GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENG DEPARTMENT OF EDUCATION

PREPARATORY EXAMINATION

2017

10601

MATHEMATICAL LITERACY

FIRST PAPER

TIME: **3 hours**

MARKS: **150**

9 pages and 2 answer sheets

X10

P.T.O.

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MATHEMATICAL LITERACY
(First Paper)

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INSTRUCTIONS AND INFORMATION

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

2. Write your name in the space provided and hand in the ANSWER SHEETS with your ANSWER BOOK.

3. Use the ADDENDUM as follows:

    - Use ANNEXURE A to answer Question 1.2.
    - Use ANNEXURE B to answer Question 1.3.
    - Use ANNEXURE C to answer Question 2.1.
    - Use ANNEXURE D to answer Question 2.3.
    - Use ANNEXURE E to answer Question 4.1.
    - Use ANNEXURE F to answer Question 4.3.
    - Use ANNEXURE G to answer Question 5.1.

4. Number your answers correctly according to the numbering system used in this question paper.

5. An approved calculator (non-programmable and non-graphical) may be used 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. Start EACH question on a NEW page.

10. Write neatly and legibly.

QUESTION 1

1.1 Dr. Kyle Brooks lives in Johannesburg. He has to pay rates to the Johannesburg Municipality for the water and electricity that he uses monthly. Below is the electricity bill that he received from the municipality for the month of August.

CITY OF JOHANNESBURG MUNICIPALITY

158 Civic Boulevard Street
Metropolitan Centre, 8th Floor, A-Block,
Braamfontein

Street Address	Client Name	Invoice Number
47 Tenth Street Linden 2196	Dr. K. Brooks	NORTH – ELEC453723

Date	Consumption details	Tariff	Sub-Total	VAT	Sub-Total Due
29/08	Previous reading: 114628 kWh Current reading: 115353 kWh → Consumption for August: _____**(A)**	R0,219 per kWh	R158,78	____**(B)**	R181,01
29/08	30 AMP Circuit Breaker	R2,80 per AMP	R84,00	R11,76	R95,76
TOTAL AMOUNT DUE					**(C)**

1.1.1 Define the term *tariff*. (2)

1.1.2 What is the current strength of the circuit breaker attached to his flat? (2)

1.1.3 Calculate the consumption for August. **(A)** (2)

1.1.4 Show how the sub-total value of R158, 78 was calculated. (2)

1.1.5 Calculate the VAT amount on R158, 78. **(B)** (2)

1.1.6 Determine the total amount due. **(C)** (2)

1.2 The graph on **ANNEXURE A** indicates the total number of visitors to Hermanus per month from January 2014 to June 2017. Study the graph carefully and answer the questions that follow.

1.2.1 What was the number of visitors to Hermanus in January 2015 and April 2017? (2)

1.2.2 For which month and year was the number of visitors to Hermanus approximately two times more than in January 2014? (2)

1.2.3 Write the number of visitors to Hermanus in April 2015 to the number of visitors in February 2016 as a ratio in the simplest form. (3)

1.2.4 Is this data an example of discrete or continuous data? (2)

1.3 The pie chart on **ANNEXURE B** indicates the visitors from other continents to Hermanus as percentages. Study the pie chart carefully and answer the questions that follow.

1.3.1 Identify the continent with the highest percentage of visitors to Hermanus and state the percentage. (2)

1.3.2 Calculate the number of visitors that came from Asia. (2)

1.3.3 During 2017 the total number of visitors to Hermanus was 1 075. It is predicted that the number of visitors to Hermanus will increase by 8% the following year. Calculate the predicted number of visitors. (2)

1.3.4 What is the difference in percentages between the visitors from Europe and the visitors from Australia and New Zealand? (2)

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QUESTION 2

2.1 Dr. Kyle Brooks is a senior lecturer at the College of Computer Studies. Study his salary advice on **ANNEXURE C** and answer the questions below.

2.1.1 What is Dr. Brooks's basic salary? (2)

2.1.2 Determine Dr. Brooks's age. (2)

2.1.3 Calculate Dr. Brooks's monthly pension fund contribution (**A** on the salary advice), if he contributes 7,5% of his monthly basic salary towards his pension fund. (3)

2.1.4 What does the abbreviation **UIF** stand for? (2)

2.1.5 (a) Calculate Dr. Brooks's monthly UIF contribution (**B** on the payslip). (3)

(b) Determine the total UIF contribution that the College of Computer Studies will pay for this employee. (2)

2.1.6 Calculate the missing values of **C** and **D** on his salary advice. (4)

2.1.7 What percentage of Dr. Brooks's travel allowance is paid towards tax? (4)

2.2 At the end of August 2017, Dr. Brooks received a water bill for 50 kilolitres of water used at his home. Use the water tariff structure below and complete ANSWER SHEET 1 (2.2.1 – 2.2.8) at the end of your QUESTION PAPER. Hand in your ANSWER SHEET with your ANSWER BOOK.

Table 1: Johannesburg municipality domestic water tariffs* for 2016/17

Johannesburg municipality domestic water tariffs* for 2016/17	
WATER	
Volume	**Charge (per kl)**
Up to 6 kl	R0, 00
6,1 kl – 15 kl	R7, 85
15,1 kl – 30 kl	R11, 29
30,1 kl – 45 kl	R13, 05
> 45 kl	R14, 00
All tariffs exclude VAT, which is charged at 14%.	

(8)

2.3 Dr. Brooks is considering taking a loan to pay for his son, Josh's university studies. The table on **ANNEXURE D** is used to calculate his monthly repayments. Study the table and answer the following questions.

2.3.1 Define the term *interest*. (2)

2.3.2 How much interest will you pay on a loan amount of R110 000, 00 (excluding initiation fees)? (2)

2.3.3 What is the longest loan term? Write your answer in years. (2)

2.3.4 Calculate the interest rate that Dr Brooks will have to pay on a loan amount of R82 000, 00.

Use the formula:

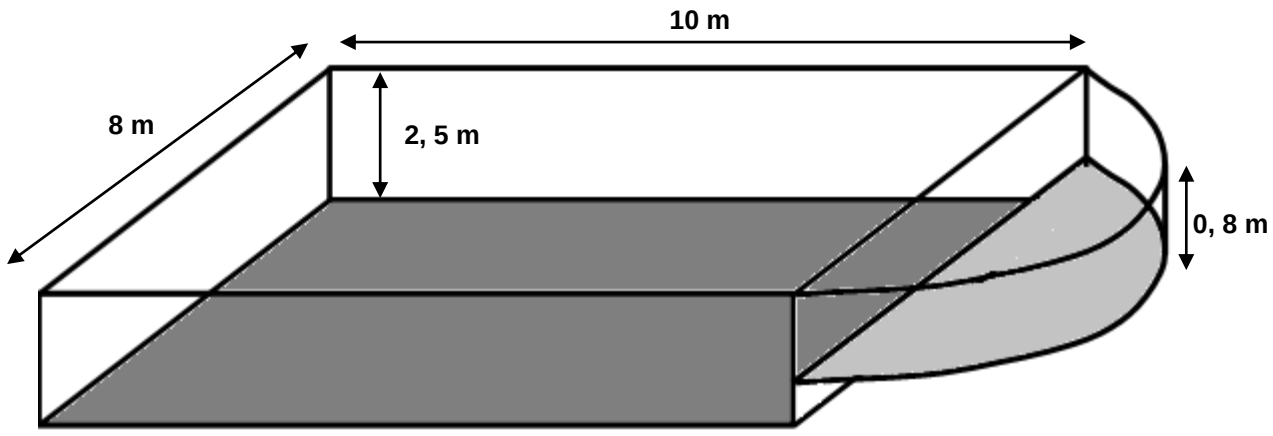
$$\text{Interest rate} = \frac{\text{Total Repayment - Loan Amount}}{\text{Loan Amount}} \text{ x } 100$$

(3)

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QUESTION 3

Dr. Brooks is planning on building a swimming pool to cool off during hot summer days and to entertain his family and friends. The pool consists of a rectangular shape at the one end and a semi-circular shape at the other end of the pool. Study the picture below and answer the questions that follow.



3.1 Calculate the circumference of the semi-circular part of the pool.
Use the formula: ***Circumference = diameter × π*** ***Use π = 3, 142*** (3)

3.2 Hence, calculate the perimeter of the entire pool. (3)

3.3 3.3.1 Determine the radius of the half cylindrical part of the pool. (2)

3.3.2 Calculate the area of the semi-circular part of the pool.
Use the formula: ***Area of a semi-circle = ½ (π × r^2)*** ***Use π = 3, 142*** (4)

3.4 Hence, calculate the volume of water for the cylindrical part of the pool.
Use the formula: ***Volume of a half cylinder = ½ (π × r^2 × depth)*** ***Use π = 3, 142*** (4)

3.5 Calculate the volume of water for the rectangular prism.
Use the formula: ***Volume = length × width × depth*** (4)

3.6 Determine the total volume of water required to fill the pool to the top. (2)

3.7 If 1 m^3 = 1 000 *l* and 1 000 *l* = 1 *kl*, determine the total kilolitres of water needed to fill the swimming pool. Round-off your answer to the nearest kilolitre. (3)

3.8 The recommended temperature for a recreational pool is 29 ^{0}C. Convert this temperature to degrees Fahrenheit.
You may use the formulae: **$^0F = (1,8 \times {}^0C) + 32$** **$^0C = ({}^0F - 32) \div 1,8$**
(2)
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QUESTION 4

4.1 Dr Brooks decided to take his wife to a concert of her favourite artist. Study the seating plan of the George Ignatieff Theatre on **ANNEXURE E** and answer the questions that follow.

4.1.1 How many seats are available in the theatre? (2)

4.1.2 Determine how many wheelchairs are catered for, if seats H1 to H13 are reserved for people using wheelchairs. (2)

4.1.3 Give the compass direction from seat G30 to the stage. (2)

4.1.4 Dr Brooks is seated in the middle block, in the third row from the back. His seat is exactly in the middle of the row. Name the row and seat number where he is seated. (2)

4.1.5 Dr Brooks's wife is seated in seat F15. She is invited to join her favourite artist on stage. Describe the shortest route from her seat to the stage. (3)

4.2 While driving to the George Ignatieff Theatre, Dr Brooks decided to listen to some music. He has a CD-pouch containing the following genres (types) of music: 6 CDs with jazz music, 2 CDs with opera music, 4 CDs with classical music and 12 CDs with instrumental music.

4.2.1 Which genre of music has the highest probability of being randomly selected? Prove your answer by calculation. (2)

4.2.2 Determine the probability of randomly selecting a CD with hip-hop music. (2)

4.2.3 What is the probability that Dr Brooks will randomly pick a CD with jazz music? Write your answer as a decimal. (2)

4.3 Refer to **ANNEXURE F**, the floor plan for the townhouse where Dr Brooks and his wife will stay after the concert. Study the floor plan and answer the questions that follow.

4.3.1 Is the scale used on the map a number scale, bar scale or word scale? (2)

4.3.2 Explain what this scale means. (2)

4.3.3 Determine the total number of doors on the floor plan. (2)

4.3.4 On which elevation will you find the porch? (2)

4.3.5 Measure the dimensions (length and breadth) of Bedroom 3 on the plan – ANNEXURE F. Give your answer in mm. (3)

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QUESTION 5

5.1 Josh Brooks is a Grade 12 learner. His father, Dr. Kyle Brooks is concerned about his son's future and is currently gathering more information on tuition fees from eight different universities.
Study the table in **ANNEXURE G** to answer the following questions.

5.1.1 Josh is interested in studying for a BA degree. What is the mean (average) amount that he could expect to pay? (3)

5.1.2 What is the modal amount for a BSc degree? (2)

5.1.3 Calculate the range for an LLB degree. (2)

5.1.4 Arrange the fees for a BA degree in descending order. (2)

5.1.5 What is the lowest fee for a BCom degree? Identify the university offering the lowest fees. (2)

5.1.6 Write the fee that the University of KwaZulu-Natal charges for a BEng degree, in words. (2)

5.1.7 Determine the median amount for a BCom degree. (2)

5.1.8 Calculate the interquartile range for an LLB degree if the minimum amount is R29 460, Quartile 1 is R32 135, the Median is R36 500, Quartile 3 is R40 668 and the maximum amount is R46 500. Show all your calculations. (2)

5.1.9 Is the data from the table on **ANNEXURE G** categorical or numerical? Briefly explain your answer. (2)

5.2 Use the information in the table on **ANNEXURE G** to draw a bar graph that will represent the cost for a BCom degree at the different universities. Complete this question on ANSWER SHEET 2 and hand in your ANSWER SHEET with your ANSWER BOOK. (4)

5.3 The second quartile is also known as ... . (2)

5.4 Give ONE example of categorical data. (2)

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TOTAL: 150

END

ANSWER SHEET 1

Name: _____ GRADE 12: ____

QUESTION 2.2

Table 1: Johannesburg municipality domestic water tariffs* for 2016/17

Johannesburg municipality domestic water tariffs* for 2016/17	
WATER	
Volume	**Charge (per kl)**
Up to 6 kl	R0, 00
6, 1 kl – 15 kl	R7, 85
15, 1 kl – 30 kl	R11, 29
30, 1 kl – 45 kl	R13, 05
> 45 kl	R14, 00
All tariffs exclude VAT, which is charged at 14%.	

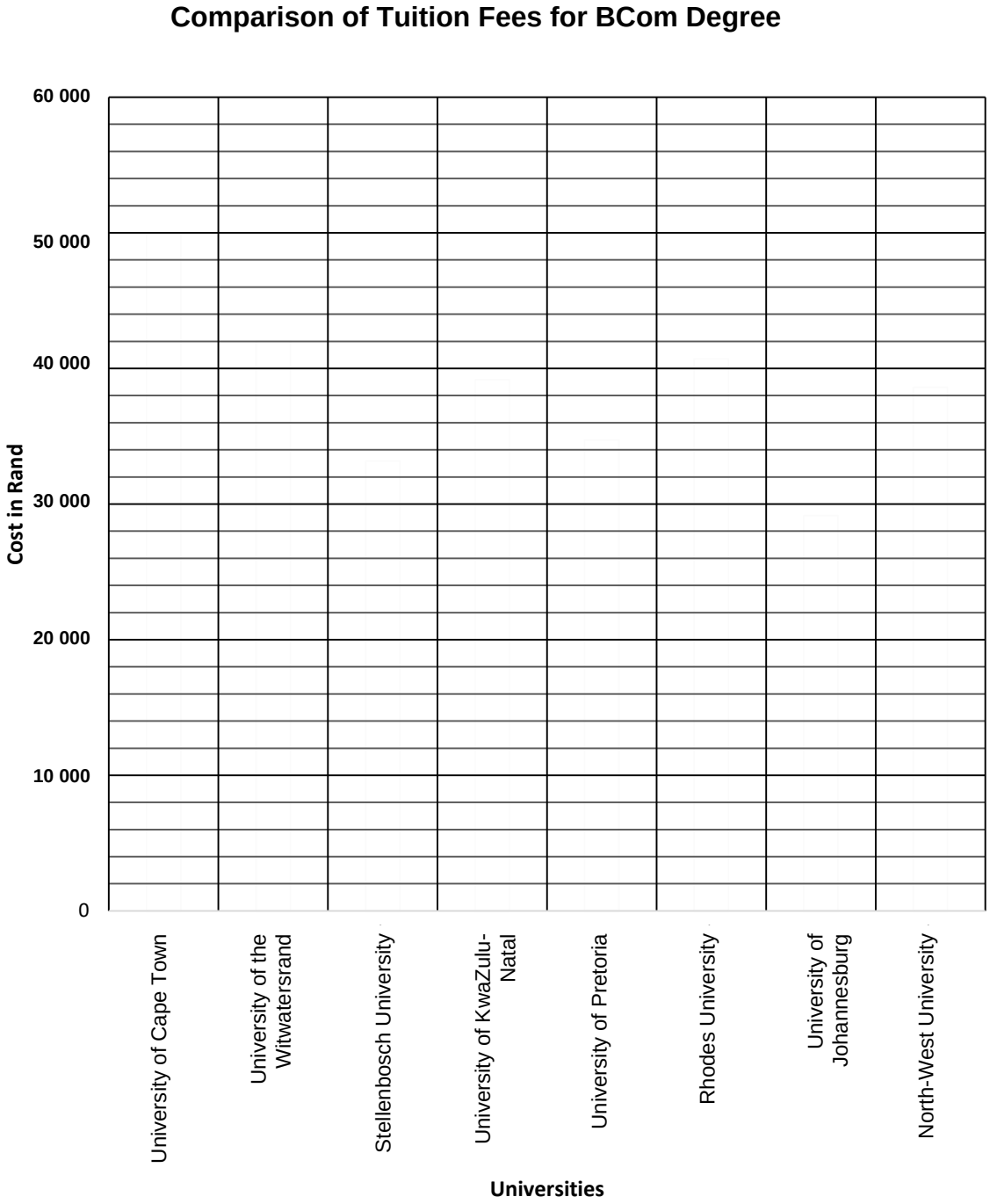
Number of kilolitres used	Cost per kilolitre	Total cost
6 kl	Free	R0, 00
9 kl	R7, 85	R70, 65
2.2.1	R11, 29	**2.2.3**
15 kl	R13, 05	**2.2.4**
2.2.2	R14, 00	**2.2.5**
	Total (VAT exclusive)	**2.2.6**
	VAT	**2.2.7**
	Total (VAT inclusive)	**2.2.8**

(8)

ANSWER SHEET 2

Name: _____ GRADE 12: ____

QUESTION 5.2



(4)