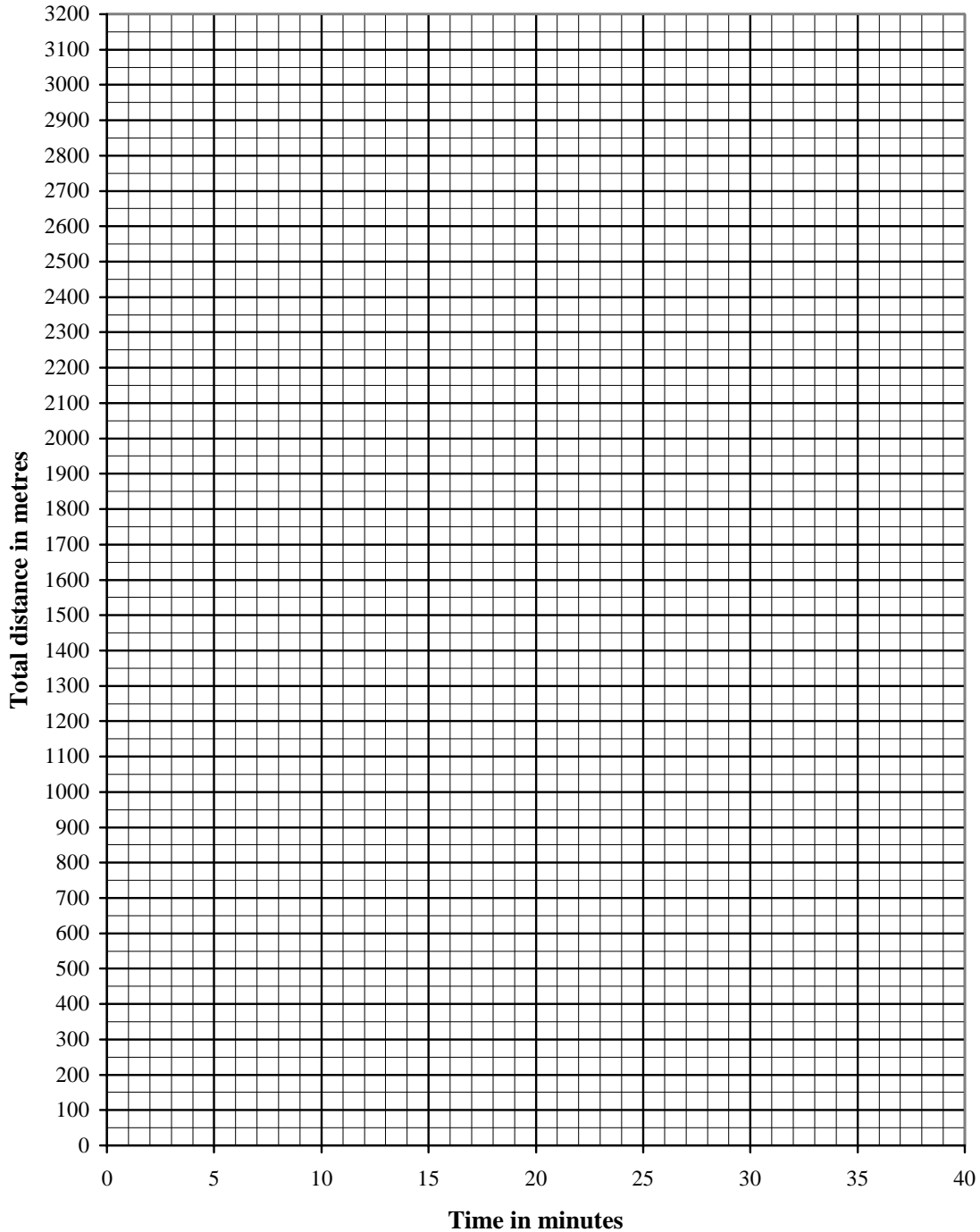
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ANNEXURE B

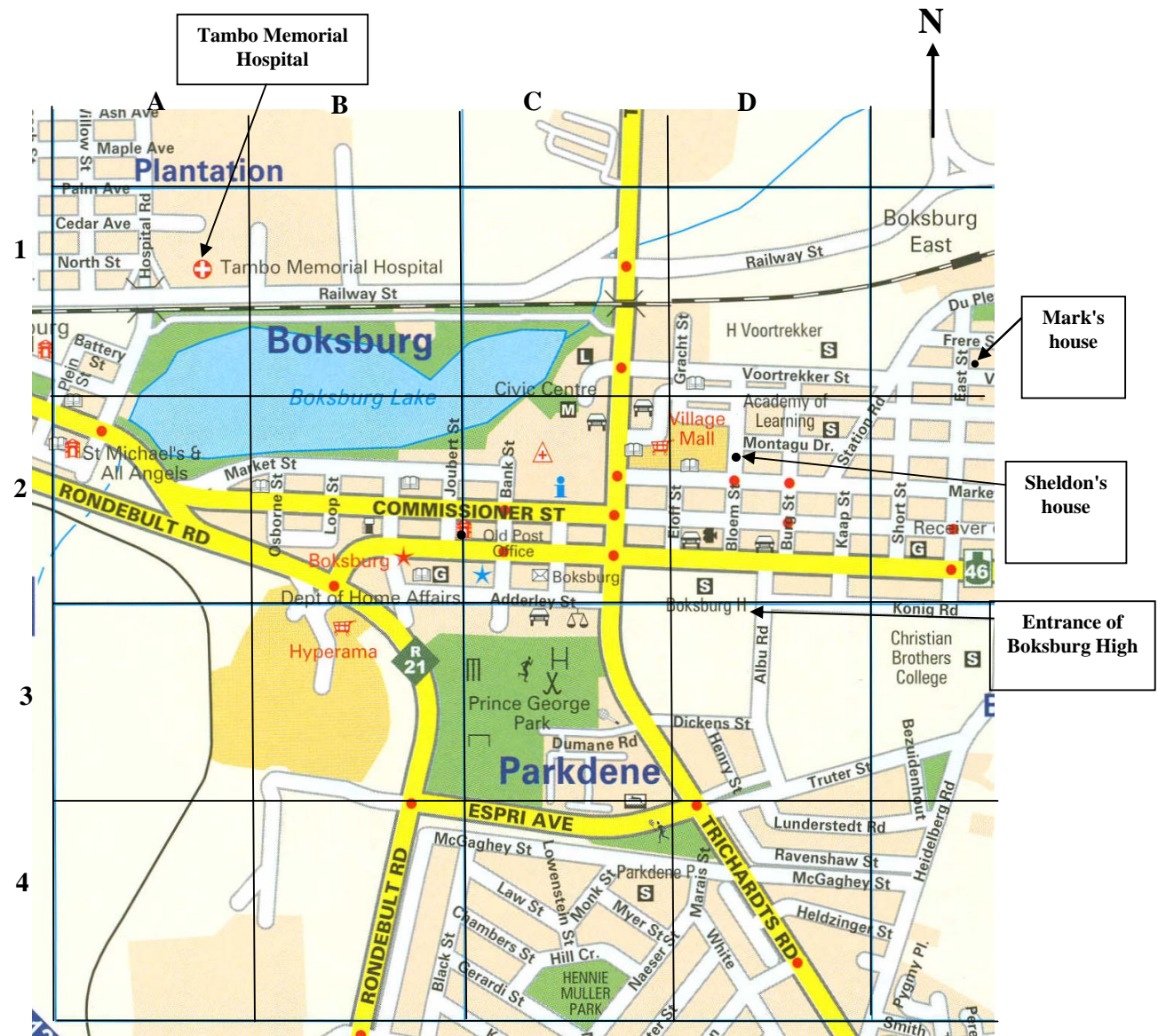
QUESTION 5.1

DISTANCE COVERED DURING TRAINING



ANNEXURE C: MAP OF PART OF BOKSBURG, GAUTENG

QUESTION 6



The scale of the map is 1:16 000.