GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

GAUTENG DEPARTMENT OF EDUCATION

PREPARATORY EXAMINATION

2016

10602

MATHEMATICAL LITERACY

SECOND PAPER

TIME: **3 hours**

MARKS: **150**

11 pages + 1 answer sheet and an addendum with 4 annexures

MATHEMATICAL LITERACY: Paper 2
1060E
10602E

X10

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INSTRUCTIONS AND INFORMATION

1. This question paper consists of FOUR questions. Answer ALL the questions.
2. Use the ANSWER SHEET at the end of the question paper to answer Question 1.1.3.
3. Use the ADDENDUM AS FOLLOWS:
    - Use ANNEXURE A to answer Question 2.2.
    - Use ANNEXURE B to answer Question 3.1
    - Use ANNEXURES C1 and C2 to answer Question 4.2.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Start the answer to EACH question on a NEW page.
6. You may use an approved calculator (non-programmable and non-graphical), unless stated otherwise.
7. Show ALL calculations clearly.
8. Round-off ALL final answers appropriately to the given context, unless stated otherwise.
9. Indicate units of measurement, where applicable.
10. Maps and diagrams are NOT necessarily drawn to scale, unless stated otherwise.
11. Write neatly and legibly.

QUESTION 1

1.1 Cellphone users were asked to complete a survey on the number of hours they spent on their cellphones daily. The number of hours spent on their cellphones, rounded-off to one decimal place, are summarized in **Table 1** below. A newspaper reported on the results of the survey. The headline for the report was:

"Shocking Statistics! Many South African cellphone users in the 15 to 19 year-old age group use their cellphones for more than 10, 5 hours per day."

TABLE 1: Daily cellphone usage in hours

9 to 14 years		15 to 19 years		20 to 25 years	
Hours per day	**Number of users**	**Hours per day**	**Number of users**	**Hours per day**	**Number of users**
0 – 1,4	10	0 – 1,4	25	0 – 1,4	4
1,5 – 2,9	102	1,5 – 2,9	110	1,5 – 2,9	115
3,0 – 4,4	93	3,0 – 4,4	**A**	3,0 – 4,4	203
4,5 – 5,9	85	4,5 – 5,9	85	4,5 – 5,9	98
6,0 – 7,4	46	6,0 – 7,4	50	6,0 – 7,4	75
7,5 – 8,9	15	7,5 – 8,9	30	7,5 – 8,9	50
9,0 – 10,4	12	9,0 – 10,4	20	9,0 – 10,4	32
10,5 – 11,9	9	10,5 – 11,9	15	10,5 – 11,9	19
TOTAL	**372**	**TOTAL**	**500**	**TOTAL**	**596**

Use the information above to answer the questions that follow.

1.1.1 Calculate the missing value **A.** (2)

1.1.2 Calculate the percentage of the total number of users spending 3,0 – 5,9 hours per day on their cell phones. (4)

1.1.3 Use the ANSWER SHEET at the end of the question paper to draw a bar graph to represent the data for the age group 15 to 19 years. (5)

1.1.4 Use calculations to substantiate the newspaper's conclusion. (4)

1.2 Mr. Ismael decided to run his business from home in order to cut down on overheads. He will need a landline to be able to send and receive faxes and to make calls. His friend, Mr. Naicker, told him that he currently pays R200 for the rental of his landline and his calls cost him R0,50 per minute. Mr. Ismael obtained two quotes from service providers, Tellicom and Renewtel respectively. **Table 2** below indicates the two quotes Mr. Ismael received from the two service providers.

TABLE 2: Tariffs for landlines from service providers

TELLICOM	RENEWTEL
Rental: R250 per month	Rental: R350 per month
First 200 minutes free	First 400 minutes free
Call costs: R0,80 per minute	Call costs: R0,90 per minute
Fax cost: R1,10 per minute	Fax costs: R1,20 per minute
No difference in tariff during 24 hour period	5% Discount on faxes between 20:00 and 07:00

Mr. Naicker uses the following formula to calculate the total monthly cost for his landline:

Total cost = R200 + R0,50 × number of minutes

Use the information above to answer the questions that follow:

1.2.1 (a) Write down formulae to calculate the total monthly cost for both service providers. (2)

(b) Mr. Ismael claims that Renewtel is the cheaper option if he spends an average of 500 minutes per month on calls. Substantiate Mr. Ismael's claim, through calculations. (5)

1.2.2 Mr. Ismael sends an average of 125 faxes per month, on top of the 500 minutes of calls, and each fax uses 2,5 minutes to be sent.

(a) Determine the total monthly cost with Tellicom. (3)

(b) If Mr. Ismael sends 25% of the total number of 125 faxes between 08:00 and 20:00 daily, calculate the total cost with Renewtel. (6)

1.2.3 Consider all calculations Mr.Ismael made and motivate with which service provider he must sign his contract. (2)

1.3 Mr. Ismael's business is under contract with ABC Fire Matches to pack and box matches for them. He counted the number of matches per box in a sample of boxes and tabled his results in **Table 3** below:

TABLE 3: Number of matches per box in a sample of boxes

Number of matches	46	47	48	49	50	51	52	53	54
Number of boxes	1	3	4	2	3	5	3	3	1

Use the information above to answer the questions that follow.

1.3.1 Write down the type of data that Mr. Ismael collected. Explain your answer. (2)

1.3.2 Determine the total number of match boxes sampled. (2)

1.3.3 Calculate what percentage of the sample contains less than 50 matches. (3)

1.3.4 Write down the minimum and maximum values for the set of data. (2)

1.3.5 Calculate the mean number of matches in the sampled boxes. (3)

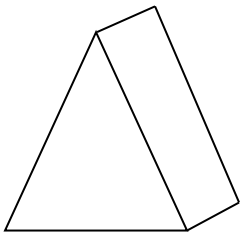
1.3.6 Explain how Mr. Ismael must calculate the median number of matches. (2)

[47]

QUESTION 2

2.1 Thandi is a student and uses her entrepreneurial skills to assist her in paying for her studies. She makes chocolate sweets in two shapes and flavours: A triangular prism, strawberry chocolate and a flat, cylindrically-shaped, caramel chocolate. She packs the triangular strawberry chocolates in triangular prism boxes and the flat, cylindrically-shaped caramel chocolates in rectangular shaped boxes as indicated below.

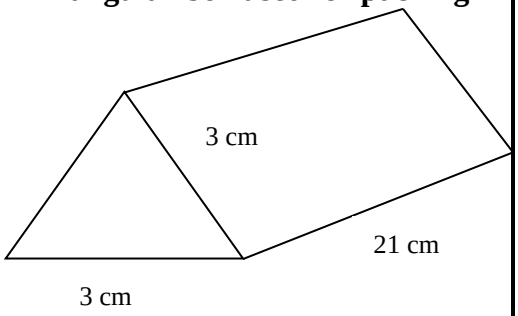
Strawberry chocolate



All sides of triangle = 3 cm
Height of triangle = 2,7 cm
Thickness = 1,5 cm

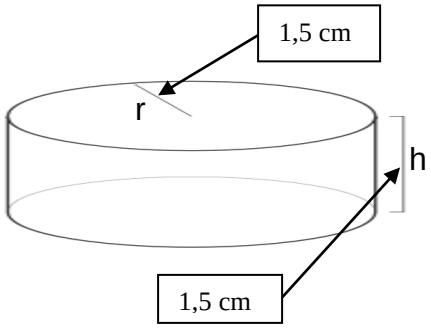
V = ½*bh* × *thickness*

Triangular box used for packing



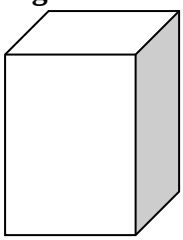
Surface area = $3(\ell \times b) + 2(½ \times b \times h)$

Caramel chocolate



V = $\pi r^2 h$; where $\pi = 3.142$

Rectangular box used for packing



Length = 3 cm
Breadth = 3 cm
Height = 9 cm

Surface area = $4(\ell \times b) + 2s^2$

Capacity of any box = $\ell \times b \times h$

Use the information above to answer the questions that follow.

2.1.1 Calculate the volume of one strawberry chocolate. (3)

2.1.2 Determine the number of strawberry chocolates that can fit into a triangular prism box. (3)

2.1.3 The capacity of the rectangular box is 81 cm^3. Determine the volume of the rectangular box that will not be filled when the chocolates are packed into it. (4)

2.1.4 Thandi imports the chocolate that she uses to make the chocolate sweets, from the USA. The cost of importing 8 kg of chocolate is $723,70. If the exchange rate is 1 USA $ = R14,26, calculate the cost of one kilogram of chocolate in rand value. (4)

2.2 Emnandi Mall is a new mall in Johannesburg North. Some of the new tenants have already opened their stores but there are still a few unoccupied locations. Refer to **Annexure A** in the Addendum and answer the questions that follow.

2.2.1 What shop number would be the best position for toilets?
Give a reason for your answer. (2)

2.2.2 Woolworths are part of the new shopping centre. They sell clothes, fruit and vegetables and everyday accessories. Which shop would suit them best?
Give a reason for your answer. (2)

2.2.3 Thandi enters Emnandi Mall at Entrance 2 and walks in a North Easterly direction past Vodacom. At shop 245 she turns in a North Westerly direction and then at the first corridor, she turns right. She continues straight and walks past the restaurant situated on her right and directly after that, she turns right. What shop is directly ahead of her? (2)

2.2.4 If Thandi enters Emnandi Mall at Entrance 2 and needs to go to "Chops & T-Bones", give her directions to reach the store. (2)

2.2.5 It takes Thandi 25 minutes to travel 27 metres throughout the mall. Calculate her average speed. Give your answer in metres per second. Use the formula:

$$\textit{Speed} = \frac{\textit{distance}}{\textit{time}}$$

(3)
[25]

QUESTION 3

3.1 Rasheed lives in Modimole, Limpopo and decides to visit his old school friend Christine who now lives in Volksrust, Mpumalanga. He plans to only drive on national main roads and to stop every hour and a half to prevent fatigue. He usually drives at an average speed of 90 km/h. He uses the map in **ANNEXURE B** to plan his trip

3.1.1 (a) Write down the major route that Rasheed can use to travel to Volksrust. (2)

(b) Write down THREE possible towns where Rasheed can stop on his journey to Volksrust. (3)

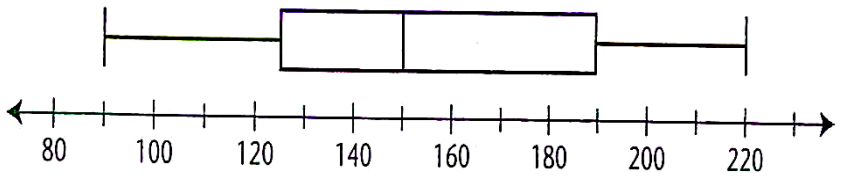
3.1.2 (a) Explain what the bar scale on the map indicates. (3)

(b) Use the bar scale on the map to determine the straight line distance from Modimole to Volksrust in kilometres. (4)

3.1.3 (a) Determine the number of times Rasheed will have to stop on his journey to Volksrust if the total distance is 347,2 km. Round-off your answer to the nearest whole number. (5)

(b) Rasheed decides to relax for 20 minutes at each of his stops. If he leaves Modimole at 07:00, calculate the time that he will arrive at Volksrust. (5)

3.2 Anton works as a game ranger at the Kruger National Park in Mpumalanga. Part of Anton's job is to investigate whether the allegation that Impala (Impala is a type of antelope found in the Kruger National Park) are being poached is true. He gathered data for 160 days and summarised his data in a box-and-whisker plot as shown below.



Use the information above to answer the questions that follow.

3.2.1 Write down the five-number summary of the data represented in the box-and-whisker plot. (5)

3.2.2 Write down the TWO values between which the lowest 25% of data lies. (2)

3.2.3 Write down the percentage of data that lies between Quartile 1 and Quartile 3. (2)

3.2.4 If this data in total represents 160 days, calculate the number of days between Quartile 1 and Quartile 3. (2)

3.2.5 Determine the interquartile range. (3)

[36]

QUESTION 4

4.1 Mandy is a ballet dancer. She wants to compete in Spain's National Ballet Championship, but is short of funds. Her family decides to hold a fundraiser to help with the financial burden. They decide to host a talent show and dinner evening to raise funds.

4.1.1 During the talent show finals, there were 36 participants. Of these, 6 were dancers, 25 were singers and the rest were musicians.

(a) What is the probability that a musician would win first place? Give your answer as a percentage rounded-off to the nearest 10 percent. (4)

(b) Is it more likely or less likely for a singer to win the finals? Give a reason for your answer. (2)

4.1.2 The dinner during the talent show consists of a 3-course meal. The cost for the show, including the dinner is as follows:

- R100 per person
- R180 per couple

(a) There were a total of 86 couples and 102 singles attending the talent show. How many people in total attended the show? (2)

(b) If there were 86 couples attending the talent show, calculate the total discount. (4)

(c) Calculate the total income received from the spectators. (3)

4.1.3 Mandy needs to travel to Spain in 2018. She decides to invest the money she earned from the talent show for 1 year. She managed to save a total of R25 680 after expenses from the talent show. She accepts a compound interest rate of 6,5% interest per annum, compounded bi-annually, with Save-It Bank. Calculate the amount of money Mandy will have available after 2 years. (5)

4.1.4 Mandy estimates that she will have R29 200,00 in savings. The predicted exchange rate for 2018 is:
€ 0,88814 = $ 1 and $ 1 = R 15,2434.
Use the exchange rate to calculate how many Euros Mandy will have, when she travels to Spain. (4)

4.2 Mandy is a 12-year old female who has been a ballet dancer since the age of 6. At her health supervision visit, she weighed 66 pounds and was 58 inches tall. Her BMI was 13,8 kg/m^2. Her mother who weighs 175 pounds and is 64 inches tall, was found to have high cholesterol and Type II diabetes associated with moderate obesity. Her father is a 70-inch tall competitive runner, who describes himself as a fitness fanatic.

Mandy's friends all weigh 10 pounds more than her and are taller than her. Final adult height can be affected by many factors, including nutrition, illness and genetic potential. Her genetic potential with respect to height can be estimated from her ***mid-parental height.***

Formula used to determine a person's mid-parental height:

$$\textbf{Mid-parental height} = \frac{\textbf{Father's height} + \textbf{Mother's height} - 5}{2}$$

$$\textbf{BMI} = \frac{\textbf{Weight in kg}}{(\textbf{Height in m})^2} \qquad \textbf{1 cm = 0,3937 inches}$$

ANNEXURE C1 contains the Growth Chart for girls aged 2 to 20 years comparing **height and age**.

ANNEXURE C2 contains the Growth Chart for girls aged 2 to 20 years comparing **BMI and age**.

Use the information above and ANNEXURES C1 and C2 to answer the questions that follow.

4.2.1 (a) Write down the percentile in which Mandy's current weight and height falls. (2)

(b) Determine Mandy's mid-parental height in metres. (4)

4.2.2 If Mandy was to continue to grow along the 25th percentile,

(a) write down her possible final adult height in cm and her final adult weight in pounds. (2)

(b) Hence, calculate Mandy's BMI in kg/m. (4)

4.2.3 Identify TWO possible reasons why Mandy has not yet grown as expected. (2)

4.3 Below is a description of a survey. The sample described below is not representative.

"A survey was conducted to determine the attitude of teenagers towards smoking. All schools within a 20 km radius from Green Point Mall, in the centre of Cape Town, were visited."

Use the information above to answer the following questions.

4.3.1 Explain why this is not a representative sample. (2)

4.3.2 Describe a method of conducting this survey which will result in a representative sample. (2)

[42]

TOTAL: 150

END

ANSWER SHEET

QUESTION 1.1.3

NAME: _____

