

MATHEMATICAL LITERACY: PAPER II

Time: 3 hours

150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This paper consists of:
 - A Question Paper of 14 pages
 - 6 questions
 - An Appendix Booklet (page i – iv) with appendices A – E
 - An Answer Sheet

Remove the Appendix Booklet and Answer Sheet from the middle of the Question Paper.

2. Write your examination number in the space provided on the Answer Sheet.
 3. Answer all questions.
 4. Approved non-programmable calculators may be used in all questions.
 5. Number your answers clearly and exactly the same as the questions are numbered in the question paper.
 6. Diagrams are not drawn to scale.
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QUESTION 1

- 1.1 Jimmy buys a pre-paid cellphone from Cellulite Cellular. **Appendix A** shows a list of calls made by Jimmy on his cellphone in a specific week and **Appendix B** shows the cost of calls made from this cell phone.

Answer Question 1.1 on the Answer Sheet. Use the following appendices when answering this question:

Appendix A – a list of calls made in a specific week
Appendix B – the cost of calls

Use **Appendix A** and **Appendix B** to help you to complete the table on the **Answer Sheet**.

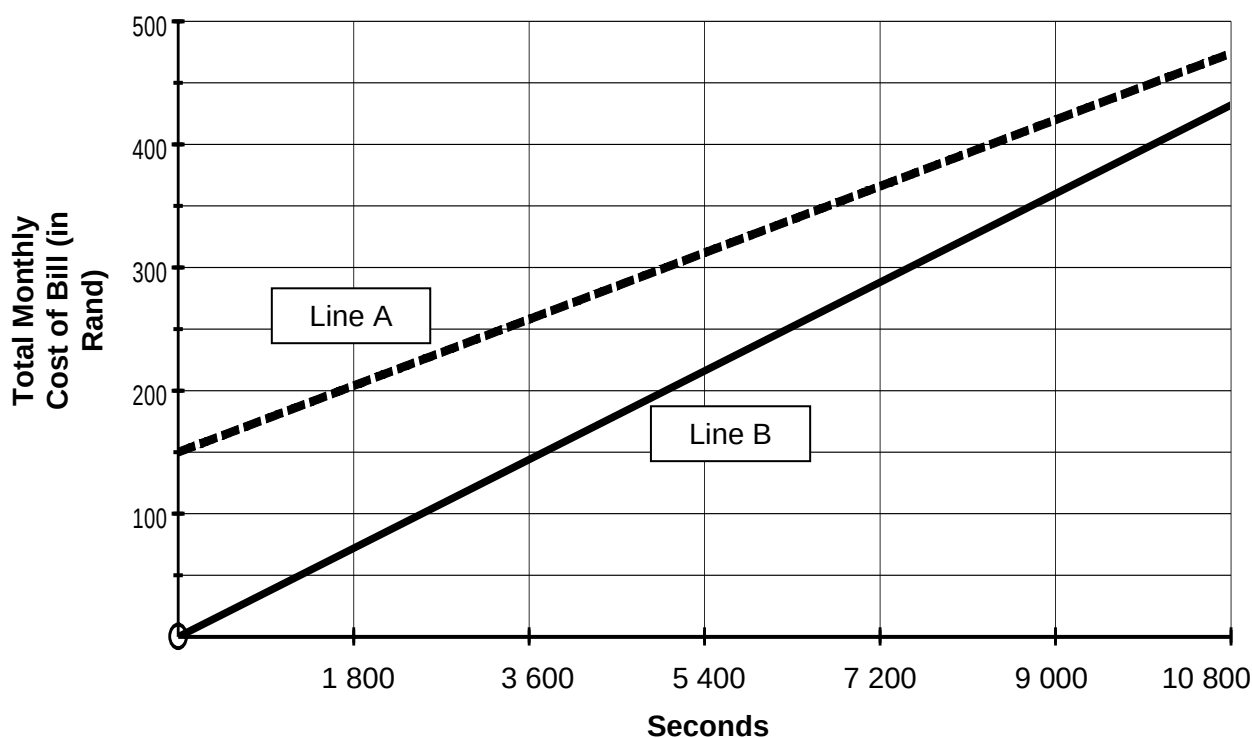
In order to complete this table you should:

- 1.1.1 Complete the columns that show the cost of each of the calls. (10)
- 1.1.2 Determine the total cost for the Peak calls and the Off-Peak calls made and fill in the amounts on the table. (2)
- 1.1.3 Calculate the total cost of the calls for the week. (1)
- 1.2 A company wanted to get cellphones for three of its employees for use during their office hours, which fall into 'Peak Time' according to the cellphone companies. The director of the company visits 'MT Cell Promises' and is presented with the following 2 packages:

	Fixed Monthly Subscription Fee	Tariff per second	
		Peak Calls	Off Peak Calls
Package 1	No Subscription Fee	R0,04	R0,02
Package 2	R150,00	R0,03	R0,01

- 1.2.1 Explain why the cost of 'Off-Peak' calls could possibly not be considered by the director. (1)

1.2.2 Consider the graph below which shows the monthly costs involved for Package 1 and Package 2 during Peak Time.



- (a) Which package is represented by Line A? Explain your answer. (2)
- (b) Explain why both graphs are represented as straight lines. (2)
- (c) **Using the two equations** below, accurately determine for how many **minutes** a person would have to talk on each cellphone package for the monthly cost of both packages to be the same. (5)

<u>Package</u>	<u>Equation</u>
Package 1	$\text{Monthly Cost (R)} = (\text{R}0,04 \text{ per } \underline{\text{second}}) \times (\text{call time in } \underline{\text{seconds}})$
Package 2	$\text{Monthly Cost (R)} = \text{R}150,00 + (\text{R}0,03 \text{ per } \underline{\text{second}}) \times (\text{call time in } \underline{\text{seconds}})$

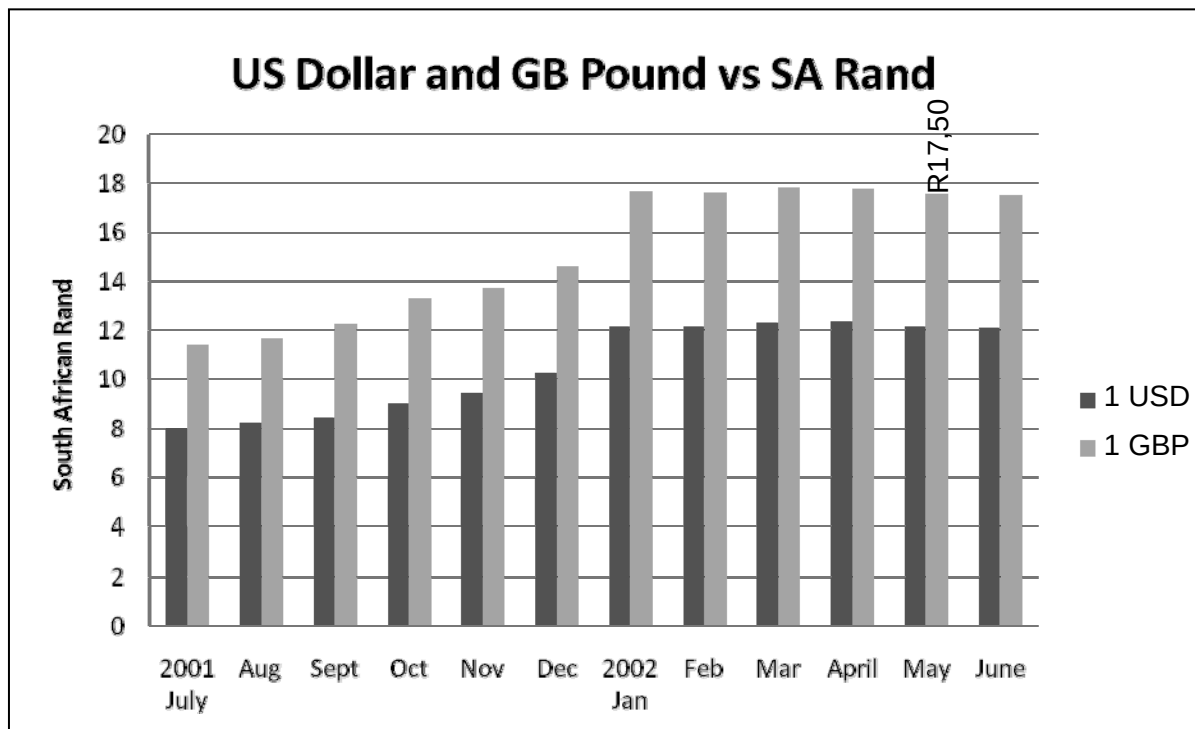
23 marks

QUESTION 2

The graph below illustrates the exchange rates between the:

- United States Dollar (USD) and the South African Rand (ZAR)
- British Pound (GBP) and the South African Rand (ZAR)

The values shown are the exchange rates on the last day of each month, starting from 31 July 2001 and ending on 30 June 2002.



- 2.1 2.1.1 If you exchanged R1 000,00 into USD on 31 July 2001, how many USD would you have received? (3)
- 2.1.2 If you exchanged £900 (GBP 900) into ZAR on 31 May 2002, how many Rand would you have received? (3)
- 2.2 A South African working in England is being paid a monthly salary in GBP. Every month he sends £1 500,00 (1 500 GBP) of his money back to his family in South Africa. Use the exchange rates given below to calculate how many more Rand his family received at the end of June 2002 compared to the end July 2001. (6)
- | | | |
|--------------|---|----------------|
| 31 July 2001 | : | £1,00 = R11,41 |
| 30 June 2002 | : | £1,00 = R17,56 |
- 2.3 Use the bar graph to calculate the range of the USD exchange rate values from 31 July 2001 to 30 June 2002. (3)
- 2.4 According to the data shown in the graph, which currency got stronger in relation to the Rand? Use the graph to explain your answer. (3)

18 marks

QUESTION 3

Refer to **Appendix C** when answering this question.

Mr Xhosiso (aged 42) earns a gross salary* of R22 500 a month. From this salary, an amount of R1 625 is deducted for his medical aid and UIF (Unemployment Insurance Fund) amounting to R225 and a further 7,5% of his gross salary is deducted in order to contribute towards his pension.

- 3.1 An individual's **taxable income** is the income received after medical aid, pension and UIF have been deducted from the gross salary. Calculate Mr Xhosiso's total deductions. **Answer this question on the Answer Sheet provided.** (3)
- 3.2 Use the example below and **Appendix C** to determine the annual tax that Mr Xhosiso needs to pay on his salary. **Answer this question on the Answer Sheet provided.**

Example:

Mrs Moodley (aged 66) earns a gross salary of R31 000 a month. Her medical aid, UIF and pension amount to R4 880 a month. Mrs Moodley calculated her actual annual payable tax as follows:

Monthly taxable income	= R31 000,00 – R4 880,00
	= R26 120,00
Annual taxable income	= R26 120,00 × 12
Answer	= R313 440,00
Basic rate of tax bracket	= R62 710,00
Add [35% of (R313 440,00 – R270 000,00)]	+ R15 204,00
Answer	= R77 914,00
Less rebate	- R13 320,00
Actual annual tax payable	= R64 594,00

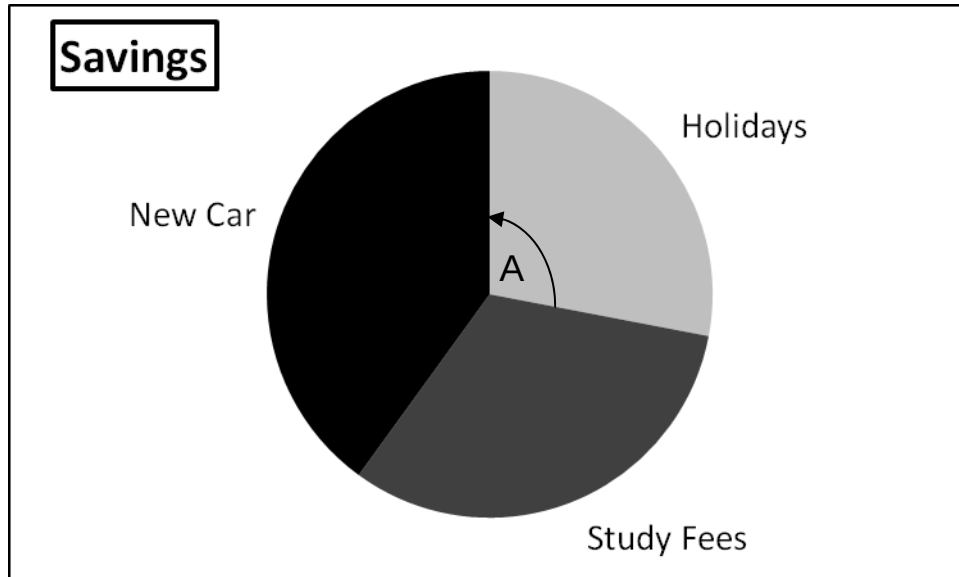
(13)

(*gross salary – the salary before any deductions have been made)

3.3 Mr Xhosiso saves R3 000,00 a month. His savings are broken up as follows:

- R ? for holidays
- R 1 000,00 for his son's future study fees
- R 1 150,00 for a new car

The pie chart below illustrates how the savings are divided.



This pie chart is not drawn accurately. Calculate the measurement in degrees of angle A.

(4)

20 marks

QUESTION 4

Consider the two graphs in **Appendix D** when answering the following questions.

4.1 Consider the graph that shows the foetal growth.

Explain why the curve only starts at 5 weeks. (1)

4.2 Whilst doing a Life Sciences project, Thembi divided the foetal growth into 8 different stages as shown below:

Growth Stages of a Foetus	Period (In weeks)
Stage 1	From 0 to less than 5
Stage 2	From 5 to less than 10
Stage 3	From 10 to less than 15
Stage 4	From 15 to less than 20
Stage 5	From 20 to less than 25
Stage 6	From 25 to less than 30
Stage 7	From 30 to less than 35
Stage 8	More than 35 weeks

4.2.1 Use the graph to explain during which stage a foetus growth rate is the greatest. (3)

4.2.2 Explain why Thembi did not describe Stage 8 as 'From 35 to less than 40 weeks'. (2)

4.3 The second graph on **Appendix D** shows the 'Weight-for-age of BOYS' aged from birth to 2 years.

The graph shows FIVE curves, namely:

- 97th percentile
- 85th percentile
- 50th percentile
- 15th percentile
- 3rd percentile

4.3.1 What does a reading below the 85th percentile curve indicate? (2)

4.3.2 Should parents be concerned if their one year old son weighed 6 kg? Explain your answer. (3)

11 marks

QUESTION 5

5.1 Refer to **Appendix E** – a portion of a road map.

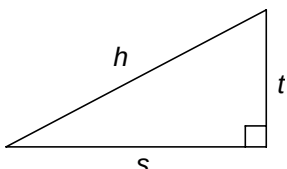
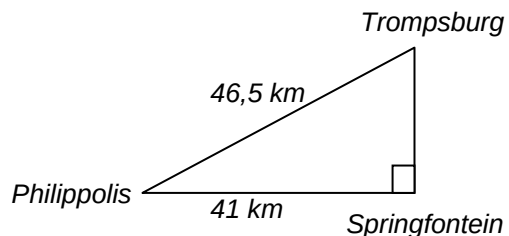
5.1.1 Calculate the distance between Petrusville and Koffiefontein. (3)

5.1.2 Provide detailed directions (distances and route numbers) to travel from Koffiefontein to Kimberley. (4)

5.1.3 A farmer travels a distance of 140 km by flying from his farm in Springfontein. Determine which town on the map he will reach if he travelled in a south-westerly direction. (2)

5.1.4 When joining the towns of Philippolis, Springfontein and Trompsburg, one almost obtains a right-angled triangle.

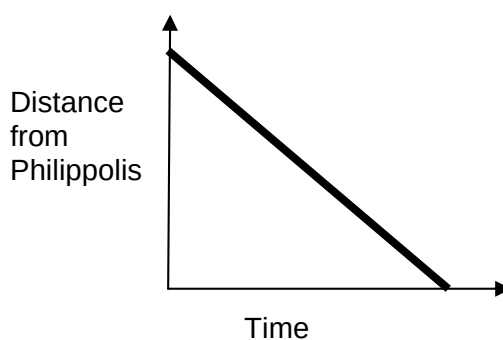
(a) With the use of the Theorem of Pythagoras, determine the approximate distance (to the nearest km) between Springfontein and Trompsburg.

Theorem of Pythagoras $h^2 = s^2 + t^2$ 	
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(4)

(b) Give TWO reasons why the distance obtained in question 5.1.4(a) is only an approximate distance. (2)

5.2 Mr Boomkamp travels from Springfontein to Philippolis by car. The graph below shows Mr Boomkamp's distance from Philippolis over time travelled.



5.2.1 The journey can best be described as follows (just write A, B, C or D):

- A Mr Boomkamp travelled at a constant speed, but he stopped for a break.
- B Mr Boomkamp travelled at various speeds without stopping on route.
- C Mr Boomkamp travelled at various speeds, but he stopped for a break.
- D Mr Boomkamp travelled at a constant speed without stopping on route.

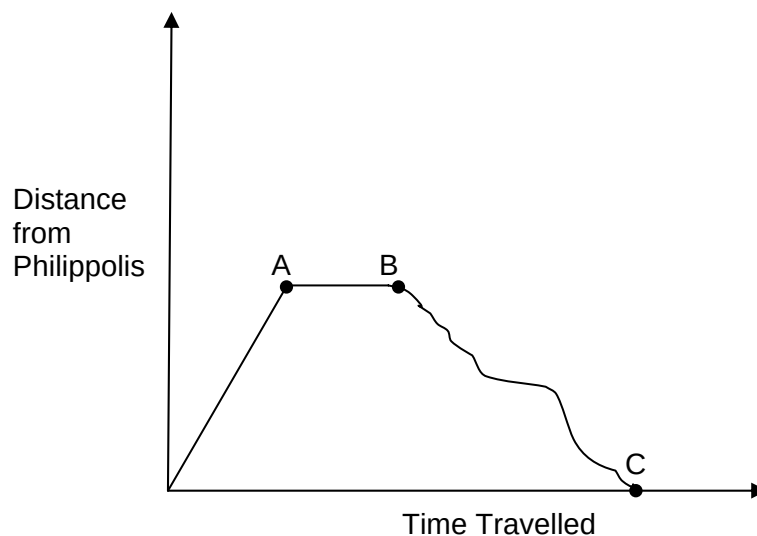
(2)

- 5.2.2 Mr Boomkamp left Springfontein for a meeting at Philippolis (a distance of 41 km) which was to begin at 9.30 a.m. Determine if Mr Boomkamp was on time for his meeting if he left home at 9 a.m., travelling at an average speed of 75 km/h and not stopping on route.

$$\text{Average Speed} = \frac{\text{Distance}}{\text{Time}}$$

(5)

- 5.2.3 Consider the journey between Philippolis and Springfontein as illustrated below.



- (a) Is this journey beginning at Philippolis or Springfontein? Explain your answer. (2)
- (b) Explain what could be happening between points A and B. (2)
- (c) Describe the journey between points B and C with reference to the speed of the car and direction in which it is travelling. (2)

- 5.3 The traffic department at Petrusville have monitored the number of vehicles travelling through their town for a six month period during 2007. The following figures were recorded:

	Number of Vehicles	
	2007 Actual Figures	2007 (Rounded to nearest hundred- thousand)
January	2 130 015	2 100 000
February	381 562	400 000
March	A	500 000
April	1 251 216	1 300 000
May	158 164	200 000
June	1 325 214	1 300 000

- 5.3.1 (a) What is the smallest possible value for A? (1)
- (b) What is the largest possible value for A? (1)
- 5.3.2 If the mean number of cars travelling through Petrusville every month during the first 6 months of 2007 was 961 547, determine the exact number of cars that travelled through Petrusville during March. (5)
- 5.3.3 Explain why the value for A (answer to question 5.3.2) is NOT the median value. (2)
- 5.4 After a rugby match between two schools in Petrusville, players were handed a cooldrink from a crate and a packet of chips from a box. Players were not given a choice, but they had to take whatever was handed to them. The crate of cooldrinks consisted of 10 Cokes and 30 Fantas, whereas the box of chips had 20 packets of Salt and Vinegar chips and 20 packets of Chutney chips.
- 5.4.1
- (a) Construct a tree diagram to show all of the possible options for a cooldrink and packet of chips for the first player in the queue. (4)
- (b) Use the tree diagram or any other method to determine the probability that the first player in the queue will end up with a packet of Chutney chips and either a Coke or a Fanta. (4)
- 5.4.2 What is the probability that the second player in the queue will get a Fanta and a packet of Chutney chips if the first player in the queue is given a Coke and packet of Chutney chips? (4)

5.5 Petrusville School's rugby team played 5 games during their 2007 rugby season.

Game	Points Scored
1	15
2	23
3	19
4	78
5	15

Which one of the averages (mean, mode or median) best describes the team's 2007 season?

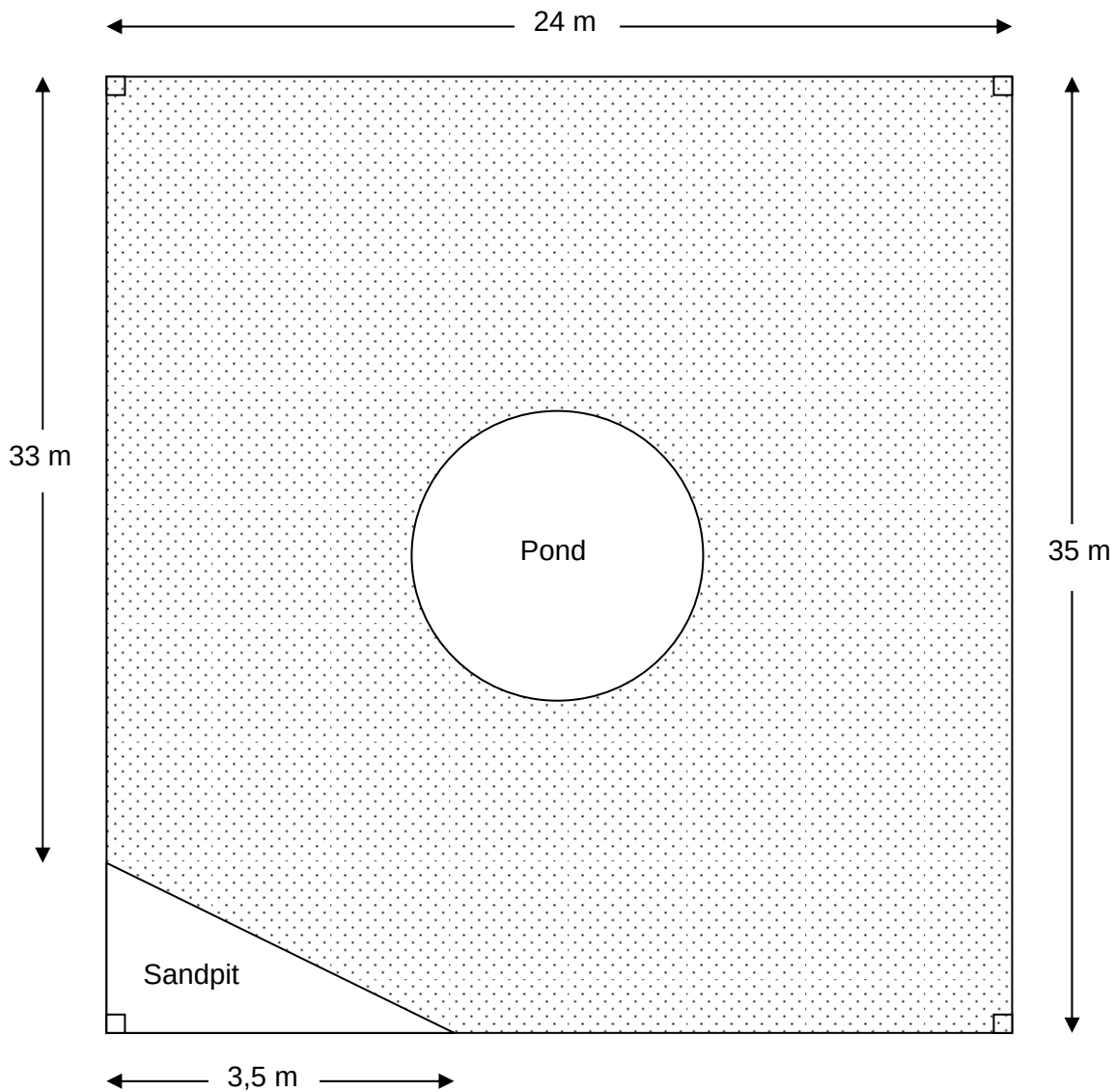
Explain why the other two averages are not suitable. You must show all the necessary calculations.

(10)

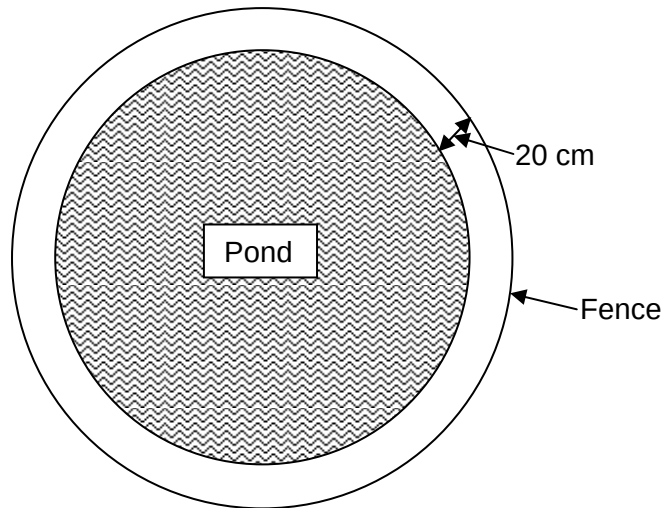
59 marks

QUESTION 6

The diagram below shows the basic outlay of a rectangular garden. There is a triangular sand pit in the bottom left corner and a circular pond in the middle of the garden. The diagram is not drawn to scale.



- 6.1 The owner of the garden wants to erect a low wire fence around the pond as shown below. He needs to calculate the length of fencing that he must buy. The following needs to be taken into account:
- The area of the entire garden is 840 m^2 .
 - The pond takes up 2,5% of the garden.
 - The distance between the fence and the pond must be uniformly 20 cm, as shown below.



The following formulae may be of use in order to answer the questions below:

$$\text{Circumference of a circle} = 2 \times \pi \times r$$

$$\text{Area of a circle} = \pi \times r^2$$

$$\text{Let } \pi = 3,14$$

- 6.1.1 Calculate the length of the radius (in meters) of the pond. Round your answer to 1 decimal place. (7)
- 6.1.2 The owner has 16 m of fencing. Is this enough fencing to fence the pond? Motivate your answer with the use of calculations. (4)

6.2 The sand pit (45 cm deep) is to be filled with sand. Sand can be bought as follows:

1 m³ (cubic meter) costs R122,55

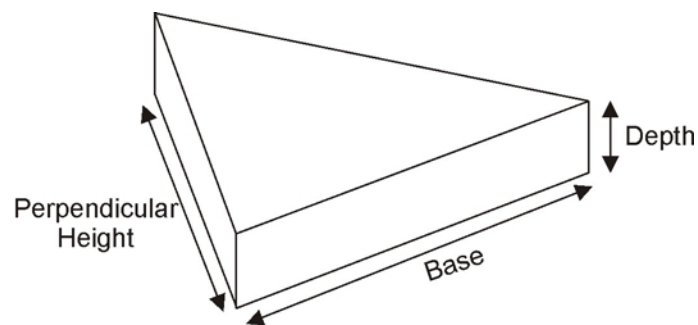
0,75 m³ costs R 81,75

0,5 m³ costs R65,50

0,25 m³ costs R35,75

Determine using the volume formula given below whether an amount of R200 would be sufficient to cover the cost for the sand required to completely fill the sandpit.

$$\text{Volume of a triangular Prism} = \frac{1}{2} \times \text{base} \times \text{perpendicular height} \times \text{depth}$$



(8)

19 marks

Total: 150 marks