Please paste the barcoded label here	TOTAL MARKS

NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2020

MATHEMATICAL LITERACY: PAPER II

EXAMINATION NUMBER

Time: 3 hours 150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of:
   - 24 pages which includes 2 additional pages at the end for rough work and calculations if necessary
   - 4 questions
2. Please check that your question paper is complete.
3. Answer ALL the questions.
4. All questions need to be answered in the spaces provided in the question paper. Note: Do not answer any question in an Answer Book.
5. It is strongly recommended that all working details be clearly shown where necessary.
6. An approved non-programmable calculator may be used where necessary.
7. It is in your own interest to write legibly and to present your work neatly.
8. Maps and diagrams are not necessarily drawn to scale, unless otherwise stated.

Question	1		2		3		4		Total	
	Marker	Mod	Marker	Mod	Marker	Mod	Marker	Mod	Marker	Mod
Mark										
Signature										
Total	54		17		60		19		150	

QUESTION 1

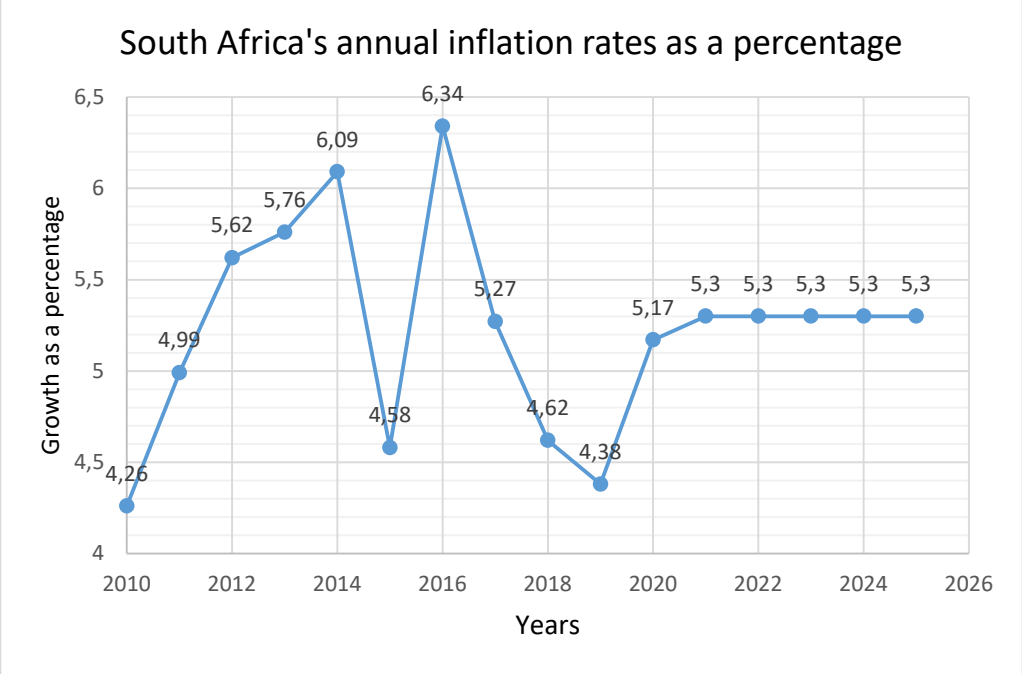
Jordan inherited a game farm, called "Lodge Supreme". He needs to fix and update several aspects of the lodge.

Jordan notices that the rate charged for the chalets has not changed in the past five years.

1.1 He states that "…even though there are more people visiting the lodge now than there were five years ago, the lodge is making less money than it did five years ago." Explain how this is possible.

(2)

1.2 Jordan found the following graph showing the annual inflation rates as a percentage from 2010:



[Source: <www.statista.com>]

1.2.1 Calculate the average change in the inflation rate over the past five years, including 2020, rounded to two decimal places.

(4)

1.2.2 Explain why the graph has values for years that are still in the future.

(2)

1.3 Jordan decides that he is going to increase the cost per night for each of the chalets by 5,16%, except for the Luxe suite for which he is going to charge R5 800 per night.

The table below shows the current prices for the three types of chalets available in the lodge:

Type	**Sleeps**	**Cost per night**
Standard	2–4 people	R2 400
Family standard	4–10 people	R3 000
Luxe suites	2–4 people	R5 200

1.3.1 Calculate the new cost per night of the standard and family standard chalets. Round off your answer to the nearest hundred.

(5)

1.3.2 Calculate the percentage increase that Jordan proposes for the Luxe suite. Use the following formula:

$$Percentage\ difference = \frac{difference}{original} \times 100\,\%$$

(3)

1.4 Jordan decides to run a special on the Family standard chalet. He will charge R4 000 per night but will decrease the amount by R100 per person occupying the chalet.

1.4.1 Use the information above to complete the table below:

Number of people	1	2	3	4	5	8	9	10
Cost per night (R)	4 000	3 900						

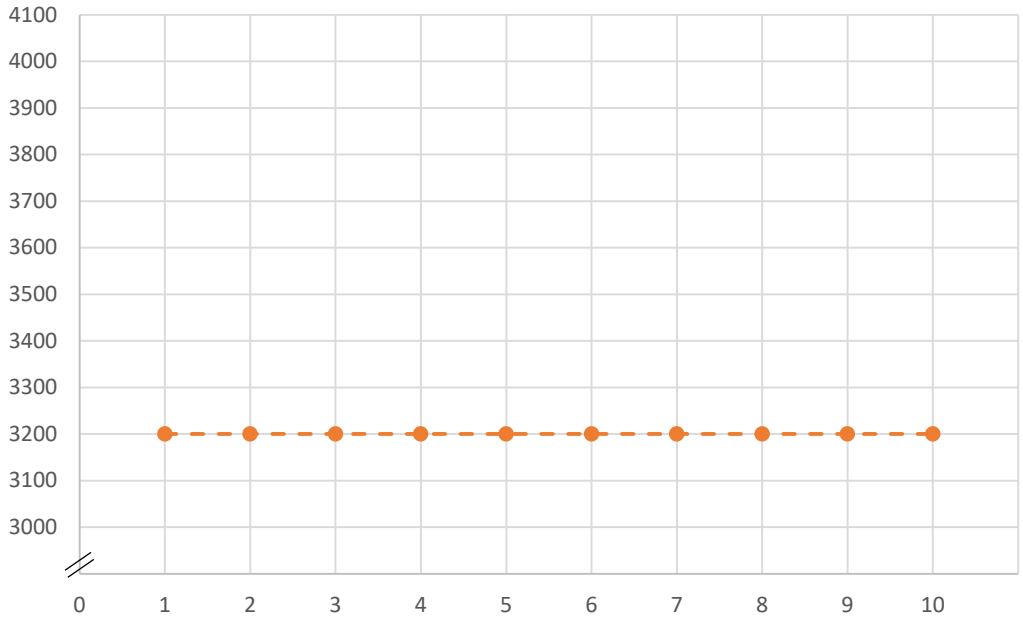
(3)

1.4.2 Write an equation that shows the relationship between the cost per night ***C*** and the number of people staying in the chalet ***n***.

(3)

1.4.3 The graph below shows the cost of renting the family standard chalet at the usual rate. On the same set of axes, draw the graph that represents renting the chalet at the special rate.

(Remember to include all missing graph elements)



(8)

1.4.4 Indicate with the letter **A** on your graph where the chalet rates are the same.

(2)

1.4.5 Use your graph to determine how many people would need to stay in the family standard chalet for the special to be more cost effective.

(2)

1.5 Illustrated below is a layout plan of the game farm. Jordan would like to build a circular campfire boma* (as shown in the picture alongside) located within the red rectangle indicated on the layout plan.

Glossary – Boma* is an enclosure where a fire is lit and people can gather around.

1.5.1 If the scale of the layout plan is 1 : 1 200, determine (in cm) the maximum diameter of the campfire boma.

(5)

1.5.2 Jordan must fill the boma with gravel to a required depth of 10 cm, to prevent a fire hazard. Determine (in cm^3) the maximum volume of gravel he will require.

The following formula may be used:

$\text{Volume} = \pi r^2 \times \text{height of cylinder}$ where $\pi = 3{,}14$

(4)

1.5.3 The gravel that Jordan would like to use costs R469 per cubic metre. Jordan budgeted R13 000 to buy the gravel. Show, with calculations, if this amount will be enough to buy the gravel needed.

(5)

1.5.4 Jordan would like to place log stumps around the perimeter of the campfire boma for guests to sit on. He would like to place the stumps two metres apart. Each stump is approximately 50 cm wide.

Determine the maximum number of stumps that Jordan can place.

The following formula may be used:

Circumference = $2\pi r$ **OR** Circumference = πd where π = 3,14

(6)
[54]

QUESTION 2

[Source: <www.timeslive.co.za>]

The Gautrain had an advert in 2010 that stated that commuters that live in Johannesburg or Pretoria, and that drive to work daily, can each spend up to 11 full days in traffic in one year.

2.1 Use the above information to answer the questions that follow.

2.1.1 There is an average of 261 working days in a year.

Show with calculations, that a driver spends an average of more than an hour a day in traffic.

(4)

2.1.2 The average consumption of petrol is 9,4 litres/100 km.
The average travelling speed of a commuter is 50 km/h.
The petrol price is R15,84/litre (as at 1 Jan 2020).

If a commuter spends an average of 1 hour in traffic per day, calculate the cost of petrol for a commuter in traffic per year.

The following formula may be used:

$d = s \times t$

(7)

2.2 In 2017, a global survey was done to see how much time was spent in traffic in cities around the world. See the results listing some South African cities in the table below:

City	Rank positions out of all cities surveyed	Hours spent in traffic per year	Peak times	Day time (off-peak)
Cape Town	41	49	25%	11%
Johannesburg	55	46	18%	7%
Durban	163	26	15%	8%
Pretoria	257	26	14%	6%
Pietermaritzburg	464	20	12%	9%
East London	576	17	10%	8%
Port Elizabeth	317	15	9%	6%
Bloemfontein	348	15	9%	7%
Welkom	999	9	6%	5%
Vanderbijlpark	1306	4	3%	2%

[Source: 2017 INRIX Global traffic score card]

Use the above table to answer the questions that follow.

2.2.1 Determine the range of the rank positions of the cities given.

(2)

2.2.2 The table states that 25% of the time spent in traffic in Cape Town was during peak time. Determine the amount of time spent in traffic in Cape Town during peak times in the format, hours : minutes.

(4)
[17]

QUESTION 3

The South African national netball team is called the SPAR Proteas, as they are sponsored by the SPAR group.

3.1 Below is a table that shows the data for the players in the team. The table shows the player's name, field positions (Pos), date of birth (DOB), height, the club they play for and their nationality (Nat).

South Africa SPAR Proteas roster

Players

Name	Pos	DOB	Height	Club	Nat	Caps
Lenize Potgieter	GS, GA	02/05/1994	1.88 m (6 ft 2 in)	Southern Steel		–
Ine-Marí Venter	GS, GA	21/04/1995	1.92 m (6 ft 4 in)	Melbourne Vixens		–
Maryka Holtzhausen	GA, WA	02/06/1987	1.81 m (5 ft 11 in)	Severn Stars		–
Renske Stoltz	GA, GS	30/10/1992	1.69 m (5 ft 7 in)	–		–
Erin Burger	C, WA, WD	10/02/1987	1.76 m (5 ft 9 in)	Stings		–
Izette Griesel	C, WA		–			–
Khanyisa Chawane	C	14/01/1996	1.69 m (5 ft 7 in)	Crinums		–
Bongiwe Msomi **(c)**	C, WA	19/01/1988	1.66 m (5 ft 5 in)	Wasps Netball		–
Shadine van der Merwe	GD, GK, WD	25/11/1992	1.79 m (5 ft 10 in)	Surrey Storm		–
Karla Pretorius	GD, WD	12/03/1990	1.81 m (5 ft 11 in)	Sunshine Coast Lightning		–
Phumza Maweni	GK, GD	04/09/1984	1.87 m (6 ft 2 in)	Sunshine Coast Lightning		–
Zanele Vimbela	GD, GK	28/04/1989	1.82 m (6 ft 0 in)	Aloes		–

Player profiles: Team website

Coaches

Head coach

- Norma Plummer

Assistant coach

- Nicole Cusack & Dumisani Chauke

Notes

- **(c)** – Captain
- **(cc)** – Co-captain
- **(vc)** – Vice-captain
- ✽ – Injury / maternity leave
- **(TRP)** – Temporary Replacement Player

Last updated: 23 May 2019

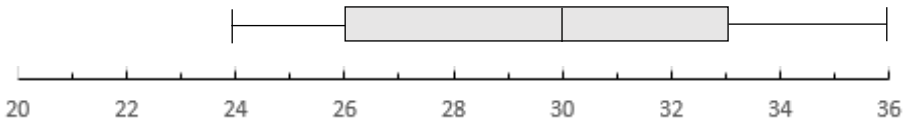
[Source: <wikipeadia.org>]

Use the above table to answer the questions that follow.

3.1.1 Determine how many different field positions there are in a netball team.

(2)

3.1.2 The box and whisker plot below shows the ages of the players in 2020. By referring only to the year in which they were born and the plot below, determine the names of the players who lie in the top 25% of this data set.



Ages of netball players

(5)

3.1.3 The team coach calculated the average age of all her players including Izette Griesel to be 29,5 years. She estimated Izette Griesel's age to be 29 years. Show with calculations whether her estimate is correct.

(5)

3.1.4 Determine Izette Griesel's height (in feet and inches to 2 decimal places), if her height in metres is 1,9.

Note: 1 m = 3,28 ft and
1 ft = 12 in

(4)

3.1.5 Give a suitable reason why Izette Griesel's data is omitted.

(2)

3.1.6 Determine the probability that a netball player chosen at random from this team, plays in an Australian club team, indicated with an Australian flag  .

(2)

3.1.7 Determine the probability that a netball player chosen at random from this team, can play in a centre position (indicated with a "C") or play in an Australian club team, indicated with an Australian flag  .

(4)

3.2

The Netball World Cup was held in Liverpool, England, in 2019. The SPAR Proteas made it to the semi-finals. SPAR agreed that they would pay the team R200 000 if they got to the semi-finals, a quarter of a million rand if they came third, R750 000 if they came second and R1 million if they won the World Cup. Although they did not win, SPAR decided to give the team a lump sum of R1,2 million which they would share amongst the players, the assistant coaches and the coach.

[Source: <www.sport24.co.za>]

Use the above information to answer the questions that follow.

3.2.1 If the team had won the World Cup, and if they had received 10% of the amount promised for qualifying for each of the rounds as incentives as well as the 1 million rand for winning, calculate the total accumulated amount the team would have received from SPAR.

(3)

3.2.2 If the lump sum money they received from SPAR was 9% more than the previous year, calculate the amount received in the previous year.

(4)

3.3 Below is a table of some of the results of the games played by the SPAR Proteas.

Match teams	Date	Score
SPAR Proteas vs England Roses	1/12/2019	54 – 48
SPAR Proteas vs England Roses	30/11/2019	53 – 59
Australian Diamonds vs SPAR Proteas	20/7/2019	53 – 55
SPAR Proteas vs England Roses	19/7/2019	47 – ?
SPAR Proteas vs Uganda	17/7/2019	65 – 37

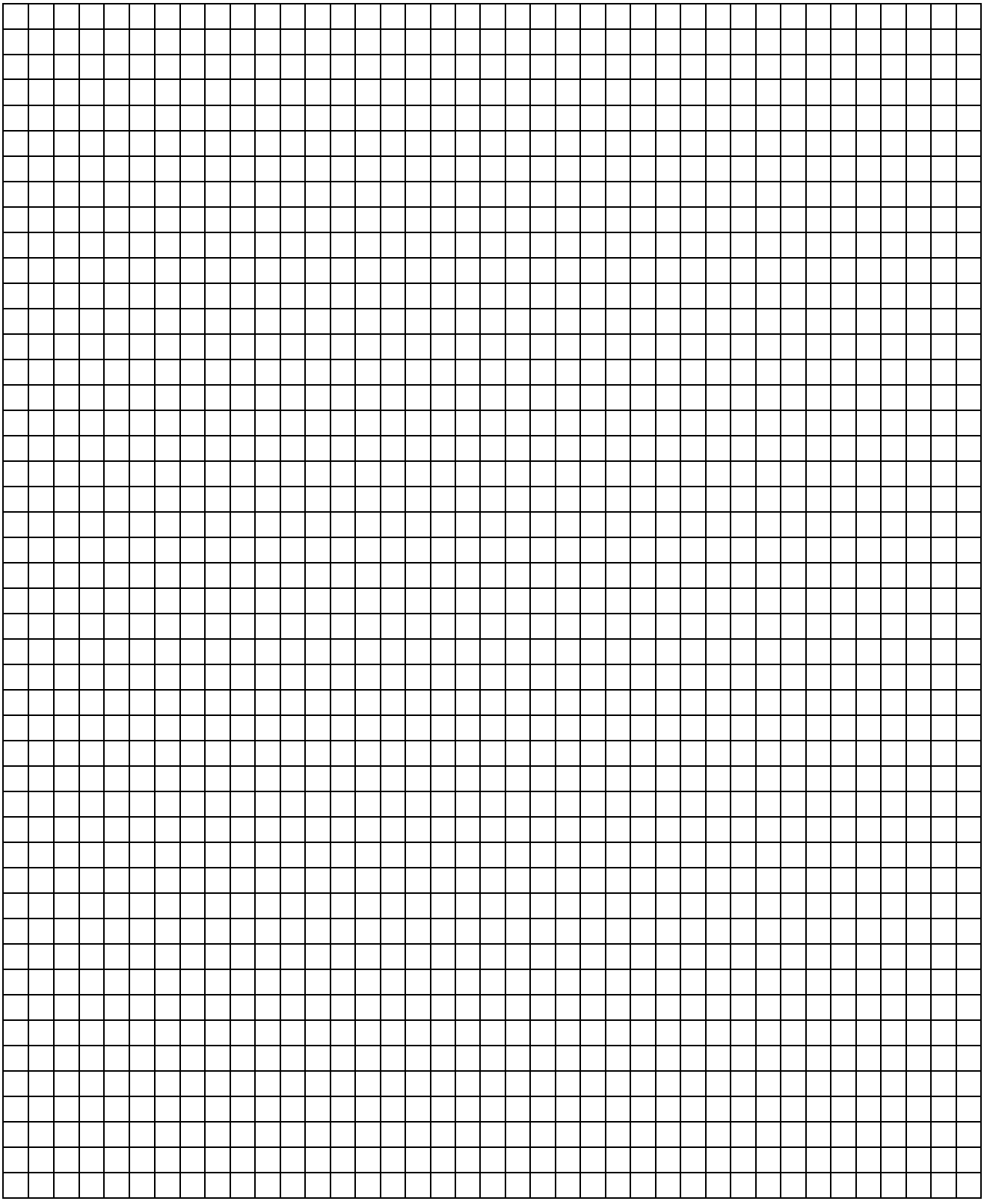
3.3.1 Calculate the median points scored by the South African team.

(2)

3.3.2 Write down the final score of the match on the 19/7/2019 if the goal difference for South Africa was (– 11).

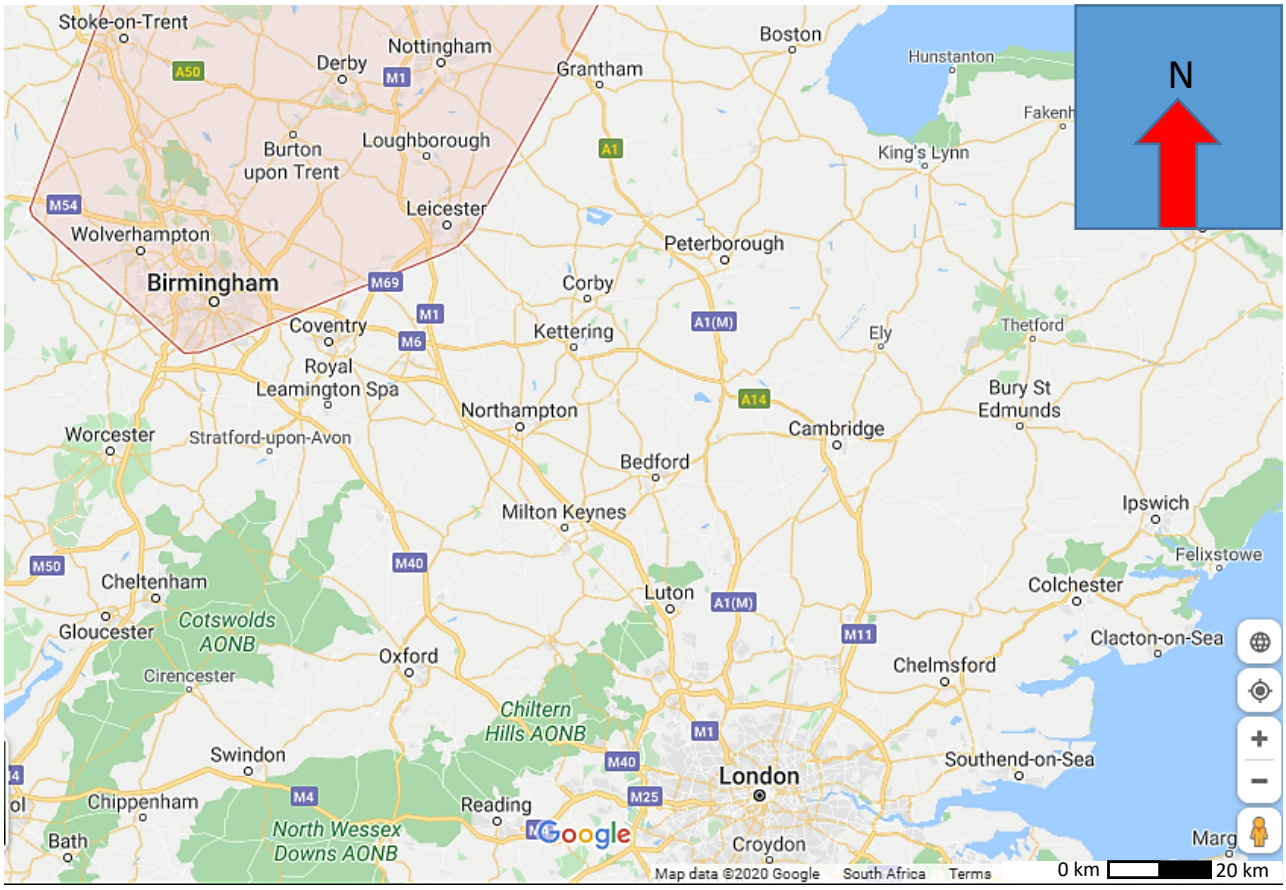
(3)

3.3.3 On the graph paper below draw a stacked bar graph representing the scores of the South African team and the scores of their opponents for each match.



(8)

3.4 The SPAR Proteas played in 3 different cities in England, namely Nottingham, London and Birmingham as shown in the map of England below.



Use the above map to answer the questions that follow.

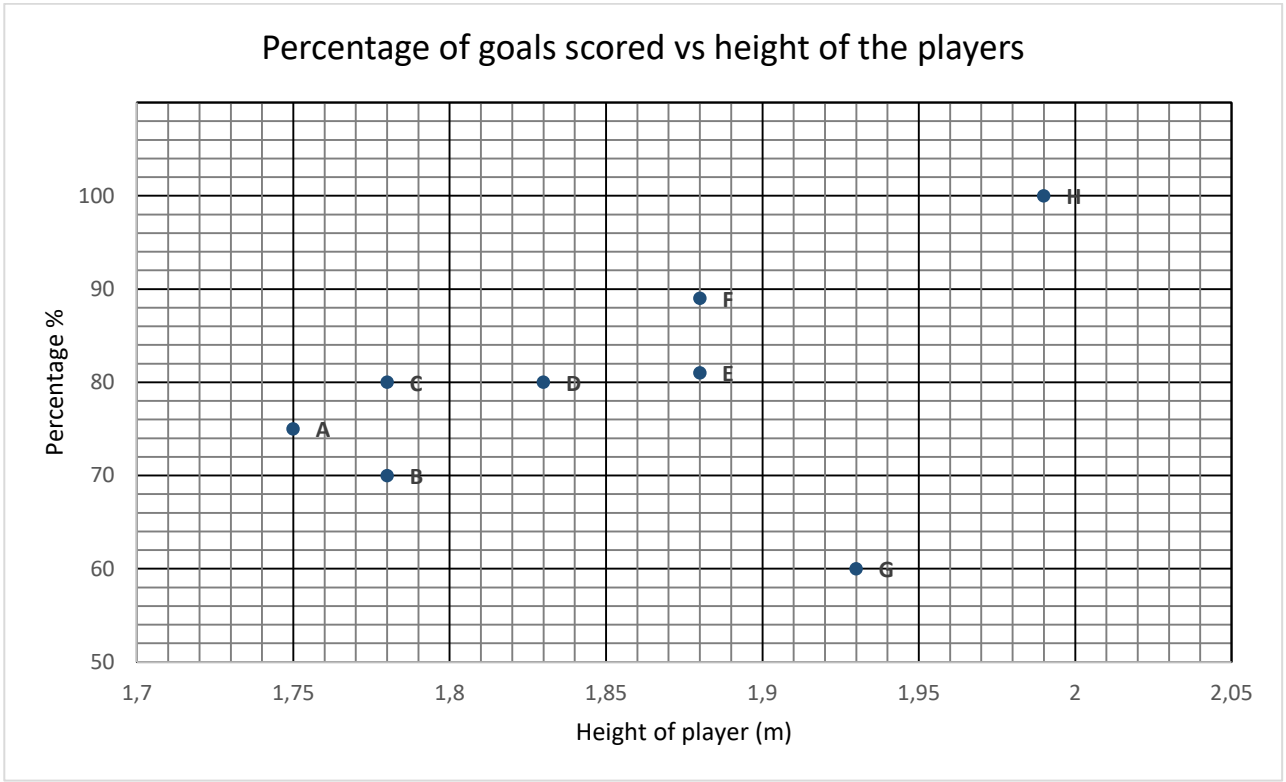
3.4.1 Determine, in kilometres, the total distance as the crow flies from Nottingham to London to Birmingham.

(6)

3.4.2 The average speed of the tour bus was 37,28 miles/hour. Show, with calculations, this is equivalent to 60 km/h if it is given that, 1 km/h = 0,621371 miles/hour.

(4)

3.5 Below is a scatter plot that shows the goal rate percentage versus the height of the players.



3.5.1 Consider the following statement: "A player on this team that is 1,78 m tall has a goal success rate of 80%". Justify why this statement might be FALSE.

(2)

3.5.2 Describe, in detail, the trend in the scatter plot by referring to the context. Refer to any possible outliers in your explanation.

(4)
[60]

QUESTION 4

Tshepo is a 75 year old male who currently earns a monthly gross salary of R14 000. He also still pays UIF, which is 1% of his gross salary and a monthly pension of R102.

4.1 Tshepo stated that if he were 10 years younger, he would have paid R7 703,28 in annual taxes. Show with calculations whether Tshepo's statement is valid, using the Income Tax table below:

2020 tax year (1 March 2019–29 February 2020)

Taxable income (R)	Rates of tax (R)
1–195 850	18% of taxable income
195 851–305 850	35 253 + 26% of taxable income above 195 850
305 851–423 300	63 853 + 31% of taxable income above 305 850
423 301–555 600	100 263 + 36% of taxable income above 423 300
555 601–708 310	147 891 + 39% of taxable income above 555 600
708 311–1 500 000	207 448 + 41% of taxable income above 708 310
1 500 001 and above	532 041 + 45% of taxable income above 1 500 000

Tax Rebates

Tax Rebate	Tax Year	Tax Threshold
	2020	
Primary	R14 220	R79 000
Secondary (65 and older)	R7 794	R122 300
Tertiary (75 and older)	R2 601	R136 750

[Source: <www.sars.gov.za>]

(11)

4.2 Determine Tshepo's net monthly income.

(3)

4.3 Tshepo, at his age, would prefer not paying any income tax at all. Analyse his current monthly salary to determine how much less he must currently be earning for him to be exempt from paying tax.

(5)
[19]

Total: 150 marks

ADDITIONAL SPACE (ALL questions)

REMEMBER TO CLEARLY INDICATE AT THE QUESTION THAT YOU USED THE ADDITIONAL SPACE TO ENSURE THAT ALL ANSWERS ARE MARKED.

