basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P1

FEBRUARY/MARCH 2018

MARKS: 150

TIME: 3 hours

This question paper consists of 13 pages and an addendum with 3 annexures (4 pages).

INSTRUCTIONS AND INFORMATION

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

2. Use the ANNEXURES in the ADDENDUM to answer the following questions:

   - ANNEXURE A for QUESTION 3.1
   - ANNEXURE B for QUESTION 4.1
   - ANNEXURE C for QUESTION 4.2

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

4. Start EACH question on a NEW page.

5. You may use an approved calculator (non-programmable and non-graphical), 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. Maps and diagrams are NOT necessarily drawn to scale, unless stated otherwise.

10. Write neatly and legibly.

QUESTION 1

1.1 A furniture store offers a dining-room suite for sale. It should be paid off in 42 equal monthly instalments of R1 078,26 (14% VAT included). No deposit is required for this offer.

[Source: www.rochester.co.za]

1.1.1 Express (in years) the total repayment period for this offer. (2)

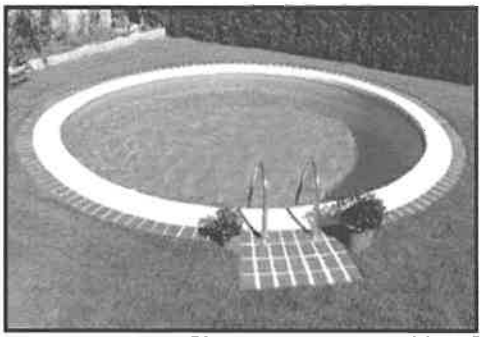
1.1.2 Determine the total repayment cost for this dining room suite. (2)

1.1.3 The advertised price for this dining room suite is R29 999,00. The store offers 15% discount on the advertised price if the purchase is settled immediately in ONE payment.

Calculate the value of the discount amount offered. (2)

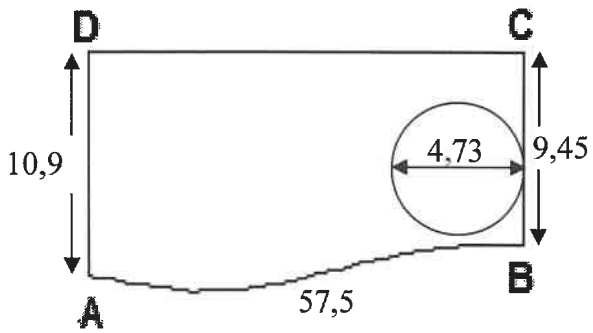
1.2 The photograph and sketch below show a circular swimming pool in a portion of Annette's garden.

CIRCULAR SWIMMING POOL



[Source: www.megaide.se]

SKETCH OF THE SWIMMING POOL IN THE GARDEN WITH DIMENSIONS (in metres)



NOTE: The curved distance for AB is 57,5 m.

1.2.1 Give, in simplified form, the ratio of distance **AD** to distance **CB**. (2)

1.2.2 The perimeter of **ABCD** is 125,92 m.

Calculate the distance **CD**. (2)

1.2.3 Write down the length of the radius of the pool. (2)

1.2.4 A fence will be erected along the curved side **AB** at a cost of R97,56 per running metre.

Calculate the total cost of erecting the fence. (2)

1.3 TABLE 1 below shows the weather forecast with maximum and minimum temperatures for three cities for 29 April 2017.

TABLE 1: WEATHER FORECAST WITH MAXIMUM AND MINIMUM TEMPERATURES OF THREE CITIES FOR 29 APRIL 2017

	TEMPERATURE IN °C (Celsius)		WEATHER FORECAST	
CITY	**MAXIMUM**	**MINIMUM**	**SUN AND CLOUD COVER**	**% CHANCE OF RAIN**
A	24	6		59
B	32	26		0
C	8	– 7		3

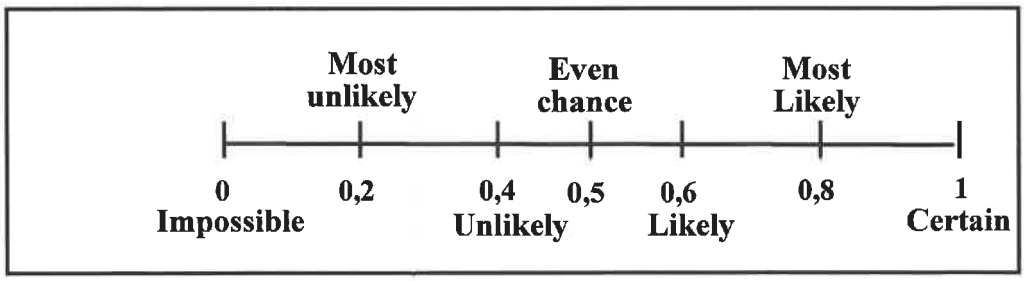
[Adapted from AccuWeather.com]

Use TABLE 1 above to answer the questions that follow.

1.3.1 Identify the city with the lowest temperature. (2)

1.3.2 Calculate the temperature range for City **C**. (2)

1.3.3 A probability scale in words and as decimal fractions is given below.



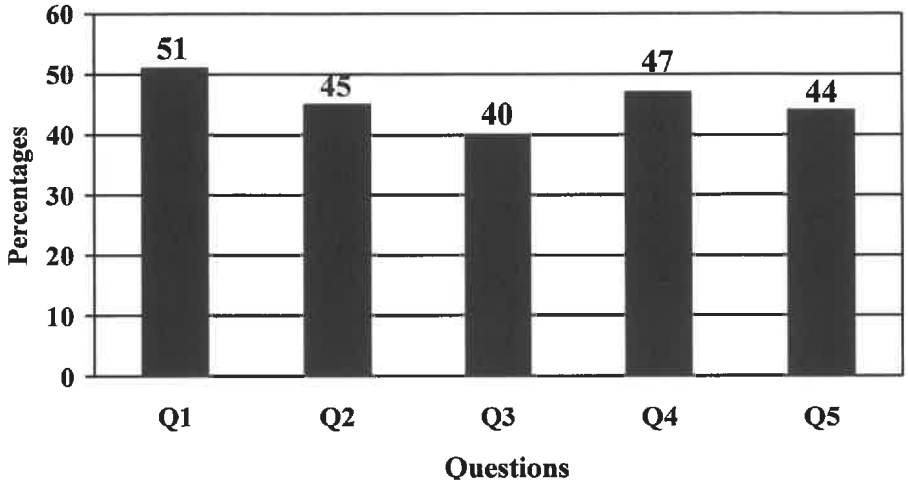
Use the probability scale and TABLE 1 above to answer the questions that follow.

(a) Identify the city that has NO chance of rain. (2)

(b) Write down, in words, the chance of rain for City **A**. (2)

1.4 361 948 candidates wrote Mathematical Literacy Paper 1 in 2016. The paper had a total of 150 marks and candidates had three hours to complete the paper. The graph below shows the average percentage mark per question for this paper.

AVERAGE PERCENTAGE MARK PER QUESTION FOR MATHEMATICAL LITERACY PAPER 1



[Source: *2016 NSC Examination Diagnostic Report*]

Use the information and the graph above to answer the questions that follow.

1.4.1 Name the type of graph used to represent the data. (2)

1.4.2 Express the number of candidates who wrote this paper in words. (2)

1.4.3 Identify the question in which the candidates obtained the second lowest average percentage mark. (2)

1.4.4 Determine (in minutes) the average time per mark required for this paper. (2)
[30]

QUESTION 2

2.1 Mapotjo contributes a regular monthly amount from her salary towards a retirement annuity. This amount is deducted from her salary through a stop order on the 15th day of each month.

Below is a summary of the statement of her retirement annuity, as on 10 May 2017.

Policy number	0097541
Maturity date	1 November 2029
Monthly contribution	R740,22
Payment frequency	Monthly
Current death value	R189 817,05
Retirement value – Lower inflation rate	R536 523,25
Retirement value – Higher inflation rate	R940 465,89

[Source: www.my portfolio. co.za]

Use the information above to answer the questions that follow.

2.1.1 Define the concept *stop order*. (2)

2.1.2 Calculate the difference between the TWO retirement values. (2)

2.1.3 Determine the number of monthly contributions that still need to be paid by Mapotjo before the policy matures. (4)

2.1.4 Determine the total value of the contributions over five years if her monthly contribution remains the same. (3)

2.1.5 Fill in the missing word(s) to make the following statement TRUE.

An annual increase in the monthly contribution would result in … maturity value. (2)

2.1.6 Show that if her monthly contribution increased by 8,5%, then the new monthly deduction from her salary would be R803,14. (2)

2.2 Zoom Car Wash employs a supervisor, eight general cleaners and a machine operator. The cleaners work for seven days a week, where Monday to Saturday is regarded as normal working hours.

TABLE 2 below shows the hourly wage rate for EACH of the worker groups for 2016 and 2017.

TABLE 2: ZOOM CAR WASH NORMAL HOURLY WAGE RATE (IN RAND PER HOUR) FOR 2016 AND 2017

WORKER GROUP	2016	2017
Supervisor	**A**	21,93
General cleaners	16,40	17,76
Machine operator	17,90	19,39

[Adapted from Mywage.co.za]

NOTE:

- Normal working hours: 08:30 to 17:30
- Overtime is paid at time and a third of the normal hourly rate.
- The Sunday wage rate is 150% of the normal hourly rate.

Use TABLE 2 above to answer the questions that follow.

2.2.1 Calculate the 2017 overtime hourly rate for a general cleaner. (2)

2.2.2 Determine the total wage a machine operator would earn for working only THREE Sundays. (5)

2.2.3 All the workers received a wage increase at the beginning of 2017.

(a) Show, by calculation, that the wage increase was 8,3%. (2)

(b) Calculate the missing value **A**. (3)

2.2.4 A general cleaner worked normal working hours for a full week.

Calculate his total weekly wage. (3)

2.3 TABLE 3 below shows the record of the vehicles washed on a particular day.

TABLE 3: RECORD OF VEHICLES WASHED ON A PARTICULAR DAY

CATEGORY	NUMBER	COST PER VEHICLE
Bakkies	7	R70
Cars	35	R50
Minibus	4	R75

Calculate the total income received for the vehicles washed on this particular day. (4)

2.4 The supervisor at Zoom Car Wash has to report for duty 30 minutes earlier than the normal starting time, from Monday to Saturday but leaves work at the same time as the other workers. He receives a monthly salary, works every Sunday and is paid overtime.

TABLE 4 below shows a monthly salary slip (some data omitted) for the supervisor.

TABLE 4: MONTHLY SALARY SLIP FOR THE SUPERVISOR

SALARY SLIP			
Name of employer	Zoom Car Wash		
Address	12 Stateway Welkom, 9460		
Name of employee	M Ncubuka		
ID No.: 890106 5387 000	Employee No.: 124567		
Position	Supervisor		
Payment period: 1 November 2017 to 30 November 2017			
	RATE	**TOTAL HOURS (hrs × days × weeks)**	**AMOUNT IN RAND**
Normal hours worked	21,93	…	**B**
Sunday hours (1,5 normal rate)	32,90	9 × 1 × 4	1 184,40
Overtime hours worked/ ($1\frac{1}{3}$ of normal rate)	…	0,5 × 6 × 4	350,88
TOTAL Gross Salary			6 272,16
UIF (1% of gross salary)			…
Net salary			**6 209,44**

[Source: www.zoomhandcarwash.com]

NOTE: Employer and employee each contribute a monthly amount of 1% of the employee's gross salary for UIF.

Use TABLE 4 above to answer the questions that follow.

2.4.1 Explain the term *employer*. (2)

2.4.2 State ONE benefit of contributing towards the UIF. (2)

2.4.3 Calculate:

(a) The value of **B** (3)

(b) The total UIF amount that must be paid on behalf of M Ncubuka to the Department of Labour (3)

[44]

QUESTION 3

3.1 A nurse from Port Allen Clinic conducts road shows to demonstrate the use of growth charts to parents. She uses a weight-for-age chart for boys as on ANNEXURE A, which shows the recorded measurements of a boy for three visits.

Use ANNEXURE A to answer the questions that follow.

3.1.1 Identify the age group represented on this chart. (2)

3.1.2 Give the boy's weight at his first visit. (2)

3.1.3 Determine the boy's age (in months) during a visit when he weighed a little less than 9 kg. (2)

3.1.4 The boy's first visit was in May.

Determine the month in which the third visit took place. (2)

3.1.5 During the fourth visit, the boy weighed 11,2 kg and his body mass index (BMI) was calculated as 19,5 kg/m^2.

Calculate the boy's corresponding height (in metres) rounded off to THREE decimal places.

You may use the following formula: $\textbf{BMI} = \dfrac{\textbf{weight (in kg)}}{\textbf{(height in m)}^2}$ (4)

3.2 The nurse uses a sedan vehicle to travel. The fuel consumption of her vehicle is 7,6 litres per 100 km travelling at an average speed.

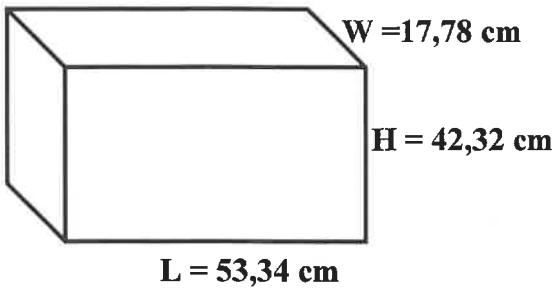
[Adapted from m.automobilio.info]

3.2.1 Calculate (to the nearest km) the distance her vehicle can travel using 55 litres of petrol. (3)

3.2.2 The nurse spends 1 hour and 45 minutes on a particular day driving between two workstations that are 189 km apart. Determine the average speed of the vehicle.

You may use the following formula: $\textbf{Average speed} = \dfrac{\textbf{distance}}{\textbf{time}}$ (3)

3.3 The dimensions (in centimetres) of a nurse's rectangular medicine box are given below.

RECTANGULAR MEDICINE BOX	DIMENSIONS OF THE MEDICINE BOX WITHOUT THE HANDLE
 [Source: Amazon.co.uk]	 **L** = length **W** = width **H** = height **NOTE:** 1 litre = 1 000 cm^3

3.3.1 Calculate the volume (to the nearest litre) of ONE medicine box excluding the handle.

You may use the following formula:

Volume = length × width × height (4)

3.3.2 The medicine box contains FOUR identical smaller boxes. EACH small box contains four different types of pills in cylindrical containers which are labelled **A**, **B**, **K** and **U**, as shown below.

[Source: Forgetting The Pill.com]

Determine (as a decimal fraction) the probability of randomly selecting a type **U** container from the medicine box. (3)

[25]

QUESTION 4

4.1 Rammone plans to travel from Colesberg to Port Elizabeth using only national roads.

ANNEXURE B shows a strip chart of the route from Colesberg to Port Elizabeth.

Use ANNEXURE B to answer the questions that follow.

4.1.1 Name the national roads that Rammone will use to travel to Port Elizabeth. (2)

4.1.2 Which national park is furthest from the N10? (2)

4.1.3 Rammone met a friend in Paterson who had to travel 61 km via the R336 from his hometown.

Name the friend's hometown. (2)

4.1.4 Calculate the travel distance between the TWO national parks. (3)

4.2 Rammone visited Port Elizabeth to check on the progress made on the house being built for his parents.

ANNEXURE C shows the floor plan of the house.

Use ANNEXURE C to answer the questions that follow.

4.2.1 Give (in mm) the external length of the wall that makes the area of Bedroom 1 larger than Bedroom 2. (2)

4.2.2 Determine (in m) the total external length of the western wall of the house. (2)

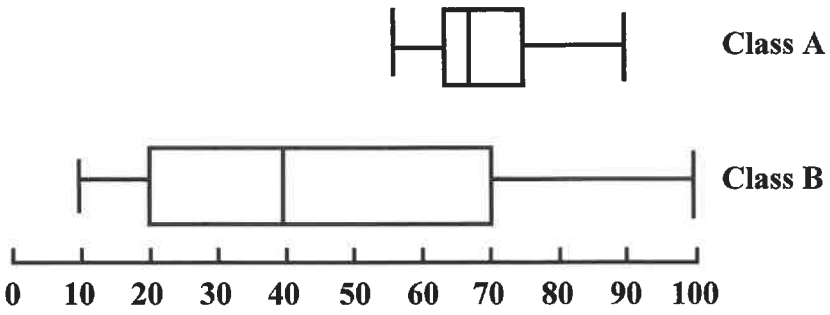
4.2.3 Name the room(s) that has more than ONE entrance. (2)

4.2.4 Identify the room that has the same floor area as the living room. (2)

4.2.5 Which bathroom fixture is NOT shown on the floor plan? (2)
[19]

QUESTION 5

5.1 The two box-and-whisker plots below represent the percentage marks achieved by two Grade 12 classes. Each class consists of 26 learners.



The percentage marks for **Class A**, arranged in order, are given below:

F	58	60	62	62	63	65	65	66
66	66	66	67	69	70	71	73	73
75	75	75	**H**	80	83	85	90	

[SASAMS database]

NOTE:

- **F** is the lowest percentage mark
- **H** is a percentage mark between 75 and 80

5.1.1 Which ONE of the following terms best describes the data above:

- Categorical
- Numerical
- Qualitative (2)

5.1.2 Determine the percentage of data values that lies between the upper and lower quartiles. (2)

5.1.3 The range of Class A is 34.

Calculate the value of **F**. (3)

5.1.4 Calculate the median percentage mark for Class A. (2)

5.1.5 Determine the inter quartile range for Class B. (3)

5.1.6 Give the modal percentage mark for Class A. (2)

5.1.7 Calculate the missing value **H** if the mean percentage mark for Class A is 70%. (3)

5.1.8 Determine (as a simplified common fraction) the probability of randomly selecting a learner from Class A who obtained a percentage mark different from any other learner in the class. (3)

5.2 A survey on the distribution of literacy levels among adults aged 35 to 64 was conducted in all provinces in South Africa.

TABLE 5 below shows the 2016 adult (aged 35 to 64) literacy levels per province.

TABLE 5: 2016 ADULT (AGED 35 TO 64) LITERACY LEVELS PER PROVINCE

PROVINCE	LITERACY LEVELS				TOTAL
	NON-LITERATE		LITERATE		
	Number	%	Number	%	
Western Cape	288 918	14,1	1 762 494	85,9	**2 051 412**
Eastern Cape	393 954	26,0	1 120 567	74,0	**1 514 521**
Northern Cape	94 552	27,9	244 282	72,1	**338 834**
Free State	192 933	24,1	609 029	75,9	**801 962**
KwaZulu-Natal	650 033	24,9	1 956 497	75,1	**2 606 530**
North West	299 994	28,3	760 068	71,7	**1 060 062**
Gauteng	575 371	12,5	4 013 463	87,5	**4 588 834**
Mpumalanga	312 273	28,5	784 347	71,5	**1 096 620**
Limpopo	372 090	28,7	922 171	71,3	**1 294 261**
TOTAL	**Q**		**12 172 918**		**15 353 036**

[Adapted from Community Survey, 2016]

NOTE: Some data has been omitted.

Use TABLE 5 above to answer the questions that follow.

5.2.1 Calculate the missing value **Q**. (2)

5.2.2 Determine the percentage of literate adults in South Africa. (3)

5.2.3 Express (as a unit ratio) the number of non-literate adults to the number of literate adults in KwaZulu-Natal. (3)

5.2.4 Arrange the number of literate adults per province in ascending order. (2)

5.2.5 Determine the province with the smallest difference between the number of literate and the number of non-literate adults. (2)

[32]

TOTAL: 150