basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

MATHEMATICAL LITERACY P2

NOVEMBER 2018

MARKS: 150

TIME: 3 hours

This question paper consists of 10 pages, an addendum with 4 annexures
and 1 answer sheet.

INSTRUCTIONS AND INFORMATION

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

2.   2.1   Use the ANNEXURES in the ADDENDUM to answer the following questions:

        • ANNEXURE A for QUESTION 1.2
        • ANNEXURE B for QUESTION 2.1
        • ANNEXURE C for QUESTION 3.1
        • ANNEXURE D for QUESTION 4.1

        2.2   Answer QUESTION 2.1.5 on the ANSWER SHEET attached. Write your centre number and examination number in the spaces on the ANSWER SHEET. Hand in the ANSWER SHEET with your ANSWER BOOK.

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 drawn to scale, unless stated otherwise.

10.   Write neatly and legibly.

QUESTION 1

1.1 Mapotjo plans to purchase a bakkie (motor vehicle). She received the following quotation from a car dealer on 28 February 2018:

Extract of a quotation for a bakkie from a dealer:

	Rand (R)
Selling price (excluding VAT) without accessories (extras)	160 087,72
Discount	6 140,00
ACCESSORIES (EXTRAS)	
Smash-and-grab film	3 500,00
Door protector	3 500,00
OTHER CHARGES	
On-road charges	4 298,25
Transaction fee	1 315,79
SUBTOTAL	**166 561,76**
VALUE-ADDED TAX	**14%**
TOTAL DUE	**189 880,41**

[Source: Group 1 Nissan and The Glen]

Use the information above to answer the questions that follow.

1.1.1 Calculate (rounded off to ONE decimal place) the percentage discount given on the bakkie's selling price, excluding VAT. (3)

1.1.2 Show how the amount of R166 561,76 was calculated. (3)

1.1.3 Give ONE reason why customers would prefer to install the accessories (extras), as shown in the quotation. (2)

1.1.4 Mapotjo has an investment of R1,25 million. The money was invested as follows:

- Twenty-seven (27) months investment period
- 6% interest per annum, compounded annually

Show whether the interest earned on this investment is sufficient to cover the total purchase price of R189 880,41. (9)

1.1.5 VAT in South Africa increased to 15% with effect from 1 April 2018.

The following shows how the dealer calculated the new increased VAT incorrectly:

Selling price, including 14% VAT = R160 087,72 + 14% of R160 087,72
= R160 087,72 + R22 412,28
= R182 500

VAT increased with 1%.

New selling price, including 15% VAT = R182 500 + R182 500 × 1%
= R182 500 + R1 825
= R184 325

Identify the mistake the dealer has made in calculating the new selling price. Hence, calculate the new selling price, including 15% VAT (excluding accessories and other charges). (4)

1.2 After Mapotjo had purchased the bakkie, she decided to paint the cargo bin (loading box) of her bakkie with rubberising paint. The spread rate of the paint is 0,25 m²/ℓ. The rubberising paint is sold in 5 ℓ tins.

A photograph of the cargo bin of a bakkie and a simplified model of the cargo bin with dimensions are given in ANNEXURE A.

NOTE: Rubberising paint – a special paint used to coat the surface of a cargo bin

Use the information above and ANNEXURE A to answer the questions that follow.

1.2.1 The cargo bin does not have a flat surface area and therefore the surface area must be increased by 2% to accommodate the uneven surface area.

(a) Calculate how many litres of rubberising paint Mapotjo needs to purchase in order to rubberise the cargo bin of her bakkie.

You may use the formula:

Surface area of an open box
= Width × length + 2(length × height + width × height) (8)

(b) Calculate the cost of applying TWO coats of rubberising paint (excluding labour) if a 5 ℓ tin costs R549, including VAT. (3)

1.2.2 Explain the significance of applying rubberising paint to the cargo bin of a bakkie. (2)

1.3 It takes 20 minutes to apply a layer of rubberising paint. There is a 4-hour waiting period before the second coat of rubberising paint can be applied. In addition, a further drying time of 2 hours is required after the second coat has been applied.

Determine, with calculations, at what time the bakkie would be ready if the workshop started rubberising the cargo bin at 08:15. (4)

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QUESTION 2

2.1 | TABLE 1 in ANNEXURE B shows data relating to the import of personal care and cosmetic products in Australia for the period 2013 to 2015. |

Use the information in ANNEXURE B to answer the questions that follow.

2.1.1   Determine:

(a)   Missing value **A** (rounded off to a whole percentage) using the following formula:

$$\% \text{ change (A)} = \frac{2015 \text{ imports} - 2013 \text{ imports}}{2013 \text{ imports}} \times 100\%$$

(4)

(b)   The median of the percentage change for the period 2013 to 2015.   (3)

2.1.2   Describe the trend in the imports of make-up and skincare products.   (2)

2.1.3   The negative value of the percentage change does not necessarily imply that the import value of the products decreased continuously over the three-year period.

Name TWO different products in TABLE 1 and explain how they support the statement above.   (4)

2.1.4   State, with a reason, whether the data in TABLE 1 can be represented using a single pie chart.   (2)

2.1.5   A line graph showing the % share of 2015 imports for the first eight products in TABLE 1 has been drawn on the ANSWER SHEET.

On the same grid, draw another line graph representing the percentage change for the period 2013 to 2015 for the same eight products.   (6)

2.2 | Nomsa plans to visit Los Angeles for an educational conference. She will be travelling from her hotel to the conference venue with an Uber taxi.

An Uber taxi is operated using two options, as shown below.

Option 1: UPFRONT fare
        = base fare (call-out fee) + (number of miles × per mile fare)

Option 2: POST-TRIP fare
        = (number of minutes × per minute fare) + (number of miles × per mile fare)

TABLE 2 below shows the different Uber taxis and their respective rates in Los Angeles for both UPFRONT and POST-TRIP fare options, including an example of a 10-mile trip using the UPFRONT fare option.

TABLE 2:   RATES FOR UBER TAXIS IN LOS ANGELES FOR UPFRONT AND POST-TRIP FARE OPTIONS

COST	UberX	UberBLACK	UberLUX
Base fare (call-out fee)	$0,00	$ 8,00	$20,00
Per minute fare	$0,15	$ 0,45	$ 0,60
Per mile fare	$0,90	$ 3,55	$ 5,00
*Minimum fare	$4,65	$15,00	$30,00
Cancellation fee	$5,00	$10,00	$10,00
Total fare (for a 10-mile trip using the UPFRONT option)	**$9,00**	**$43,50**	**B**

[Adapted from www.uber.com, March 2016]

*Minimum fare: the lowest fare one would be charged per trip

Use the information above to answer the questions that follow.

2.2.1   Calculate the missing value **B**.   (3)

2.2.2   Calculate (rounded off to the nearest mile) the maximum distance for which a person can use the UberX taxi if you pay the minimum upfront fare.   (4)

2.2.3   Nomsa travelled a distance of 29,73 miles with UberBLACK. The post-trip fare option was used and the trip took 1 hour and 9 minutes to complete.

Nomsa stated that she would have saved more than $20,00 if she had used the upfront fare option.

Show, with calculations, whether her statement is correct.   (8)

2.2.4   Explain the importance of a cancellation fee for the Uber service provider.   (2)

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QUESTION 3

3.1

FULL MARATHON			
	CUT-OFF 1	**CUT-OFF 2**	**CUT-OFF 3**
Distance from start	25,5 km	31,5 km	Finish line
Time from start	4 hours 15 min	5 hours 15 min	7 hours

The Big Five Marathon is an annual event in South Africa. It can be run as a full 42 km marathon or as a half-marathon of 21 km.

The race has specific cut-off times (certain compulsory distances to be covered within specific times). Runners who do not meet the cut-off times are forced to withdraw from the race.

Below are the cut-off times for the full marathon.

[Source: http://aublog.southafrica]

ANNEXURE C contains the Big Five 42 km full marathon map.

Use the information above and ANNEXURE C to answer the questions that follow.

3.1.1   Determine (as a decimal fraction) the probability of a runner of the Big Five marathon route accessing a refreshment station that offers ONLY Coke and water. (3)

3.1.2   Give the general direction in which a marathon runner is heading when passing the 20 km mark. (2)

3.1.3   Consider the heights above sea level for this race.

         (a)   Explain why a runner was CORRECT when he stated that he was running uphill from the start to the 10 km mark. (2)

         (b)   Express, in the form **1 : ...**, the lowest possible height above sea level to the highest height above sea level. (3)

3.1.4   Explain why there are cut-off times for a marathon. (2)

3.1.5   For the half-marathon a runner must cover a distance of 16,5 km in a time of 5 hours from the start of the race to beat the cut-off 2 time for the half-marathon.

A runner of the full marathon compared his speed with the speed of a half-marathon runner and stated that he had to run 2,7 km/h faster in order to beat the cut-off 2 time of the full marathon.

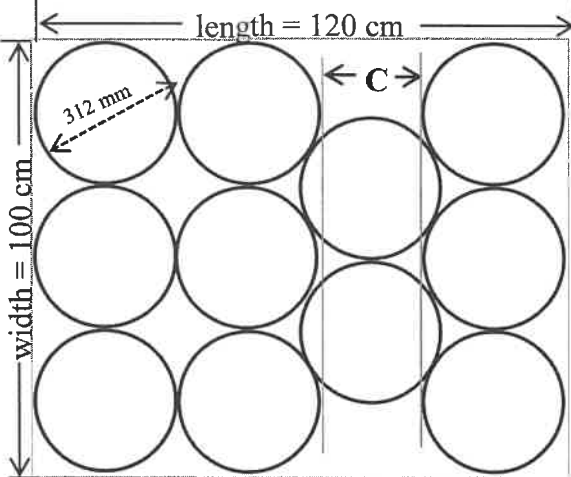Verify, showing ALL calculations, whether he is CORRECT.

You may use the formula:

Distance = speed × time (6)

3.2 | More water must be taken to the refreshment stations. The water will be transported in cylindrical buckets (with lids) with a maximum capacity of 20 litres of water.

The cylindrical buckets, containing water, with lids are shown below.

Picture of a bucket (20 ℓ capacity) with lid	Top view of buckets placed on a solid rectangular pallet
Outside diameter of bucket = 31,2 cm **NOTE: Bucket walls are 2 mm thick.**	

[Source: www.meyaplast.co.uk]

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

3.2.1 Determine the maximum height (in cm) of the water in the bucket if the outside diameter of the bucket is 31,2 cm.

You may use the formula:

Volume of a cylinder = $\pi \times$ (radius)$^2 \times$ height

where $\pi = 3,142$ and 1 ℓ = 1 000 cm^3 (7)

3.2.2 Buckets are placed on the pallet, as shown in the diagram above.

(a) Calculate the unused area (in cm^2) of the rectangular floor of the solid pallet.

You may use the formula:

Area of a circle = $\pi \times$ (radius)^2, where $\pi = 3,142$ (6)

(b) Determine length **C**, as shown in the diagram above. (3)

3.2.3 The organiser would have preferred each pallet to have 12 buckets arranged in three rows of four each, as shown in the diagram alongside.
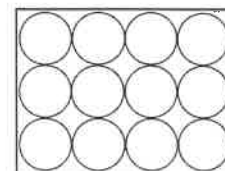
Calculate the percentage by which the length of the pallet should be increased to accommodate this new arrangement. (5)

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QUESTION 4

4.1 | ANNEXURE D shows photographs of the London Eye, which is a *Ferris wheel.
|
| The following information represents features of the Ferris wheel:
|
| • The structure is 443 feet tall.
| • The radius of the wheel is 197 feet.
| • It has 32 capsules that are spaced apart evenly.
| • Each capsule can carry a maximum of 28 passengers.
| • Ticket prices for all capsules are identical.
|
| The following are the ticket prices per person:
|
	TICKET CATEGORY	PRICE
Adults (16+)	£27,00
Children aged 3–15	£22,00
Senior citizens	£25,50
10% discount for tickets bought online	
[Source: www.londoneye.com]
Conversions: 1 pound (£) = R16,58
**   1 metre = 3,28 feet**
*Ferris wheel: a very large upright wheel with capsules on its circumference for people to ride in

Use the information above to answer the questions that follow.

4.1.1   Capsule 24 and capsule 30 have the following number of occupants.

	ADULTS (16+)	CHILDREN AGED 3–15	SENIOR CITIZENS
Capsule 24	18	7	2
Capsule 30	10	1	5

Only 5 adults of the total number of occupants in the table above bought tickets online. A South African tourist at the London Eye remarked that more than R18 400 was spent on these tickets. Verify, with calculations, whether this remark is CORRECT.   (8)

4.1.2   The capsules are mounted on the circumference of the wheel.

(a)   Calculate (in feet) the circumference of the wheel.

You may use the formula:

Circumference = 2 × π × radius, where π = 3,142   (2)

(b)   Hence, calculate the distance (to the nearest metre) on the circumference between any TWO capsules right next to each other.   (3)

4.2 Tourism creates many employment opportunities in the United Kingdom. Tourists are most likely business visitors, holiday visitors or visitors to friends and relatives (VFR).

TABLE 3 below shows information regarding the number of visitors (in thousands) and the reasons for their visits. It also shows the number of employment opportunities for the different tourist regions.

TABLE 3: NUMBER OF VISITORS (IN THOUSANDS) AND THE REASONS FOR VISITS TO DIFFERENT TOURISM REGIONS IN THE UNITED KINGDOM AND EMPLOYMENT OPPORTUNITIES

REGIONS	NUMBER OF VISITORS (IN THOUSANDS) ACCORDING TO REASON FOR VISIT			DIRECT EMPLOYMENT
	HOLIDAY	VFR	BUSINESS	
London	7 575,9	3 556,0	3 092,2	471 928
North East	115,3	175,1	115,3	...
North West	624,0	762,6	531,5	170 113
Yorkshire	273,0	480,5	273,0	119 639
West Midlands	312,6	562,7	609,6	107 230
East Midlands	166,0	405,7	295,0	76 496
East of England	467,0	856,2	447,6	120 343
South West	766,5	806,8	302,6	179 450
South East	1 335,5	1 594,0	1 033,9	226 003
Scotland	1 157,0	600,8	378,3	172 282
Wales	324,5	324,5	87,6	...
TOTAL	13 117,3	10 124,8	7 146,6	...

[Adapted from visitbritain.org/research]

Use the information above to answer the questions that follow.

4.2.1 Calculate the difference between the number of holiday visitors to the North West and the number to the West Midlands. (3)

4.2.2 Determine (as a percentage) the probability of randomly selecting a business visitor to the Midlands from the total business visitors. (4)

4.2.3 A visitor stated that there are more than 3 times more holiday visitors than business visitors to Scotland.

Verify, with a calculation, whether this statement is valid. (3)

4.2.4 Calculate the interquartile range for VFR visitors. (5)

4.2.5 Give ONE other reason, besides employment opportunities, why tourism is important to a country. (2)

4.2.6 The mean direct employment in the United Kingdom is 162 666,5455. The North East employs 30 440 fewer people than Wales. Calculate the direct employment for the North East. (5)

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TOTAL: 150

ANSWER SHEET

QUESTION 2.1.5

CENTRE NUMBER

EXAMINATION NUMBER

Percentage imports and average growth of personal care and cosmetic products in Australia