



MATHEMATICAL LITERACY: PAPER I

Time: 3 hours

150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of 12 pages, an Answer Booklet of 2 pages (i – ii) and an Annexure Sheet of 1 page. **Detach the Answer Booklet** from the centre of the question paper and hand it in with your Answer Book and Question paper.
 2. Ensure that your question paper is complete.
 3. The question paper consists of 6 questions. Answer ALL the questions.
 4. Start each question on a new page.
 5. Number the answers exactly as the questions are numbered.
 6. An approved (non-programmable, non-graphical) calculator may be used.
 7. ALL necessary calculations must be clearly shown.
 8. Units of measurement must be included where applicable.
 9. Round off final answers to two decimal places, unless specified otherwise.
 10. It is in your own interest to write neatly and legibly.
 11. Please hand in this question paper.
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QUESTION 1

1.1 Calculate:

1.1.1 $872,04 - \sqrt{484} \times 5^2 + 2,96$ (2)

1.1.2 30% of 3 000 ml (3)

1.1.3 $\frac{9}{10}$ of 1×10^7 (3)

1.2 Calculate the time, in hours, minutes and seconds, it would take to fly 7 000 km at a constant speed of 920 km/h.

The following formula may be used:

$$\text{Speed} = \text{Distance} \div \text{Time} \quad (4)$$

1.3 Ubuntu High School holds a school raffle to raise funds. 456 tickets are sold and 3 winners will be drawn.

1.3.1 If Sipiwe buys 4 tickets, calculate the probability, as a percentage, of one of his tickets winning on the first draw. (2)

1.3.2 Sipiwe's ticket is not drawn in the first or second draw. State the probability, as a fraction, of one of Sipiwe's tickets being drawn on the third draw. (2)

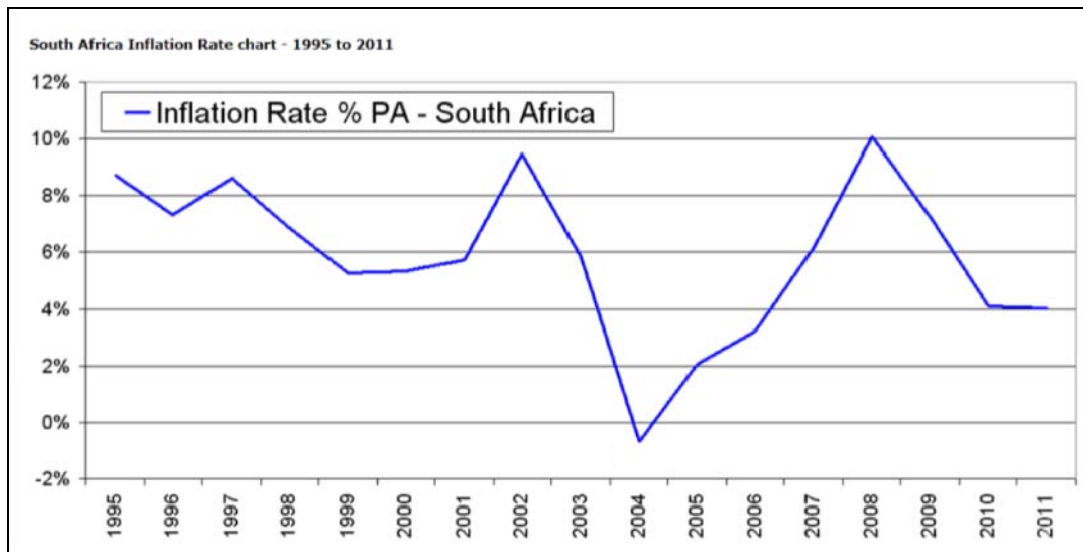
1.4 Emma sells blankets which she makes by hand. She spends R375 a month buying the fabric and stock she needs. She sells each blanket for R75. Calculate how many blankets Emma needs to sell each month in order to break even. (2)

1.5 1 ZAR (South African Rand) = \$0,11 US Dollar

1.5.1 If you have R5 500 to exchange, then calculate how many dollars you would receive. (2)

1.5.2 If you have \$5 500, how many rands would you receive? (2)

1.6 Refer to the graph below to answer the questions that follow.



[<www.aboutinflation.com>]

For each of the following, simply state whether the statement given is TRUE or FALSE. No reasons are required.

- 1.6.1 This graph shows the annual inflation rate of South Africa since 1995. (1)
- 1.6.2 The inflation rate was at its lowest in 2008. (1)
- 1.6.3 The approximate rate of inflation between 2010 and 2011 was 40%. (1)
- 1.6.4 The rate of inflation decreased between 2002 and 2003. (1)
- 1.6.5 At no point in the graph is the inflation rate negative. (1)
- 1.6.6 Between 1995 and 2010, the inflation rate has increased as many times as it has decreased. (1)

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QUESTION 2

Suzanne lives in Clarens in the Free State and has just finished studying. She is very excited about moving into her own place and starting her new job.

Suzanne will be earning R144 000 per annum.

She sees this house for sale in the advertisement shown below and investigates the possibility of buying it. She has no deposit.

R 926,000
Clarens
Type: House
Ref# 4117414

Pam Golding Properties
 Listed in the Last 3 Months
 Updated from Agent's Site: 2 Day(s) Ago

3 BEDS 2 BATHS

Action

- > [View More Details](#)
- > [Add to ShortList](#)
- > [SMS & Email Agent](#)

This three bedroom home in a quiet cul-de-sac is set in a pretty garden with lovely mountain views. A one bedroom flat which generates extra income is attached to the main house. Do not miss this opportunity to live in "The Jewel of The Free State".

- 2.1 Write down the advertised cost of this house. (1)
- 2.2 How many bedrooms does the main house have? (1)
- 2.3 Suzanne uses an online bond cost calculator to calculate what her monthly repayments would be if she bought this house.

Years to repay	<input type="text" value="20"/>		<p style="color: green;">What will my monthly repayment be?</p>
Interest rate	<input type="text" value="8.5"/>	%	
Purchase price	R <input type="text" value="926,000"/>		
Deposit	R <input type="text" value="0"/>		
Your monthly repayments =		R 8,036	
Total loan =		R 1,928,650	
		<input type="button" value="clear"/> <input type="button" value="calculate"/>	

- 2.3.1 State what Suzanne's monthly repayments would be if she bought this house. (1)
- 2.3.2 Suzanne's monthly bond repayments may not exceed 30% of her salary. Calculate Suzanne's affordable monthly repayments. (3)
- 2.3.3 The total loan amount shown would include the loan plus the interest to be paid. Calculate how much interest Suzanne will pay if she buys this house and pays the bond off over 20 years. (3)

2.4 Suzanne realises she needs to calculate what loan amount she can afford. She uses another online bond calculator.

Gross monthly income	R	<input type="text" value="12,000"/>	What loan amount do I qualify for?
Net monthly income	R	<input type="text" value="9,793"/>	
Total monthly expenses	R	<input type="text" value="7,000"/>	
Net surplus income	R	<input type="text" value="2,793"/>	
Years to repay		<input type="text" value="20"/>	
Interest rate (eg 14.5)		<input type="text" value="8.5"/> %	
Qualified Amount = 30% Gross Income			
Qualified Amount = 100% Net Surplus Income		R 321,840	
		<input type="button" value="clear"/>	<input type="button" value="calculate"/>

- 2.4.1 Calculate how much money is deducted off Suzanne's gross salary every month. (2)
- 2.4.2 State the total amount of Suzanne's monthly expenses. (1)
- 2.4.3 State the total loan amount that Suzanne can actually afford. (1)

2.5 Suzanne decides to start saving in order to accumulate a good deposit for an affordable house in a few years' time. If she is able to save R1 250 a month, calculate how much money she will have available after 4 years at an interest rate of 4,76% per annum compounded monthly.

The following formula may be used:

$$F = \frac{x[(1+i)^n - 1]}{i}$$

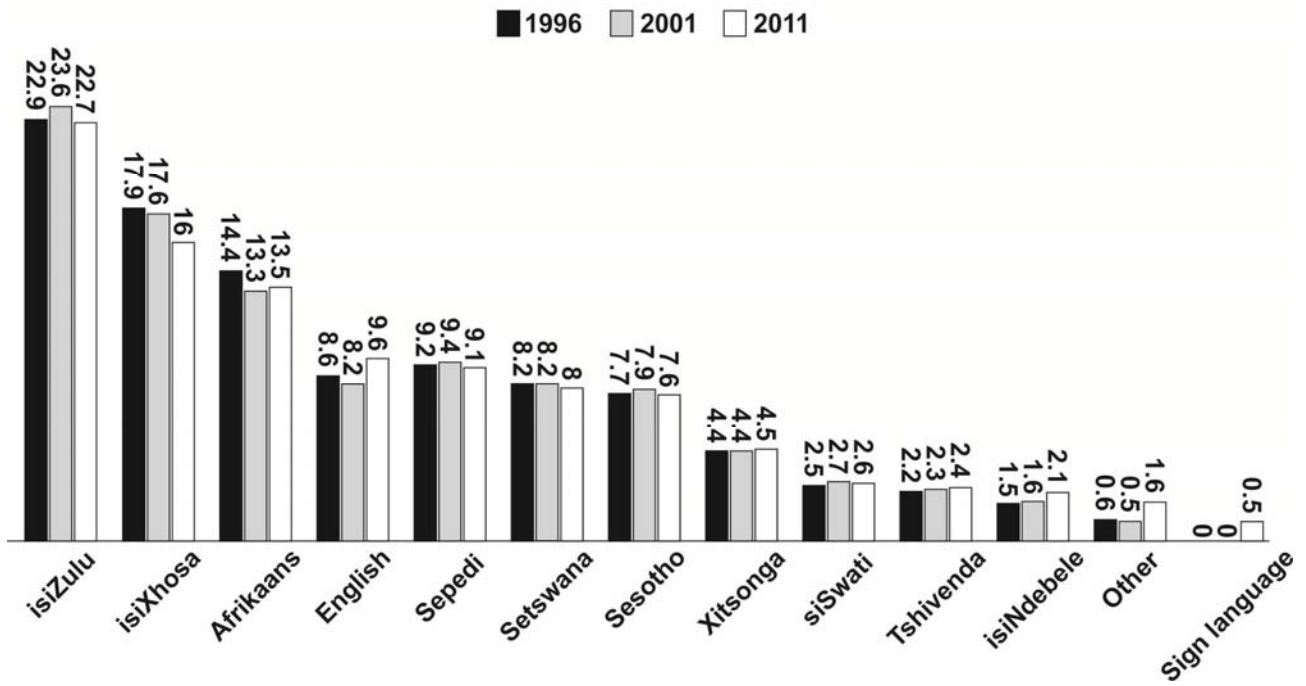
Where F = Future value of the investment
 x = monthly savings payment
 i = monthly interest rate
 n = term of investment in months (5)

- 2.6 Refer to **Annexure A** in order to answer the following questions.
 - 2.6.1 Refer to the scale of this map and complete:
 - ... cm = 1 km (1)
 - 2.6.2 If the length of Main Street on the map is 6 cm, then determine the actual length in meters. Show all working. (3)
- 2.7 Refer to **Annexure B** in order to answer the following questions.
 - 2.7.1 In which general direction would Suzanne be travelling if she travelled along the N3 from Warden to Harrismith? (1)
 - 2.7.2 If the distance from Frankfort to Villiers, along the R26 is 32 kilometers, determine the scale of this map to the nearest thousand. Show all measurements and calculations. (4)
 - 2.7.3 Suzanne needs to travel from Clarens to Warden. Describe the simplest route she could take to get there. (4)

QUESTION 3

3.1 The graph below shows the percentage of the population that spoke each of the given languages in 1996, 2001 and 2011.

South Africa: Home Language Percentage



[Source: <<http://www.salanguages.com/stats.htm>>]

Refer to the graph above to answer the following:

- 3.1.1 Which language is spoken by the greatest percentage of the population in South Africa? (1)
- 3.1.2 Which language was spoken by 13,5% of the population in 2011? (1)
- 3.1.3 What percentage of the population spoke Xitsonga in 2001? (1)
- 3.1.4 Name any two languages which were spoken by a greater percentage of the population in 2011 than in 2001. (2)
- 3.1.5 If the total population of South Africa was 50 961 443 in 2011, calculate how many people spoke English in 2011. (2)

- 3.2 According to the *World Fact Book*, the planet's population continues to increase at a rapid rate. The table below summarises the data.

Year	Population	Range in years	Percentage increase	Average increase of population per year
1820	1 000 000 000	–	–	–
1930	2 000 000 000	110	100%	9 090 909
1960	3 000 000 000	(a)	50%	33 333 333
1974	4 000 000 000	14	33,3%	(c)
1987	5 000 000 000	13	(b)	76 923 077
1999	6 000 000 000	12	20%	83 333 333
2012	7 000 000 000	13	14%	76 923 077

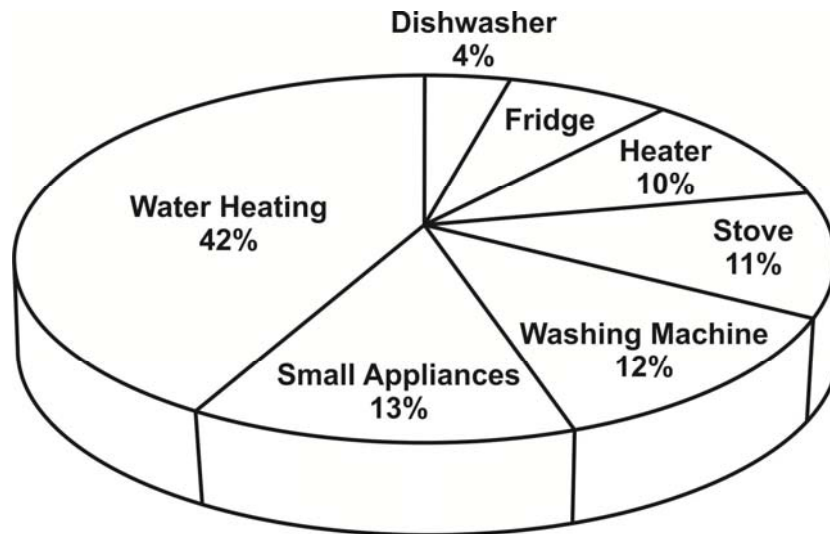
[<<https://www.cia.gov/library/publications>>]

- 3.2.1 State the percentage increase in the population between 1820 and 1930. (1)
- 3.2.2 In which year was the population of the planet 4 billion? (1)
- 3.2.3 State the average increase in the population **per year** from 1987 to 1999. (1)
- 3.2.4 Calculate the missing values (a), (b) and (c) in the table. (8)
- 3.2.5 (a) Calculate the range in years between 1820 and 2012. (1)
- (b) Complete the sentence by finding values for (i) and (ii).
- Between the years 1820 and (i), a total of (ii) years, the population increased by 5 billion. (2)
- (c) Calculate the percentage increase in the population between 1820 and 2012. (4)
- 3.2.6 Use the above table and the axes provided on your Answer Sheet to draw a line graph representing the growth of the population over the last 2 centuries. (8)

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QUESTION 4

4.1 The pie chart below shows the typical electricity usage in a home.



4.1.1 According to the pie chart, which domestic appliance uses the most electricity? (1)

4.1.2 Calculate the percentage of electricity used by the fridge. Show all working. (3)

4.1.3 Calculate the size of the angle, to the nearest degree, of the stove sector in the chart. Show all working. (4)

4.2 A kettle is used, on average, for 0,4 hours per day. Convert this time to minutes. (2)

4.3 A washing machine operates, on average, for 0,75 hours per load. If a household does 5 loads of washing a week, calculate how many hours the washing machine would be in use, per month, if there are 4 weeks in that month. (3)

4.4 The following formula may be used to calculate the daily electricity consumption of a particular appliance:

$(\text{Wattage} \times \text{Hours Used Per Day}) \div 1\ 000 = \text{Daily Kilowatt-hour (kWh) consumption}$

1 kilowatt (kW) = 1 000 Watts

Multiply this by the number of days you use the appliance during the year for the annual consumption in kWh per year.

4.4.1 Use the formula given above to calculate the daily electricity consumption of a Plasma/LCD 32" television, if it has a power rating of 250 Watts and is in use for 6 hours per day. (3)

4.4.2 Calculate the annual consumption of kWh per year of the television, if we assume it is in use for 6 hours every day of the year in 2013. (2)

4.4.3 If the tariff charged is 117,29c/kWh, calculate the cost, in rands, of the electricity needed to power this television for a year. (3)

4.5 Heating the water in a geyser is the biggest consumer of electricity in a home.



4.5.1 This geyser can hold 150 ℓ of water.

If $1 \text{ cm}^3 = 0,001 \text{ ℓ}$, calculate the volume of the geyser in cm^3 . (2)

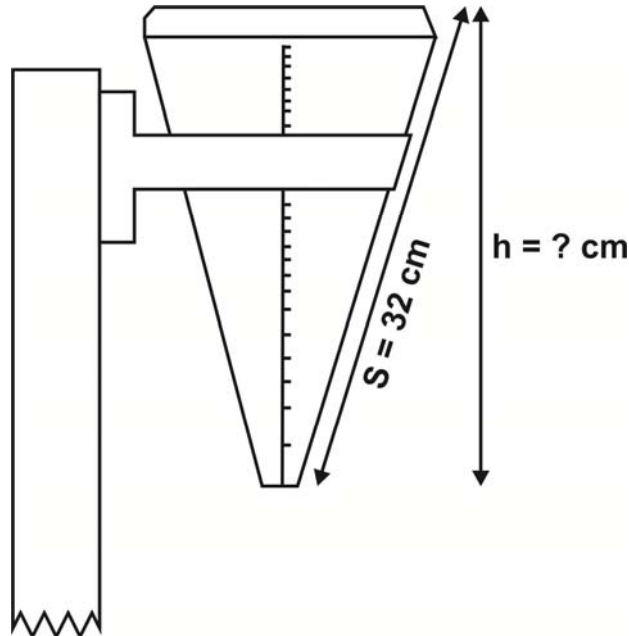
4.5.2 If the length of the geyser is 1,2 m, calculate the diameter of the geyser, to the nearest centimetre.

The following formula may be used:

Volume of a Cylinder = $\pi \times \text{radius}^2 \times \text{length}$ if $\pi = 3,14$ (6)
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QUESTION 5

Manqoba has bought a rain-gauge as a gift for his father. It is cone shaped with the radius of the circle on top being 6,5 cm. The length of the slope is 32 cm, as illustrated in the diagram below.



- 5.1 Use the theorem of Pythagoras to calculate the perpendicular height (h) of the rain-gauge. (4)
- 5.2 Calculate the minimum amount of wrapping paper he would need if he needs to gift wrap the rain gauge.

The following formula may be used:

$$\text{Surface Area} = \pi rs + \pi r^2 \text{ if } \pi = 3,14 \tag{3}$$

- 5.3 Calculate the maximum amount of rain, in litres, the rain-gauge can hold.

The following formulae may be used:

$$\text{Volume} = \frac{1}{3} \pi r^2 h \text{ if } \pi = 3,14 \qquad 1 \text{ cm}^3 = 1 \text{ ml} \tag{3}$$

[10]

QUESTION 6

Joshua owns a Music Shop called *The Beats*. The table below shows some figures, rounded to the nearest thousand, for the last 6 months:

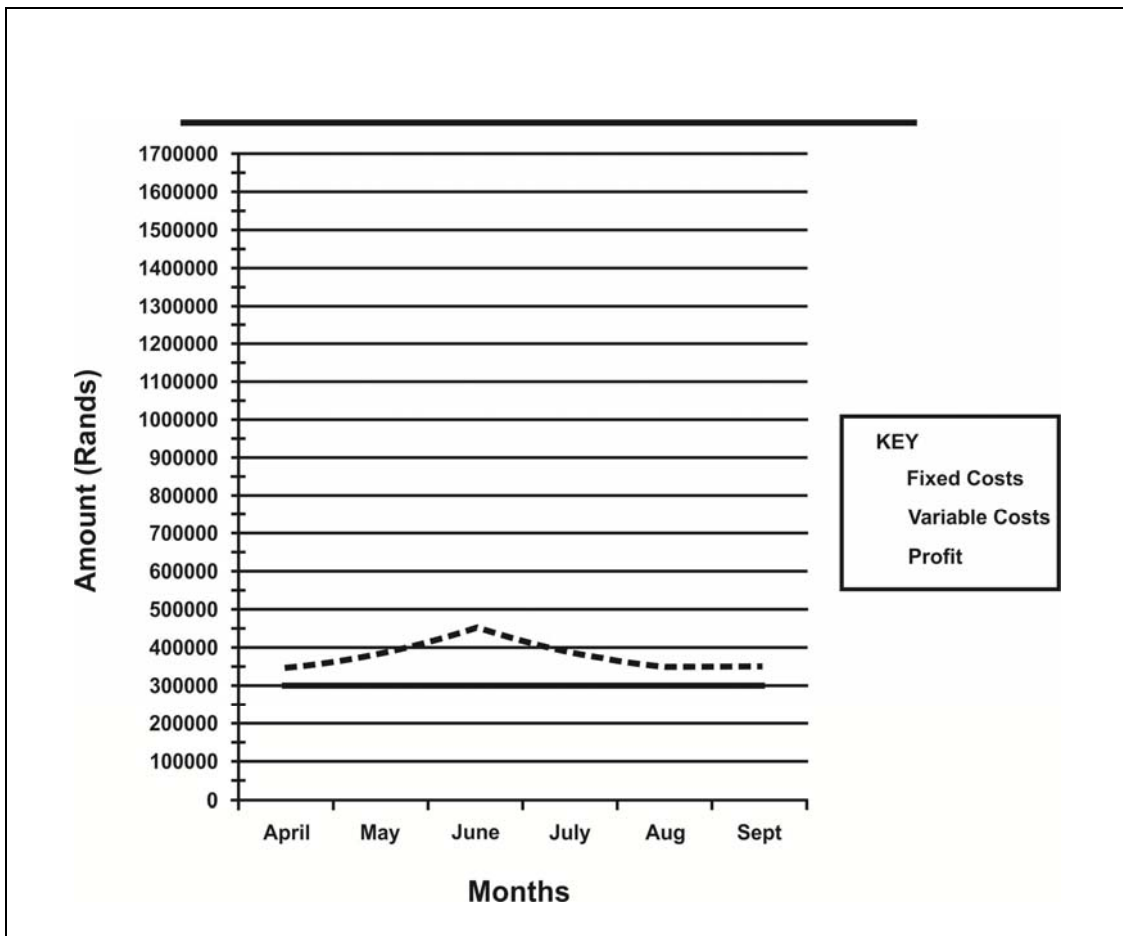
	Income (R)	Expenses (costs) (R)	Profit (R)	Profit Margin (%)
April	1 657 000	650 000	(a)	60,8%
May	(b)	680 000	1 063 000	61%
June	2 010 000	750 000	1 260 000	62,7%
July	2 265 000	(c)	1 575 000	69,5%
August	1558 000	650 000	908 000	58,3%
September	1 601 000	655 000	946 000	(d)

$$\text{Profit Margin} = \frac{\text{Profit}}{\text{Income}} \times 100\%$$

$$\text{e.g. Profit Margin for June} = \frac{1\,260\,000}{2\,010\,000} \times 100 = 62,7\%$$

- 6.1 Calculate the missing values (a), (b), (c) and (d). (9)
- 6.2 In which month did Joshua receive the highest income? (1)
- 6.3 Calculate the difference between his expenses for May and June. (2)
- 6.4 In which month was his profit margin the lowest? (1)

6.5 The following graphs represent *The Beats'* Fixed Costs and Variable Costs.



- 6.5.1 Use the Answer Sheet provided and complete the key showing the fixed cost and variable cost graphs. (1)
 - 6.5.2 Using the Answer Sheet provided and the values in the table, draw the graph representing *The Beats'* profit on the same set of axes as the costs. (4)
 - 6.5.3 Give your graph a heading. (1)
- [19]**

Total: 150 marks