Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

MATHEMATICAL LITERACY P2

PREPARATORY EXAMINATION

SEPTEMBER 2016

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

MARKS: 150

TIME: 3 Hours

**N.B. This question paper consists of 14 pages, 2 answer sheets and
the addendum with 3 annexures.**

INSTRUCTIONS AND INFORMATION

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

2.   Use ANNEXURES in the addendum and ANSWER SHEETS as follows:

   2.1   Use ANSWER SHEET 1 to answer question 2.1.4.

   2.2   Use ANNEXURE A to answer Question 1.

   2.3   Use ANNEXURE B to answer 2.2.3.

   2.4   Use ANNEXURE C to answer 3.2.

   2.5   Use ANSWER SHEET 2 to answer question 4.2.1, 4.2.2 and 4.2.3.

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

4.   Start **EACH** question on a **NEW** page.

5.   An approved calculator (non-programmable and non-graphical) may be used,
        unless stated otherwise.

6.   **ALL** the calculations must be clearly shown.

7.   **ALL** the final answers must be rounded off to **TWO** decimal places or according
        to the given context, unless stated otherwise.

8.   Units of measurement must be indicated where applicable.

9.   Diagrams are NOT necessarily drawn to scale, unless stated otherwise.

10.   Write neatly and legibly.

QUESTION 1

1.1 Every year Monaco Streets are converted into a Formula 1 racing track as shown on ANNEXURE A.

    1.1.1 The ratio of pit lane distance to home straight (from Anthony Noghes to Saine Devote) distance is 1 : 1,95. Determine the length of pit lane rounded off to the nearest 10m if the home straight is 431m. (3)

    1.1.2 If 1 mile = 1,60934 km, verify the correctness that maximum speed of 282km/h is indeed equivalent to 175mph as indicated in **figure 3**. (2)

    1.1.3 The process of refuelling and changing of **all 4 tyres** (known as pit stops) in Formula 1 racing is breath-taking in its speed and efficiency. The car is guided into its pit by the 'lollypop man. The car is jacked up by 2 men, front and rear, respectively. Three men (mechanics) are involved in changing a **wheel**, one removing and refitting the nut with a high-speed air gun, one is removing the old wheel and one fitting the new one. The car is refuelled by 2 men at a rate of 12 litres per second.

        (a) Determine how many people are physically involved in refuelling and changing of all 4 tyres to a Formula 1 car. (3)

        (b) The record time of pit stops was 1,951 seconds made by Ferrari Team with Fernando Alonso as a driver during Japanese Grand Prix but it was broken in the same year by Mark Webber of Red Bull Team during US Grand Prix. It was reduced by 1,38%. Hence, determine the record time in seconds made by Red Bull team. Round off your answer to 3 decimal places. (2)

1.1.4   The table 1 shows race track corners, distances and speed of Monaco Grand Prix. This race has 78 laps (rounds).

TABLE 1: Average Distance, Speed and Time in Monaco Grand Prix

Corners	Distance (meters)	Speed Km/h	Duration (in seconds)
Anthony to Saint Devone	431	275	5,64
Saint Devone to Beau Rivage	440	112	14,14
Beau Rivage to Casino Square	170	275	A
Casino Squire to Mirabeau	310	166	6,72
Mirabeau to Loewe	210	45	16,80
Loewe to Portier	215	B	6,192
Portier to Tunnel	321	264	49
Tunnel to Nouvelle Chicane	420	282	5,36
Nouvelle Chicane to Tabac	215	224	
Tabac to Piscine	430	170	9,11
Piscine to La Racasse	140	63	
La Racasse to Anthony Noghes	65	88	2,66
LAP TOTAL	**3367**		**85,21**

Adapted from: https://en.wikipedia.wiki./file

Use TABLE 1 to answer the questions that follow:

(a)   Calculating the values of A, and B. Show your calculations.

       You may use the following formula:

   **Speed = Distance (km) ÷ time (hours)**   (5)

( )

(b)   During Monaco Grand Prix Race a certain car had to stop to refuel and change tyres every 30 minutes and it was driven at average times indicated in Table 1. Determine how many times did this car stop during the race.   (4)

1.2   The following scatter plot graph compares the top 7 driver's pole positions and wins which are more 20 times. **Study the graph and answer the** questions that follow:

NOTE: Pole Position is when driver starts race in front of other drivers.

Drivers Code:

1. Allan Prost   4. Sabastien Vettel   7. Fernando Alonso
2. Lewis Hamilton   5. Ayrton Senna
3. Michael Schumacher   6. Nigel Mansel

DRIVER'S POLE POSITIONS AND WINS ABOVE 20 TIMES
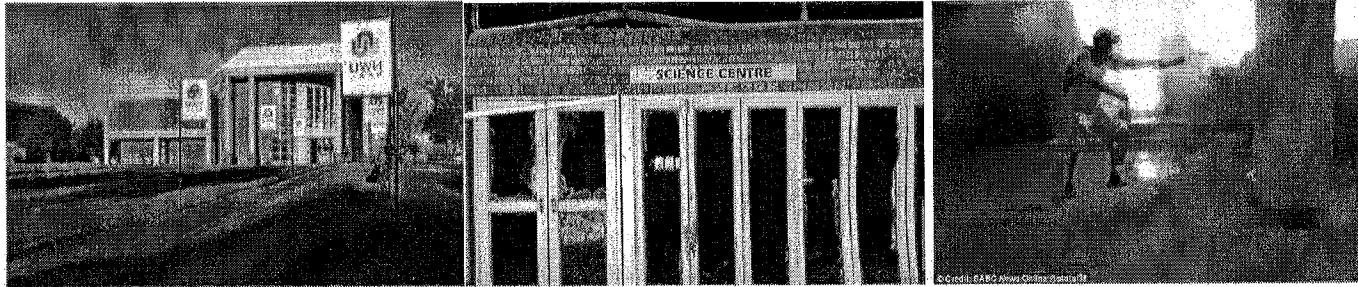

Adapted from: https://en.wikipedia.wiki./file
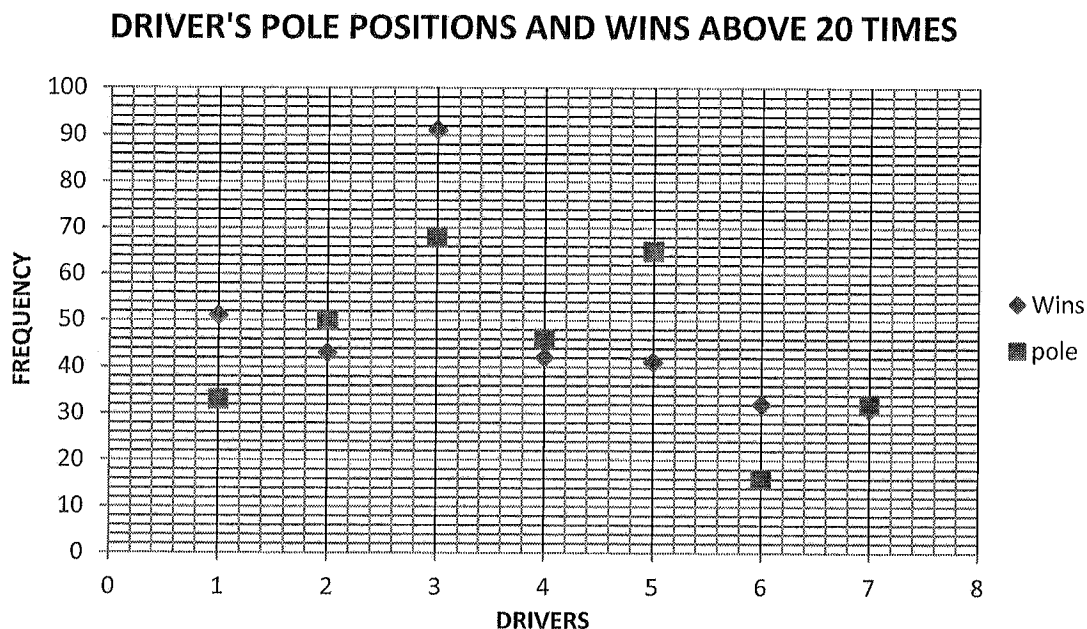
1.2.1   Calculate the number of races won by Michael Schumacher but did not start them on pole position.   (2)

1.2.2   Is there any clear trend shown by this graph? Explain your answer.   (3)

1.2.3   Is it correct to make a conclusion that "the more pole position the driver has, the more wins the driver has"? Justify your answer.   (3)

1.2.4   Provide a possible reason why the graph does not show the wins of Fernando Alonso.   (2)

1.2.5   Is the data provided in this scatter plot discrete or continuous? Justify your answer.   (3)

                                                   [32]

QUESTION 2

2.1

> The University of North West is planning a fundraising campaign to rebuild the damaged science centre.
>
> www. google.co.za/url
>
> The university has posted requests through social networks to former students for donations of R1 000 per student. The university Council has pledged R80 000 a month from its investments. The aim is raise a total of R2,5 million in 2 years. A levy of 25 cents per copy was introduced in the University library.

2.1.1 Suggest TWO possible reasons why the University chose to ask donations from their former students. (4)

2.1.2 Write down a formula that can be used by the university to calculate funds raised through this campaign. (3)

2.1.3 Use your formula to calculate the total amount to be raised after a year, if 150 former student contributed and 620 000 copies were done. (3)

2.1.4 During the first two months, donations were made by only 60 and 20 former students, respectively and the University made its contribution. Copies made were 16 000 and 24 000 in those months. Use Answer Sheet 1 to draw a stacked compound bar graph to display money raised during the **first 2** months. (5)

2.1.5 The money raised was invested in a bank account which offered an interest rate of 6,8% compounding annually. The financial report after first two months showed the balance R298 817.86. Verify, the correctness of this balance. Show your calculations (4)

2.1.6 However, after two months, the bank statement showed a balance of R298 702.86. Provide the possible reason why the balances differ. (2)

2.2   A cycle race was organised from Potchefstroom to Mafikeng to raise more funds.
       The map showing the route is given on ANNEXURE B.

       2.2.1   The first advertisements of this race had road names (R53; R52 and R503)
                and distances as race directions. One of the international cyclists used these
                directions in the advertisement to practice for the race. He claimed that the
                probability of getting lost in the roads in Lichtenburg town is $\frac{5}{6}$ due to so
                many intersections and they are also not clearly demarcated.

                (a)   Explain what does this probability mean. Justify your answer by
                       referring to the map in Annexure B.   (3)

                (b)   As mathematical literacy learner, what additional information
                       could have been included in the **first advertisement** to minimize
                       the problem of taking the wrong route. Justify your answer.   (3)

       2.2.2   Annexure B in the Addendum is the map showing race directions and
                stages given to cyclists.

                (a)   Measure the straight line distance of stage 1 to determine the
                       scale of this map. Round off the answer to the nearest hundred
                       thousand.   (3)

                (b)   Use your scale determined in 2.2.3 (a) to verify the distance of
                       stage 3 and then explain why the distance given on the map differ
                       from your answer.   (4)

                (c)   Suggest and justify the type of a scale that could minimize the
                       above problem.   (3)

       2.2.3   All cyclists were charged an entry fee but interested students were allowed
                to compete in the race free of charge. Free entries were to race in stage 2
                and stage 3 only.

                (a)   Provide 2 possible reasons for the above.   (4)

                (b)   Some professional cyclists criticized the manner in which the
                       stages were set up. Is their criticism justified? Support your
                       answer by referring to the table of stages found in annexure B.   (3)

       2.2.4   Some suggested that the route for this race should have included big
                towns like Klerksdorp. Suggest TWO possible reasons why this town
                was excluded.   (4)
                                                                                                [48]

QUESTION 3

3.1

> The South African U/23 football team has recently attended Rio Olympic Games from 05 to 21 August 2016 in Brazil. The SA team spent only 10 days in Rio. The team had 35 members including 23 players.
>
>
>
> The return plane ticket for each member was R18 250 and the accommodation was R2 400 per person a night (including 2 meals). There was a daily allowance of R300 per person per day. These expenses were paid from a sponsorship of R1,05 million and the grant from the government and SASCOC (The sport's Governing Body).

3.1.1   Calculate how much was the total expenses of the team.   (4)

3.1.2   If the government and SASCOC contributed equally to pay for expenses above the sponsorship amount, determine the contribution made by the government to U/23 team.   (3)

3.1.3   Suggest 2 possible reasons why the government was compelled to make a contribution towards the expenses of the team.   (4)

3.1.4   The quarter of the non-playing members of the team was females. Determine the number of female members.   (3)

3.1.5   The currency is exchanged before you travel to another country. The exchange rates during the Olympic Games were as follows:

Table 2: Exchange rates

Brazil Real	ZAR (South African Rand)
1 Real	R4.14
Brazil Real	Botswana Pula
1 Real	3.01 Pula
Botswana Pula	ZAR (South African Rand)
1 pula	R1.36

Source: www.google.com

Mr Chetty (who went to Olympic Games) claims that it was advantageous to him to exchange his R40 000 to Pula and then to Brazil Real . Verify his claim by comparing R40 000 exchanged directly from ZAR to Brazil Real with the one exchanged from ZAR to Pula and then to Brazil Real. Show your calculations. (7)

3.2   Shopping malls are now found in most of the towns all over the world. On
       ANNEXURE C is layout plan showing the Grand Gateway Mall in Shanghai.

       3.2.1   To which general direction is the shop 440 from 413A?   (2)

       3.2.2   If someone is waiting for the friend in front of shop 413B. The friend
                was coming from the ground floor and can appear from the escalators
                or stairs or lifts. What is the probability that he will come from the stairs?
                Express your answer as a decimal fraction.   (3)

       3.2.3   The friend used the wrong escalators which dropped him next to shop 471.
                Provide a detailed directions of the shortest route from shop 471 to 413B.   (4)
                                                                                    [30]

QUESTION 4

4.1   The Grade 9 Technology teacher teaches her learners a skill of making hats using damaged cardboards from the nearby factory. Figure 4 shows one the hats made.
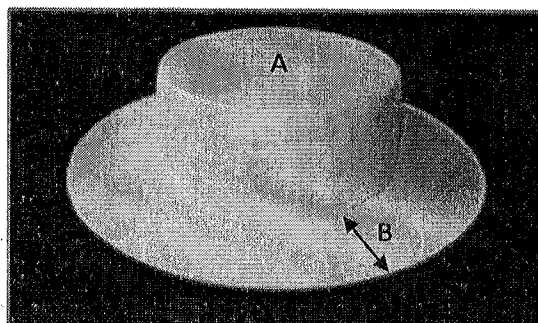
Figure 4: The Hat

4.1.1   Figure 4 indicates the 3 parts of the hat. The dimensions of a medium-size hat are: diameter of Part A is 170mm, the height of Part A is 90mm and width of the brim (Part B) is 75mm.
A mat made of beads is laid on top of the brim (Part B).
A special paint is used to paint the exterior part of Part A.

     (a)   Calculate the area (in cm ^{2}) to be painted by the special paint
            You may use the following formula:

            Surface area of a cylinder $= 2\,\pi \times r^2 + (2\,\pi \times r \times$ height),
            where $\pi = 3{,}142$ (4)

     (b)   Hence, calculate the total area covered by beads, the brim or Part B

            You may use the following formula:

            Area of the circle $= \pi \times$ (radius^2) where $\pi = 3{,}142$ (4)

     (c)   Calculate the total cardboard material (in cm^2) that has been used to make a complete hat.   (5)

     (d)   To ensure that the hat is strong enough to be sold to tourists, the mass of the hat should not be less than 10g. Does the total surface area calculated in 4.1.1 (c) comply with this requirement . Show your calculations to justify your answer.

            N.B. The following conversion scale must be used.

            1m^2 = 160g   (4)

4.1.2 Hats are packed carefully into boxes in the storeroom. They are separated by protective sponges. **N.B.** Sponges have equal width.

Figure 5: The box to store hats (not drawn to scale)
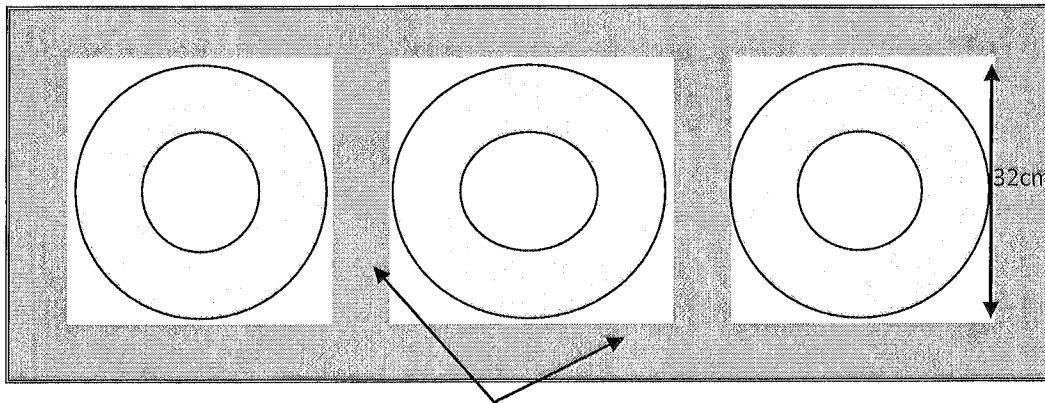
Sponges (40mm wide)

Calculate the floor area of the box to load 3 hats as shown in figure 5.

You may use the following formulae:

Area of rectangle = length × breadth

The following conversions may be useful:

1 cm² = 100 mm² (4)

4.2 The factory that makes cardboards uses Door to Door Courier Service to deliver cardboard boxes. This Courier Service charges R750 per day; R150 for driver per day and R2.50 per km.

4.2.1 On Answer sheet 2, draw a fully labelled line graph to illustrate the delivery cost for an average of 900 km a day. (5)

4.2.2   Step by Step Logistics offered to transport the goods with flat rate of R5.00 per km and 100 km free a day for trips more than 400 km.

       (a)   Draw another line graph on answer sheet 2 to show the delivery costs of Step by Step.   (4)

       (b)   Does the point of intersection of the graphs indicate anything to the factory? Support your answer.   (3)

       (c)   Looking at this graph, suggest a possible decision that could be taken by the factory to reduce transport costs.   (3)

4.2.3   The new manager proposed to the owners to use the factory van since it costs an average of R2 650 a month. Suggest TWO advantages provided by the manager to support his proposal.   (4)

                                                      [40]

TOTAL MARKS: [150]

ANSWER SHEET 1

NAME OF CANDIDATE: _____   GRADE 12: _____

QUESTION 2.1.4

Monthly Investments

Total Amount (R'000)
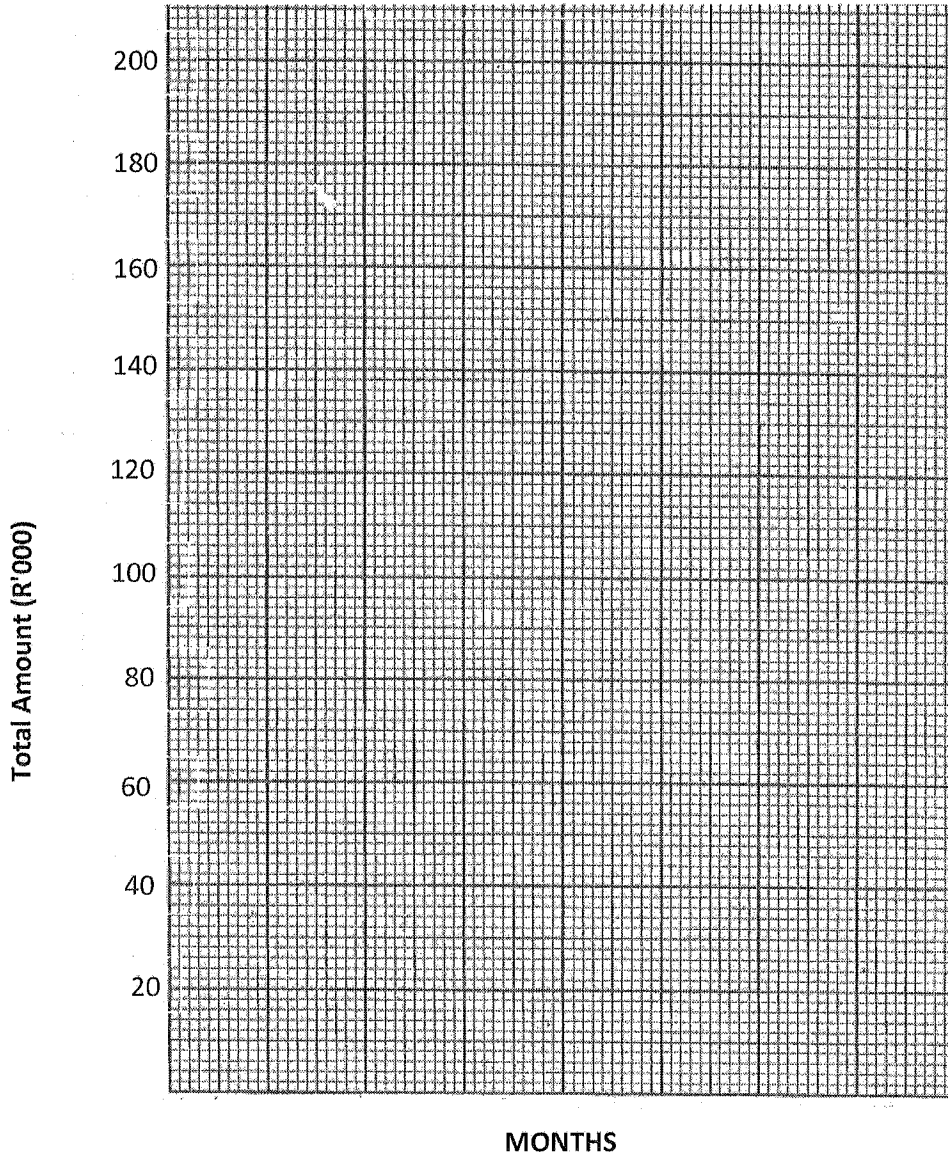
MONTHS
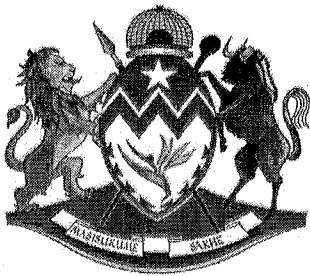
ANSWER SHEET 2

NAME OF CANDIDATE: _____ GRADE 12: _____

QUESTION 4.2.1 , 4.2.2 and 4.2.3
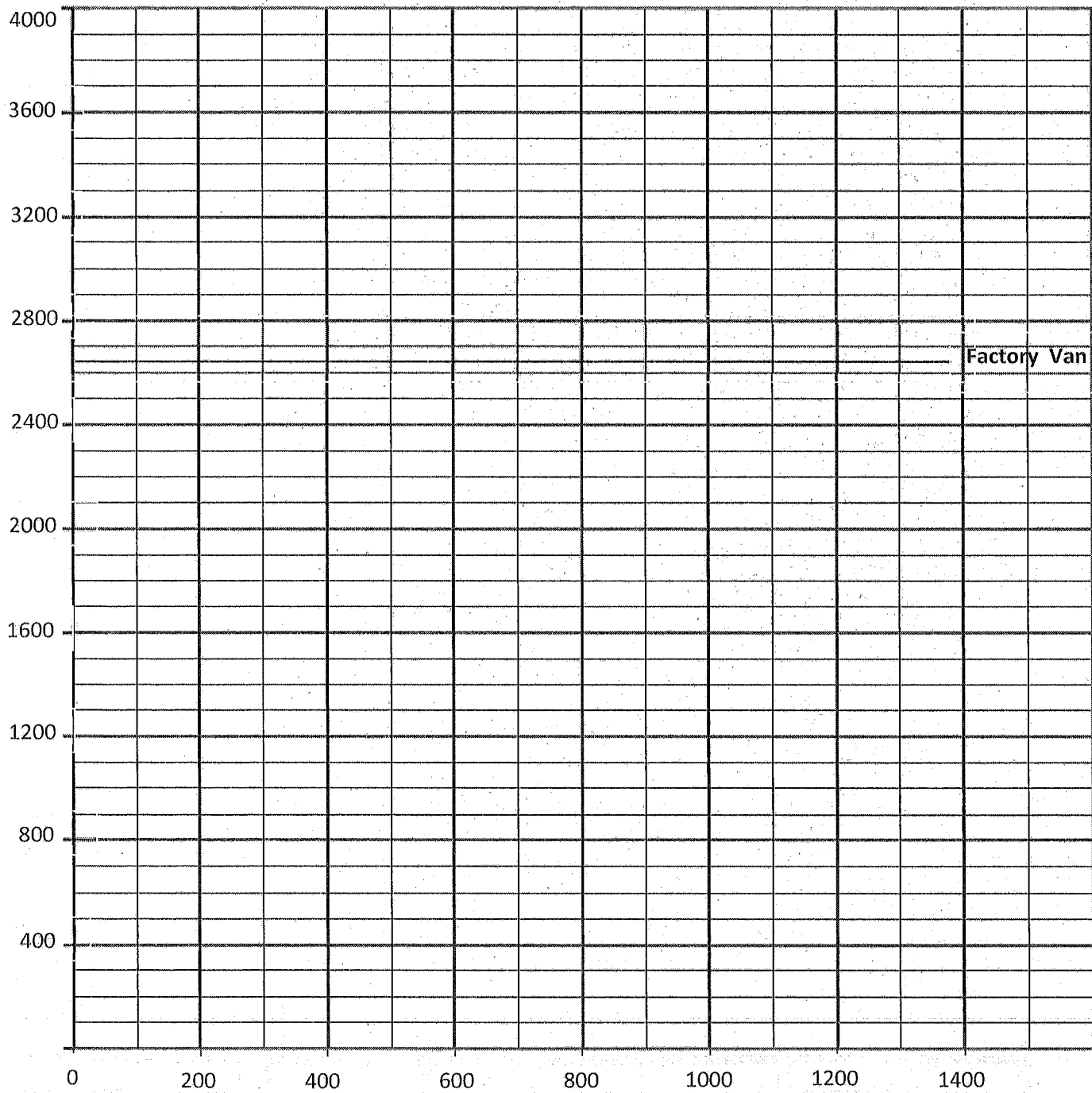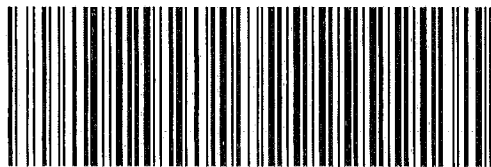
Basic Education

KwaZulu-Natal Department of Basic Education
REPUBLIC OF SOUTH AFRICA

MATHEMATICAL LITERACY P2

ADDENDUM

SEPTEMBER 2016

PREPARATORY EXAMINATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

N.B. This Addendum consists of 4 pages including this page.

ANNEXURE A
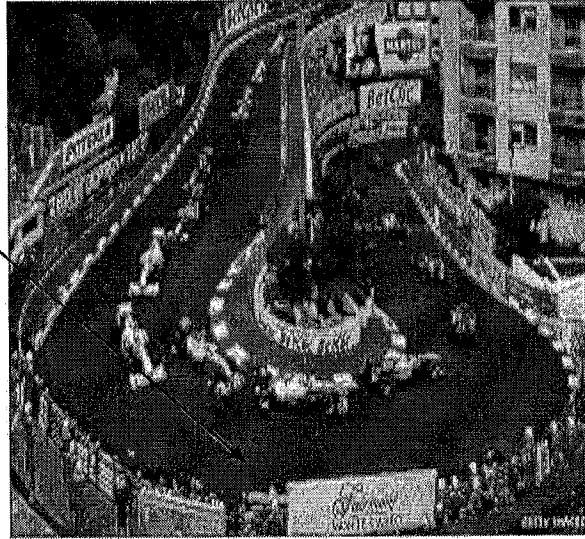
QUESTION 1

MONACO RACING CIRCUIT

Figure 1
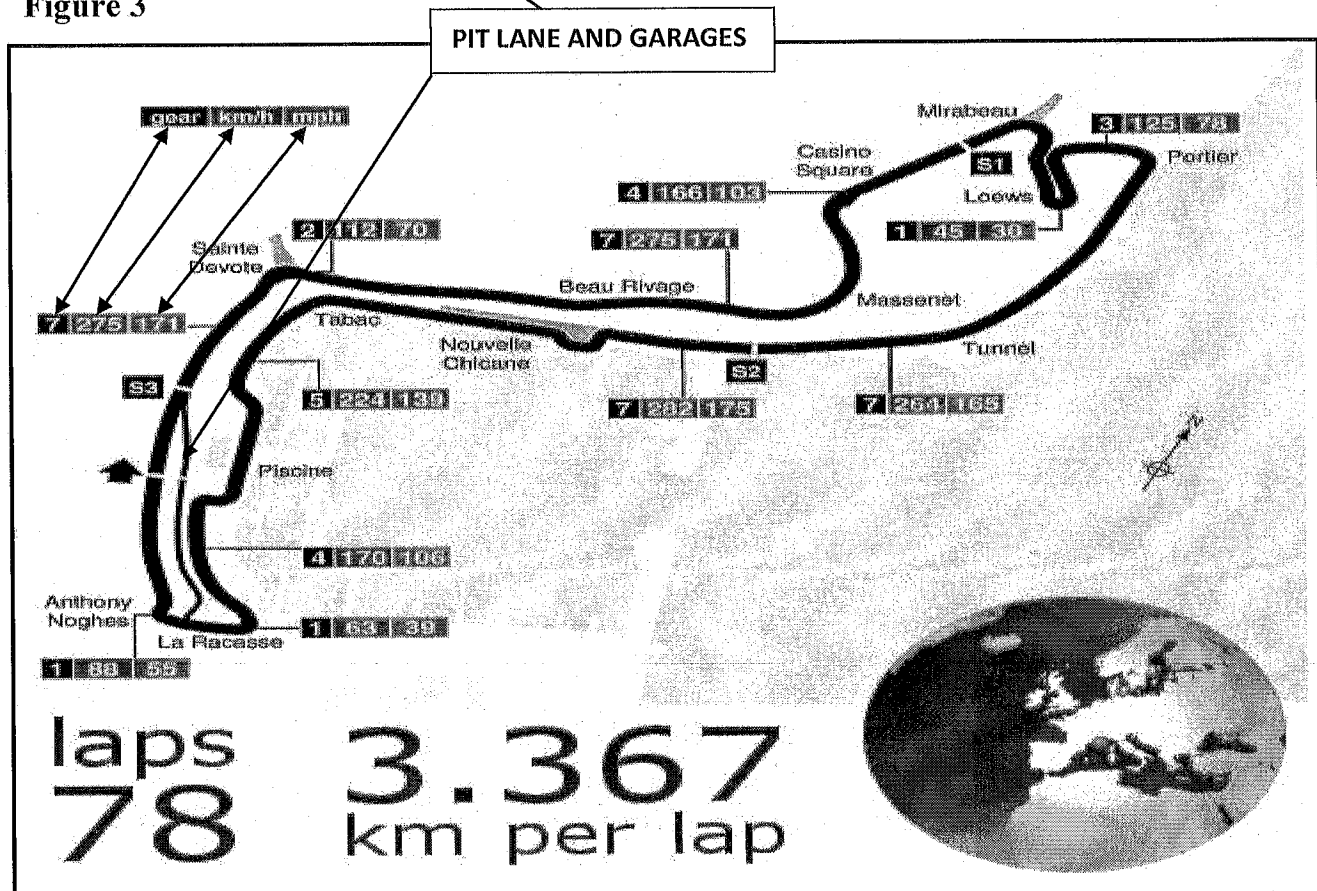
Figure 2

Figure 3
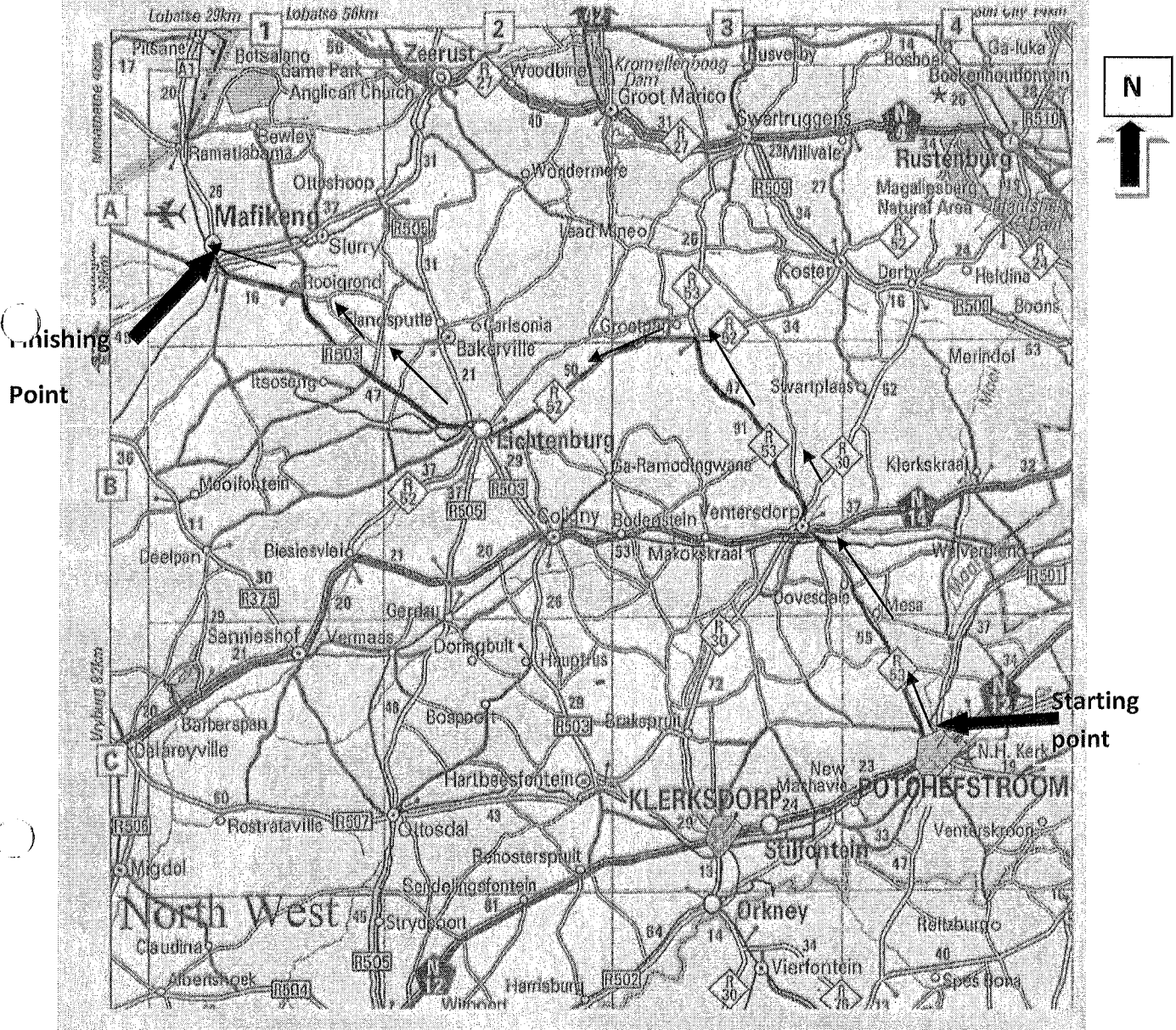
PIT LANE AND GARAGES
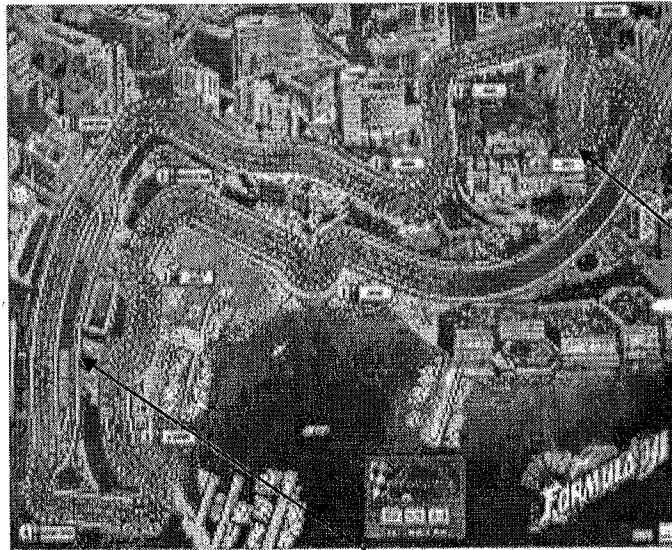
laps
78
3.367
km per lap

Source:www.senategrandprix.com/monaco

ANNEXURE B

QUESTION 2.2.3

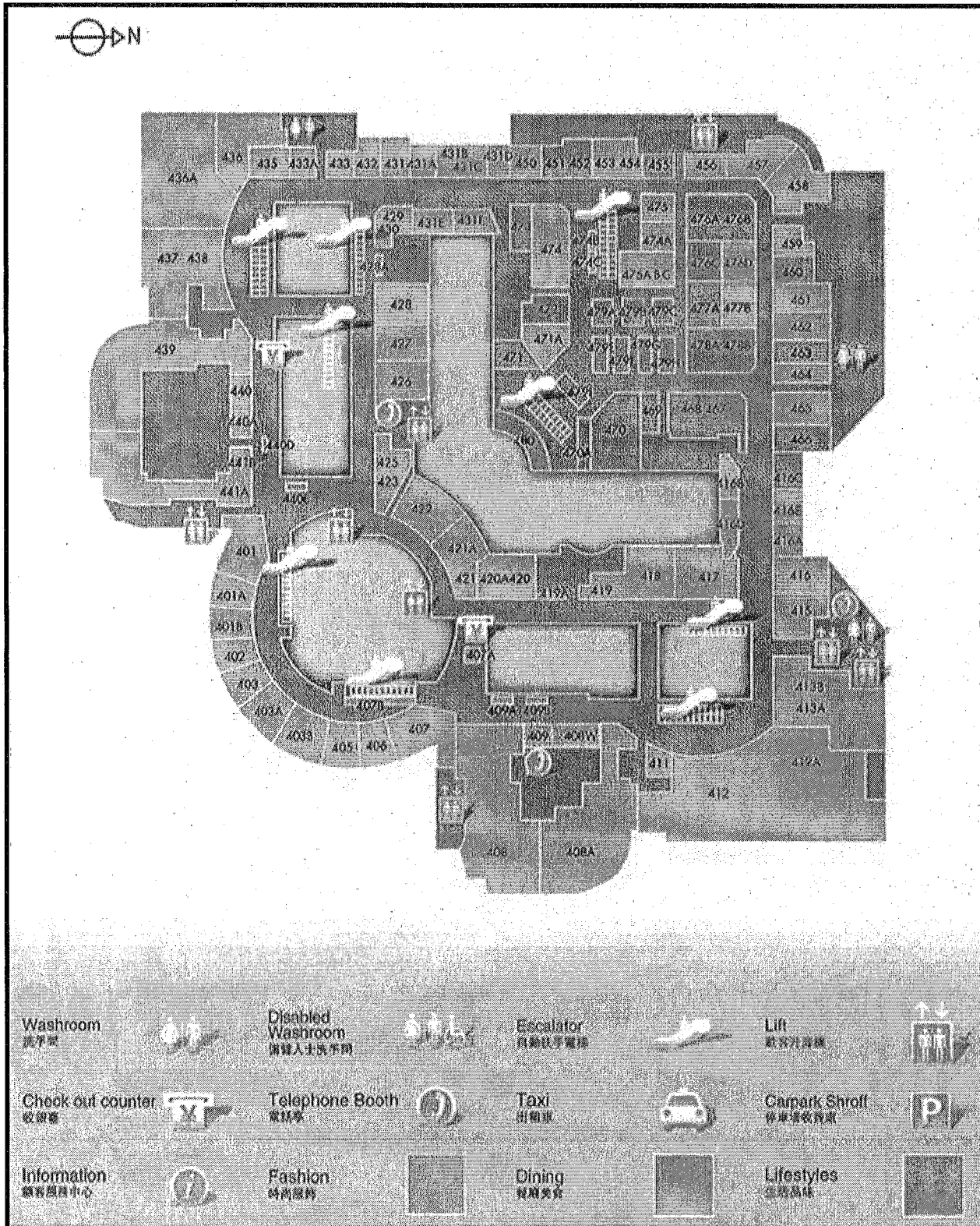Map showing Potchefstroom to Mafikeng cycle racing route

Source: www.google.co.za

STAGES	Starting Point	Finishing Point	DAY	Total Distance (km)
STAGE 1	Potchefstroom	Ventersdorp	1	55
STAGE 2	Ventersdorp	Lichtenburg	2	97
STAGE 3	Lichtenburg	Rooigrond	3	47
SPRINT STAGE	Rooigrond	Mafikeng	3	16

ANNEXURE C

QUESTION 3.2

Source: http:www.tripadvisor.com

MITT & MATH P2.

Education

KwaZulu-Natal Department of Education
REPUBLIC OF SOUTH AFRICA

MATHEMATICAL LITERACY P2

MEMORANDUM

PREPARATORY EXAMINATION

SEPTEMBER 2016

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

MARKS: 150

N.B. This memorandum consists of 13 pages (including ANSWER SHEET 1 and 2)

Please Turn Over

QUESTION 1   [32]

QUESTION	SOLUTION	EXPLANATION	LEVEL
1.1.1	1 : 1,95 Pitlane : 431m $= \dfrac{431}{1,95}$ ✓M $= 221,02$ m ✓S $= 220$ m ✓R	1M Concept of ratio 1S Simplification 1R Rounding **Answer only full marks** (3)	DH L2
1.1.2	1 mile $= 1,60934$km miles $= 282$km Km $= 175,19$ ✓C ≈ 175km Yes it is correct because if you round off 175,19 it gives us 175km ✓ J	1C Conversion 1J Justification (2)	M L3
1.1.3 (a)	Total = 1(Lollypop) + 2 jack men + 3 x 4 ✓M men for tyres + 2 men for petrol ✓M = 17 people✓A	1M multiplying 3 by 4 men 1M Adding people 1A Answer **Answer only full marks** (3)	DH L2
(b)	✓M New Record =1,951sec – 1,38% of 1,951 sec = 1,924seconds ✓A OR New record = 1,951 x 0,9862✓M = 1, 924 sec✓A	1M Deducting a % 1A Answer **Answer only full marks** (2)	M L2

Please Turn Over

1.1.4	(a)	Speed = Distance(km) ÷ time (hours)			M L4
		$A = \dfrac{0.17km}{275km/h}$ ✓S	1S	Change subject of formula	
		= 0,0006181..hours ×3 600 seconds✓C	1C	Conversion to seconds	
		A = 2,23 sec ✓CA	1CA	Time	
		Speed = Distance(km) ÷ time (hours)			
		Speed = $\dfrac{0.215km}{0,00172hours}$ ✓C	1C	Converting to m to km	
		B = 125km ✓A	1A	Distance	
				(5)	
	(b)	Total stops = $\dfrac{85,21 \sec \times 78}{60}$ ✓M	1MA	multiplying by 78 laps	DH L2
		= 110,77minutes ✓C	1C	Converting to minutes	
		∴ stops = $\dfrac{110,77 min s}{30 min s}$ ✓M	1M	Diving by 30mins	
		=3,69			
		= 3 stops ✓CA	1CA	Stops	
				Answer only full marks (4)	
1.2.1		91- 68 ✓M	1M	Subtracting pole positions from no. of wins	DH L2
		= 23✓CA	1CA	Answer	
				Accept 22 to 24	
				(2)	
1.2.2		No clear trend. ✓A	1A	No trend	DH L4
		Some drivers have more pole positions yet they have less wins and vice versa.✓J	2J	Justification	
				(3)	
1.2.3		No ✓A	1A	No	DH L4
		three out of 7 drivers have less poles and more wins. ✓✓J	2 J	Justification	
				(3)	
1.2.4		His wins are equal to his pole positions ✓✓O	2O	Reason (2)	DH L4
1.2.5		Discrete data✓A, because the answer is either win or not and pole position or not. ✓✓J	1A	Discrete	DH L4
		OR	2A	Justification	
		Wins and pole positions will always be whole numbers not decimals ✓✓J		(3)	
				[32]	

QUESTION 2 [48]

2.1.1	• Former students might have a soft spot for the University. ✓✓ O	2O x 2	Reasons	F L4
	• Most students wish to see their former University progressing✓✓ O			
	• Most of them wish to plough back to the University which graduated them			
	OR			
	Any other valid point			
			(4)	
2.1.2	Amount raised = R80 000 × months + R1000 x ✓A number of students + 25c × copies✓ A	3A	Each item	F L2
			(3)	
2.1.3	Total amount raised = R80 000 ×12✓+ R1000 x ✓MA	1MA	Multiplying R80 000 by12	F L2
	150 + R0.25 × 620 000			
	= R960 000 +R150 000 + 155 000✓ S	1S	Simplification	
	= R1 265 000 ✓CA	1CA	Amount	
			(3)	
2.1.4	Answer Sheet 1			F L3
	1A Key/Legend✓ 1A 2 correct bars for 1A stacked compound students✓ graph✓ 1A 2 correct bars for copies✓ 1A 2 correct bars for the university✓			
	If correct bars are not stacked give a maximum of 3			
			(5)	
2.1.5	Bank Balance = **Month 1**			F L3
	= R144 000,00 + (6.8% ÷ 12) ×R144 000,00	1A	Concept of % increase	
	= R144 000,00 + R816,00			
	= R144 816,00✓A			
	Month 2			
	R144 816,00+R106 000,00 (investment)	1M	Concept of compound interest	
	= R250 816,00+ (6.8%÷ 12) ×R250 816,00✓M	1CA	Balance	
	= R250 816,00 +R1 421,29	1CA conclusion		
	=R252 237,29✓CA			
	The balance is not correct. ✓CA		(4)	

2.1.6	The balance brought forward might have not been added. The calculations are wrong✓✓ Or Any other valid point	2 O Opinion (2)	F L4
2.2.1 (a)	✓ A It means 5 out of 6 times the person will take the wrong route. because there are 5 intersections which are not R503 to Mafikeng ✓✓ J	1A concept of probability 2 J Justification (3)	MP L4
2.2.1(b)	✓A Compass directions, so that nobody can take R503 south instead of R503 north✓✓ J **OR** Route map, to show the direction	1A Compass directions 2J Justification (3)	MP L3 L4
2.2.2 (a)	35mm : 55km $1 : \dfrac{55000000mm}{35mm}$ ✓ MA 1 : 1 571 428,57 ✓S 1 : 1 600 000 ✓CA **OR** 3,5 cm : 55 km $1 : \dfrac{5500\ 000cm}{3,5cm}$ ✓MA 1 : 1 571 428,57 ✓S 1 : 1 600 000 ✓CA	1MA Diving by 35 mm 1S Simplification 1CA Scale 1MA Diving by 35 mm 1S Simplification 1CA Scale **Accept : 34mm to 36mm** (3)	MP L3
2.2.2 (b)	1 = 1 600 000 35mm = actual distance $= \dfrac{56\ 000000}{1\ 000000}$ ✓ M actual distance = 56 km✓CA The map size might have changed and the number scale remains the same. ✓✓ J	1M Concept of scale 1CA Actual distance 2J Reason **NPR** (4)	MP L3 & L4 (3)
2.2.2 (c)	A bar scale ✓ A Because its dimensions change when the size of the map changes. ✓✓ J	1A Bar scale 2J Justification (3)	MP L4

2.2.3 (a)	To encourage students to participate in the race✓ O To encourage students to be part of the race. ✓✓ O To get more spectators from other students not racing. **OR** Any other valid point	2 O x 2 Opinion (4)	MP L4
2.2.3 (b)	Yes ✓A, stage 1 should have been longer than stage 2 because cyclists would be fresh on the first day. ✓✓J **OR** Last day is also longer than the first day and there is also a sprint race on the third day when cyclists are tired. **OR** No ✓, the terrain might be difficult on the first day. ✓✓J **OR** Any other valid point	1A Yes 2 J Justification **OR** 1A No 2J Justification (3)	MP L4
2.2.4	The route was going to be very long✓✓ It would be dangerous to use the national road , namely N12✓✓ **OR** Any other valid point	2 O x 2 Opinions (4)	MP L4
			[48]

QUESTION 3   [30]

3.1.1	Total expenses = Plane tickets x 35+ Accommodation ×35 × 9 + Daily allowance × 35 x 10 = (R18 250,00 × 35) + (R2 400,00 × 35 × 9) + ✓MA (R300,00×35 ×10) ✓M = R638 750,00 + R756 00,000 +R105 000,00 ✓S = R1 499 750✓CA	1MA Multiplying x 9 nights and by 10 days 1M adding all values 1S simplification 1CA Expenses (4)	F L2
3.1.2	Govt contribution = (R1 499 750,00- 1 050 000,00) ✓MA ÷ 2✓ MA = R224 875,00✓CA	1MA Subtracting sponsorship 1MA Divide difference by 2 1CA Contribution (3)	FL2

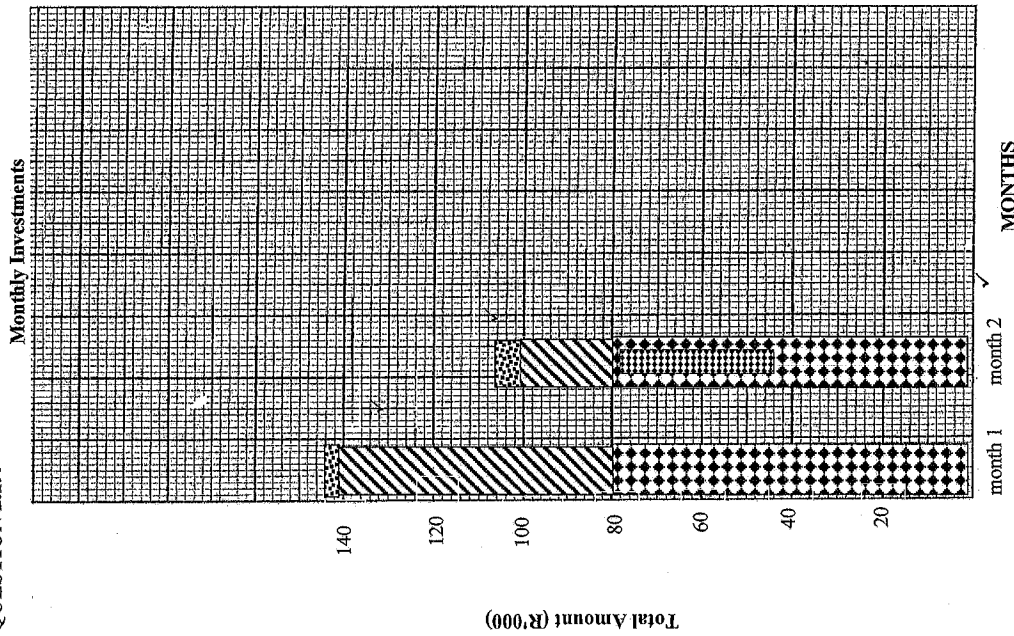| No.		Codes		Level
3.1.3	**Any 2 of the following reasons** • because they are representing the country ✓✓ • to encourage people to participate in sports✓ ✓ • to enable the team to meet its financial expenses **OR** Any other valid opinion	2O x 2	Opinion (4)	F L4
3.1.4	✓A Female members $= \dfrac{1}{4} \times (35 - 23)$ $= \dfrac{1}{4} \times 12$ ✓M $= 3$ ✓A	1A 1M 1A **Answer only full marks**	Concept of a quarter Subtracting 23 from 35 Answer (3)	F L2
3.1.5	From SA to Brazil 1 Real = R4,14 Real = R40 000 Real $= \dfrac{R40000}{R4,14}$ ✓C = 9 661,84 Real✓S From SA to Botswana to Brazil 1 pula = R1,36 Pula = R40 000 Pula $= \dfrac{R40000}{R1,36}$ ✓C = 29 411,76 Pula✓A 1 Real = 3,01 pula Real $= \dfrac{29411,76}{3,01}$ = 9 771,3488 ≈ 9 771,35 real✓CA Yes, it was a wise decision because he had more Brazilian Real when changing pula to real✓✓	1C 1S 1C 1A 1CA 2O	Converting units Simplification Converting units Botswana Pula Brazil Real NPR Justification (7)	F L3 L4
3.2.1	South West or SW ✓✓A	2A	SW (2)	MP L4

No.		Codes		Level
3.2.2	$P = \dfrac{9}{26}$ ✓✓A $= 0,35$✓C	2A 1C **Answer only full marks**	Concept of probability Converting to decimal fraction (3)	P L2
3.2.3	• From the escalators walk pass shop 470A ,470 and 469 on your right ✓ • immediately after shop 469 turn right into the passage ✓ • pass shop 468 and 467 on your left, ✓Turn right at the next passage passing shops 416 to 415on your left and you have reached your destination, 413B✓ **OR** • From the escalators walk pass shop 470A ,470 and 469 on your right ✓ • Continue straight to the end of the passage ✓ • Turn right at the next passage passing shops 416 to 415 on your left✓ • and you have reached your destination, 413B ✓	4A 4A	Correct directions (4) Correct directions (4)	MP L3
				[30]

QUESTION 4 [40]

No.		Codes		Level
4.1.1 (a)	Area to be painted = Circular part + body of part A $=[\pi \times (\text{radius})^2]+ (2\pi \times r \times \text{height})$ ✓SF ✓SF $= [3,142 \times (8,5\text{cm})^2] +(2 \times 3,142 \times 8,5\text{cm} \times 9\text{cm})$ $= 227,0095\text{cm}^2 + 480,726\text{cm}^2$✓S $= 707,74\text{cm}^2$ ✓CA **OR** $=[2\pi \times (\text{radius})^2] + (2\pi \times r \times \text{height})$ $= 2 \times 3,142 \times (8,5\text{cm})^2 + (2\times 3,142 \times 8,5\text{cm} \times 9\text{cm})$	2SF 1S 1CA	Substituting radius and height Simplification Area painted (4)	M L3

	Working	Marks	Level
	=454,019- 227,0095cm² + 480,726 =227,0095cm² +480,726cm² =707,74cm²✓CA		M L3
(b)	Area of Part B = Area of the circle - area of circle of Part A ✓SF ✓MA = [3,142×(16cm)²] - [3,14 ×(8,5cm)²] = 804,352cm² - 227,0095cm² ✓S =577,34cm²✓CA	1SF Substituting radius of hat 1MA Subtracting part A 1S Simplification 1CA Area of part B (4)	M L3

(c)	Total material = Area of circular Part A + area of body of Part A + Area of part B
	    ✓SF ✓SF
	 = [3,142 x (8,5cm)²]+ [2 x 3,142 x 8,5cm x 9cm] + [3,142 x (16cm)² – 3,142 x (8,5cm)²]
	     ✓MA
	 = 227,0095 cm² + 480,726cm² + 804,352cm² - 227,0095 cm²
	 =707,7355cm² + 577,3425cm²✓M
	 =1 285,08 cm²✓CA
		1SF Substituting Radius
		 1SF Substituting height
		 1MA Subtracting Part A circle
		 1M Adding part A and B
		 1CA Total material
		 (5)
			M
			 L3

(d)	160g = m² g = (540,84cm² ÷ 10 000)✓C g = 0,054... m² x 160g ✓C = 8,65g✓CA ∴ The mass of the material does not meet the requirements because it is less than 10g✓CA	1C Converting to cm² m² 1C Converting to m² 1CA Grams 1CA Answer (4)	M L4

	Working	Marks	Level

4.1.2	Floor area = Length x breadth
	 = (width of 3 hats + width of 4 sponges) x (width of a hat + width of 2 sponges)
	     ✓A ✓A
	 = (32cm × 3 + 4 x 4cm) x (32cm +2 × 4cm)
	 = 112cm x 40cm✓S
	 =4 480cm²✓ CA
	
	 OR
	
	 Floor area = (width of 3 hats + width of 4 sponges) × (width of a hat + width of 2 sponges)
	     ✓A ✓A
	 = (320mmx 3 + 4 x 40mm) ×(320mm + 2 ×40mm)
	 = 1 120mm x 400mm✓S
	 =448 000mm²
	 1 cm² = 100 mm²
	 Cm² = 448 000mm²
	 =4 480cm²✓CA
		2A Dimensions (32 cm and 4 cm or 40 mm)
		 1S Simplification
		 1CA Floor area
		
		 OR
		
		 2A Dimensions (320 mm and 40 mm)
		 1S Simplification
		 1CA Floor area
		 (4)
			M
			 L3

4.2.1	Answer Sheet 2 1A Line graph 1A (0 : 900) 1A labeling the graph 1A x Any 2 correct co-ordinates ,excluding (0 and 900) 1A Correct break-even point or point of intersection (5)		F L3

4.2.2 (a)	Answer Sheet 2 1A co-ordinate(400: 1800) 1A co-ordinate (0: 0) 1A for any 2 correct co-ordinates except for 0 and for 400) 1A Labeling the graph		(4)	F L3
(b)	Yes, A✓ it means that the delivery costs of the service providers are equal✓✓J	1A Yes 2J Justification	(3)	F L4
(c)	✓A Use Step by Step for return distances less than 700 km and Door to Door for more than 700 km ✓✓O	1A Step by Step 2O Opinion	(3)	F L4
4.3	• The factory van is always available ✓✓O • It is easily accessible✓✓O • Goods are delivered on time • The factory will pay less if the distance is more than 700km **OR** • Any other valid point	2O x 2 Opinions	(4)	F L4
			[40]	

TOTAL MARKS: [150]

ANSWER SHEET 1

QUESTION 2.1.4

Monthly Investments

Key
- Copies
- Students
- University

1A Legend✓	1A 2 correct bars for students✓
1A compound graph✓	1A 2 correct bars for copies✓
	1A 2 correct bars for the university✓

QUESTION 4.2.1 , 4.2.2 and 4.2.3
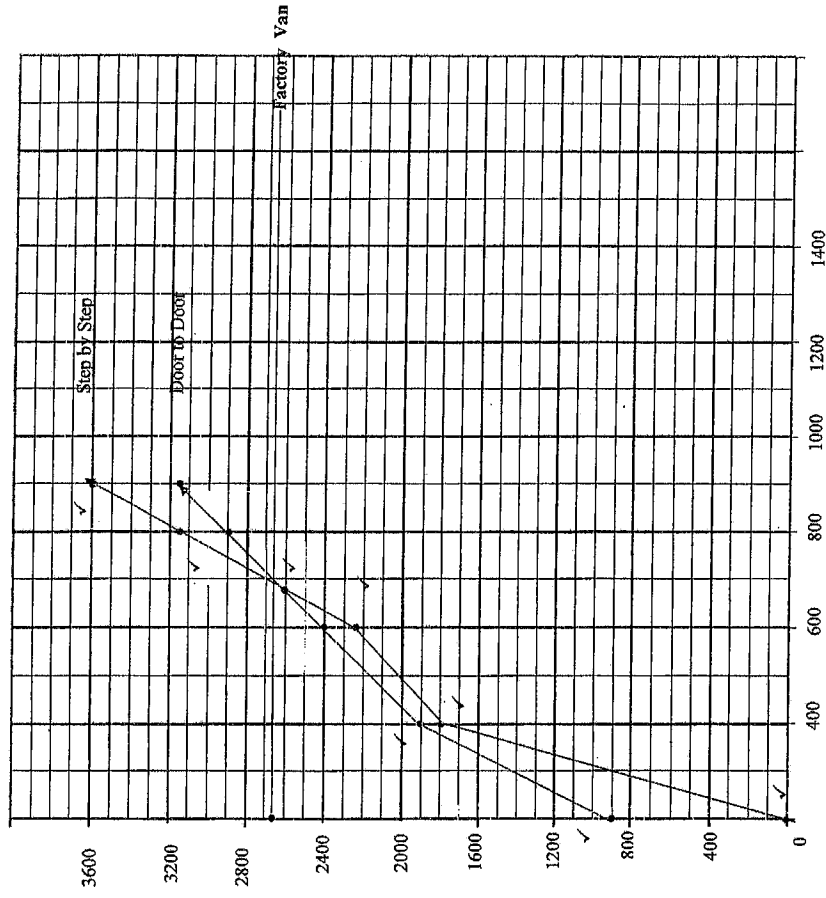
1A Co-ordinates (400;2000) ✓	1A Co-ordinates (0;0) ✓
1A Co-ordinates (500;2000) ✓	1A for any 2 correct except (500;2000), (0; 0) and (400;2000) ✓