



MATHEMATICAL LITERACY: PAPER I

Time: 3 hours

150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This paper consists of:
 - A question paper of 13 pages
 - Five questions
 2. Check that your question paper is complete.
 3. Answer ALL the questions.
 4. Number the answers exactly as the questions are numbered.
 5. It is strongly suggested that all working details be shown.
 6. Units of measurement must be included where applicable.
 7. Where necessary, round off all answers to two decimal places.
 8. Approved non-programmable calculators may be used.
 9. It is in your own interest to write legibly and present your work neatly.
-

QUESTION 1

A family of 4 from New York decide to come to South Africa on holiday.

1.1 The following is the breakdown of the total fare (price) they will be paying for their flight tickets:

TOTAL FARE FOR ALL TRAVELLERS (INCLUDING TAX)	
Description	Price
Base Fare	USD 4 729,58
Taxes	USD 412,73
Carrier surcharges	USD 1 196,51
Fuel surcharge (YR)	USD 1 196,51
Total	USD 6 338,82

[Source: <www.flysaa.com>]

1.1.1 What percentage of the total airfare is taxes? (3)

1.1.2 A month before these tickets were booked the fuel surcharge increased by 12%. Calculate the amount the fuel surcharge was before the increase. (3)

1.2 The family travelling deposited USD 2 000 into a savings account, two years ago, which had an interest rate of 14% per annum compounded monthly. Calculate how much the family would now have to contribute towards the air tickets.

$$A = P(1 + i)^n$$

Where the following is true:

<i>A</i>	Final Amount
<i>P</i>	Principle Amount
<i>i</i>	Interest rate as a percentage
<i>n</i>	Number of times interest is calculated

(5)

1.3 If the following is true:

$$1 \text{ USD (United States Dollar)} = 9,17 \text{ ZAR (South African Rand)}$$

then how much does the airfare cost in ZAR? (2)

- 1.4 Knowing they would need some spending money, the family also started saving 2 years ago by depositing money every month into a different savings account that had an interest rate of 4% per annum compounded annually. Calculate how much they deposited every month if they now have 1100 USD.

$$F_v = x \left[\frac{(1+i)^n - 1}{i} \right]$$

Where the following is true:

F_v	Future Value
x	Monthly instalment
i	Interest rate as a percentage
n	Number of times interest is calculated

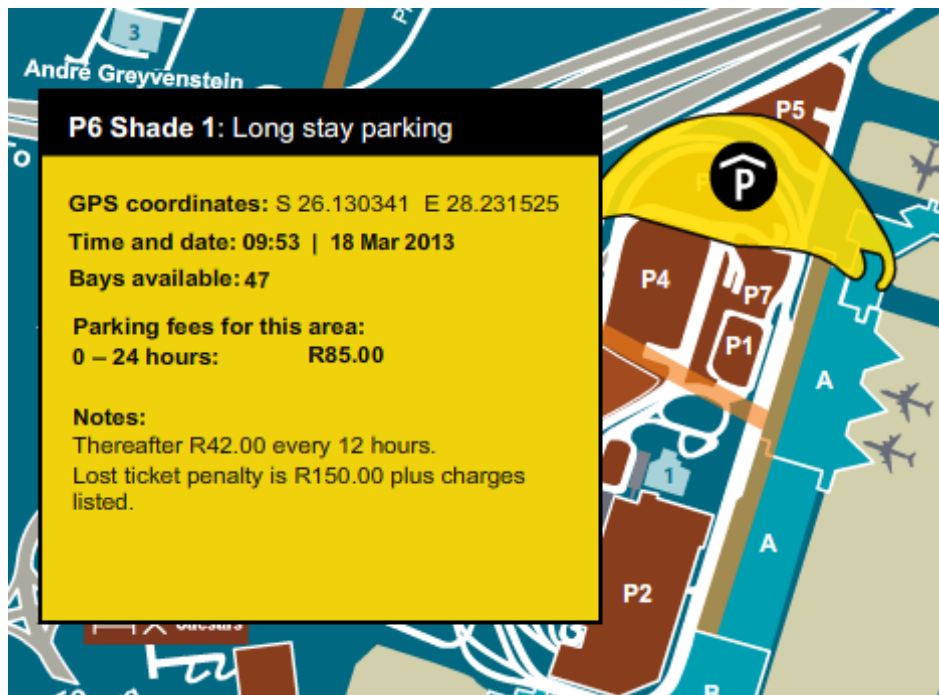
(4)

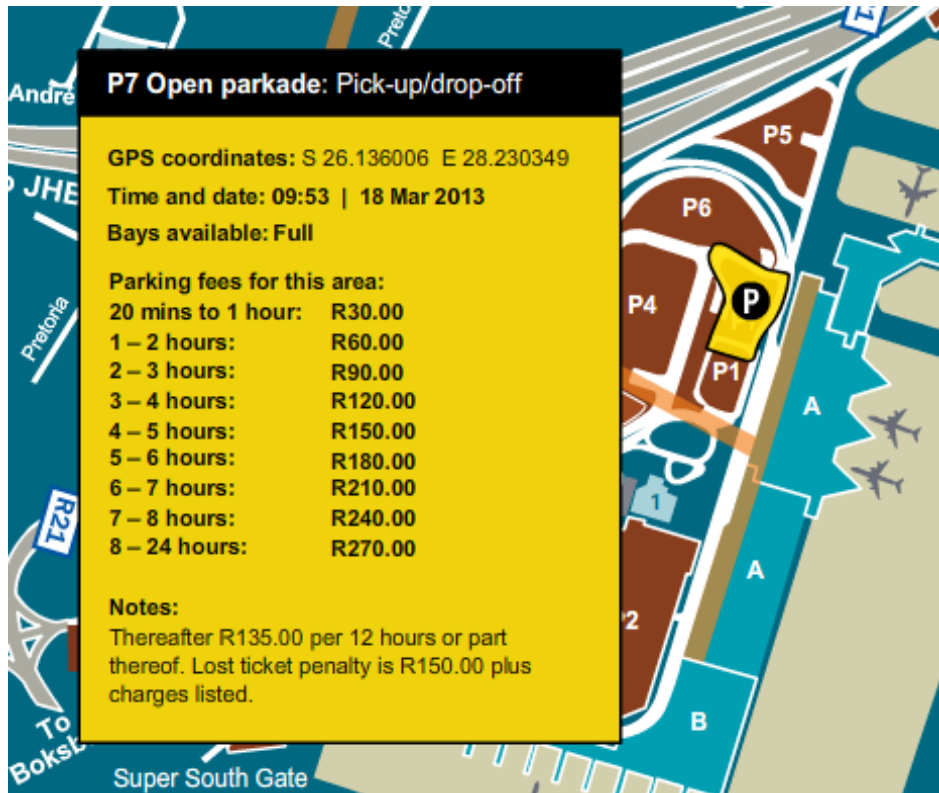
- 1.5 After how many whole years would the following be true:

$$5300 = 1200 \left(1 + \frac{4,5\%}{4} \right)^{n \times 4}$$

(2)

- 1.6 Another family that live in Johannesburg fly to Cape Town for the weekend. They will park their car in one of the parking bays available at the airport. The following tables show the rates for two of the parking bay options, namely Parkades P6 and P7, at the airport.





1.6.1 Complete the table below in order to determine the cost (P) of parking your car at P6.

(H) Number of hours	12 hours	24 hours	36 hours	48 hours
(P) Cost of Parking	<i>a</i>	<i>b</i>	<i>c</i>	<i>d</i>

(4)

1.6.2 The equation for calculating the cost of parking in Parkade P6 can be written as:

- (i) Cost of parking = price for first 24 hours + number of 12 hours × price for every 24 hours thereafter.

Rewrite the equation by filling in the relevant amounts where applicable.

(2)

- (ii) Using the equation above, calculate the cost of parking at P6 for 26 hours.

(1)

1.6.3 Refer to the information on Parkade P7.

- (i) How many hours are there in 3 full days? (1)
- (ii) How much are you paying for the first 24 hours at P7? (1)
- (iii) How many parts of 12 hours are there in 2 full days? (1)
- (iv) What price will you pay for every 12 hours after the first 24 hours? (1)
- (v) Calculate the cost of parking for 3 full days at P7. (2)
- (vi) Calculate the cost of parking for 3 full days at P6, using the equation you got in Question 1.6.2. (2)
- (vii) Which parkade would be better? (1)

1.7 It is possible to rent a car from car rental companies based at the airport. The following quote is from one such company called Budget Car Rental:

Quotation reference number	BQ1888243		
Email address	djones@webmail.co.uk		
Pickup	OR Tambo Intl JS	Date	1 Sep 2013 Time 08:00
Drop off	OR Tambo Intl JS	Date	4 Sep 2013 Time 08:00
Duration	4 days		
Car group	A	A – Chevy Spark/similar	
Accessories	Personal Accident Insurance, Collection plus R10/km over 25km		
Quoted rate code	W11	Weekend Wheels – Green	
<u>Rental Charges</u>			
Daily Charge	R140.00	Per Day	R140.00
KM Charge : 200 Included kms per day, thereafter	R1.21	Per Km	
<u>Liability waiver charges</u>			
Personal Accident Insurance	R11.00	Per Day	R11.00
(CDW) Collision Damage (Standard Liability)	Included		Nil
(TLW) Theft of Vehicle (Standard Liability)	Included		Nil
<u>Accessories & Additional Charges</u>			
<u>(Subject to change without notice)</u>			
Collection on Weekend	R550.00	Per Instance	Nil
Contract fee	R60.00	Per Rental	Nil
<u>Surcharges</u>			
<u>(Subject to change without notice)</u>			
Tourism Levy 1.00 % of Daily Charges	Included		Nil
Airport Tax 11.00 % of Daily Charges	Included		Nil
<u>Estimated quoted value</u>			<u>R151.00</u>
<u>Remarks</u>			
No remarks			

- 1.7.1 State the estimated quoted value. (1)
 - 1.7.2 Identify on the quote the fees that are charged daily and state their amounts. (4)
 - 1.7.3 How many *km* are you entitled to per day before you need to start paying? (1)
 - 1.7.4 State the rate, per *km*, you will need to pay once you are required to start paying. (1)
 - 1.7.5 If a customer drove 600 km in one day, calculate the cost they would pay by completing the table on your Answer Sheet. (5)
- [47]**

QUESTION 2

O.R. Tambo International Airport (ORTIA) in Johannesburg is the air transport hub of Southern Africa, catering for more than seventeen point two million passengers each year. With more than 18 000 people employed by various companies at ORTIA, the airport plays a vital role in the city's and Gauteng province's economy, and boasts an impressive infrastructure that has expanded by thousands of square metres from its modest origins.

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

2.1 Write seventeen point two million as a number. (1)

2.2 If a domestic flight at ORTIA is a flight in and around South Africa, and it is said that $\frac{1}{3}$ of all flights at ORTIA are domestic flights, calculate how many passengers travel on a domestic flight at ORTIA each year. (3)

2.3 2.3.1 There are 100 stores and 45 restaurants in the airport. Write this as a ratio of stores to restaurants in simplest form. (2)

2.3.2 It was noted that '18 000 people are employed by various companies at ORTIA'. If the number of people employed at the restaurants and stores are evenly distributed, calculate how many are employed at restaurants. (3)

2.4 The airport has 585 000 square meters of rentable space for shops. Calculate what this would be in square miles if the following is true:

1 square meter = 0,0001 hectare

1 square mile = 258,99 hectares

(3)

2.5 2.5.1 The average length of a sedan (a normal car with a boot and bonnet) is 3 000 mm and the breadth is 2 600 mm. Calculate the area of the minimum sized parking bay that the sedan covers, in square meters.



(3)

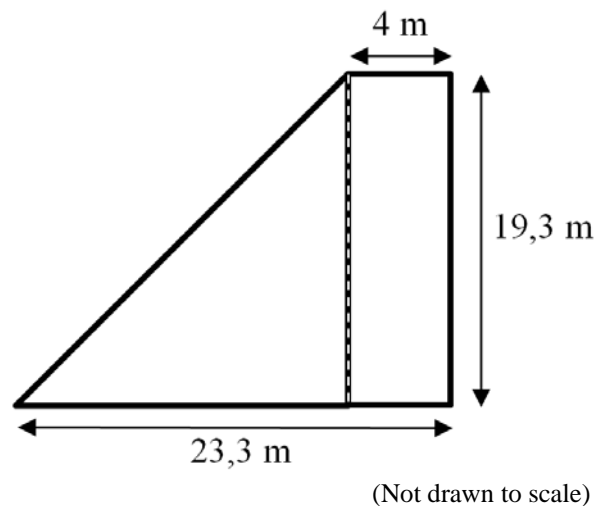
2.5.2 The parking bay needs to allow for getting in and out of the car once parked and so another 50 cm is added on both the length and breadth of the parking bay. Calculate the actual area of the parking bay in meters squared. (3)

2.5.3 If the total area available for parking at the airport is 5 265 000 m² and each parking bay is the size calculated in Question 2.5.2, how many parking bays could there be? Round your answer off to the nearest ten-thousand. (3)

2.6 The tail of a 747 jumbo jet aeroplane has the following shape and the airline company is considering painting a new logo on it.



The tail can be broken down into two basic shapes with the following dimensions:

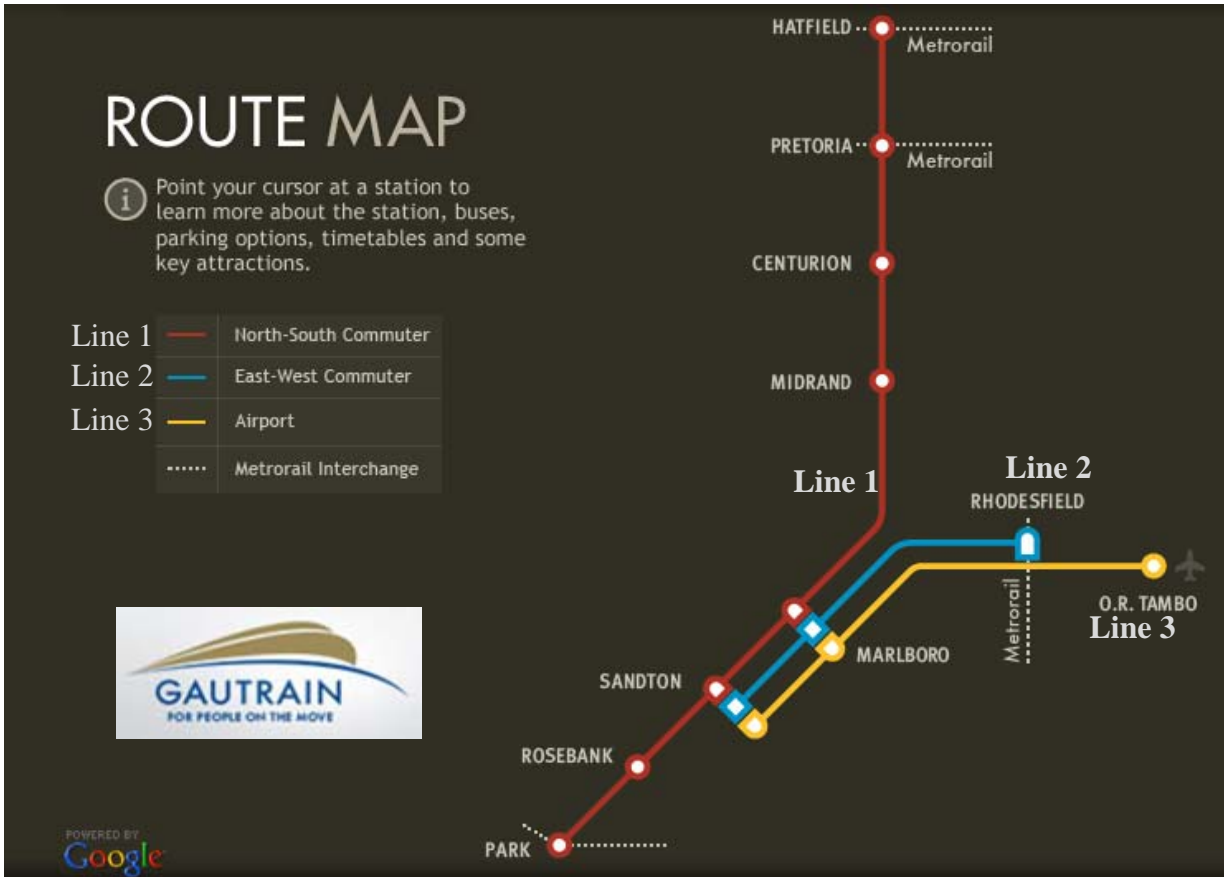


- 2.6.1 Calculate the surface area for one side of the tail. (4)
- 2.6.2 If 250 ml of paint cover 5 m², how much paint (in ml) will the airline company need in order to re-paint the tail on both sides with two coats of paint? (4)
- 2.6.3 In order to design a new logo, they need a scale diagram of the tail to work on. The designers use the scale of 1 : 200 to draw the diagram.
 - (i) What would 1 cm on the scale diagram be equal to in metres in reality? (2)
 - (ii) How many cm on the scale diagram represents one km in reality? (1)
 - (iii) What would the length of the line be on the scale diagram in order to represent 23,3 m in reality? (3)

[35]

QUESTION 3

Below are the map routes for the Gautrain. Take note that there are three different lines.



- 3.1 Explain to someone who has landed at O.R. Tambo International Airport how to get to Hatfield, Pretoria on the Gautrain. (3)

3.2 Below is a map of Hatfield, Pretoria. Refer to it when answering the questions that follow:



- 3.2.1 Determine, using the given scale, the ratio of *cm* to *m* of this map. (2)
 - 3.2.2 Measure the distance in *cm*, as the crow flies, between the Gautrain Pretoria station (Marked 'A') and the tree on Church Square. (2)
 - 3.2.3 Calculate the actual distance, in metres, between the Gautrain Pretoria station and Church Square. (3)
 - 3.2.4 In which general direction would you be going if you went from Barracks Station on Artillery Road to Church Square? (2)
- [12]**

QUESTION 4

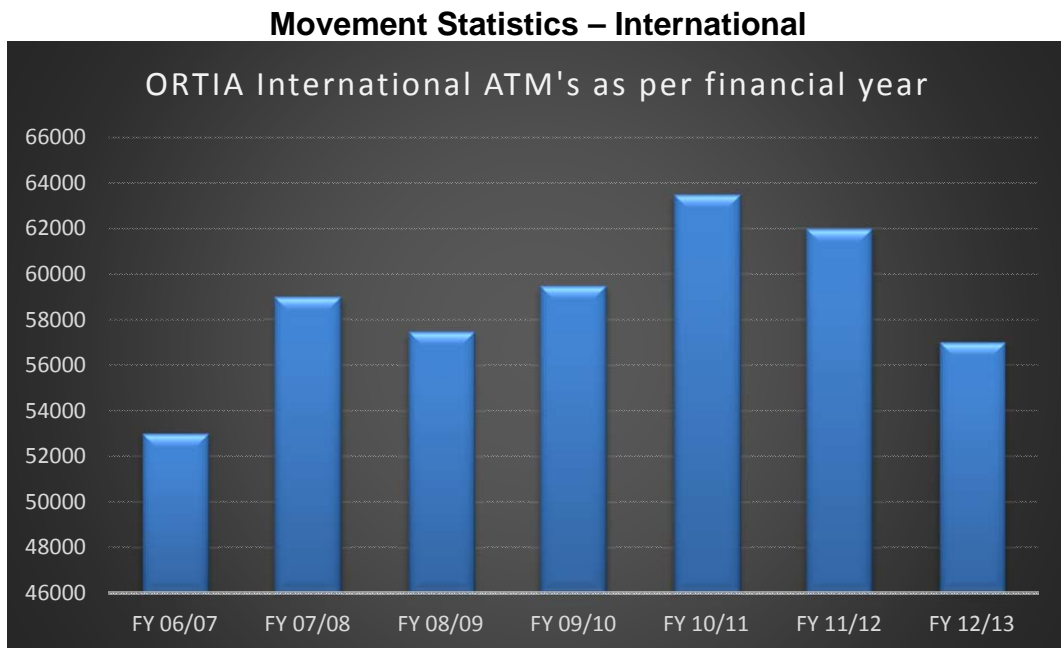
4.1 The following data shows the number of passengers travelling internationally at O.R. Tambo International Airport.

Year	International	
	Passenger movements	% Change
2006-07	6,958,277	no data
2007-08	7,645,647	▲ 9.9%
2008-09	7,480,461	▼ 2.2%
2009-10	7,489,211	▲ 0.1%
2010-11	7,965,594	▲ 6.4%

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

- 4.1.1 Using the values in the third column, calculate the average percentage change from 2007 to 2011. (4)
- 4.1.2 Calculate what the predicted number of passengers will be in 2011-12, if they were to increase by the average percentage calculated above. (3)
- 4.1.3 If you were to round off the number of passenger movements in the table to the nearest 100 000 what would your mode be? (3)
- 4.1.4 Using the rounded off values calculated above, draw a histogram to depict the information of the number of passenger movements in the table. Use the axis provided on the Answer Sheet. (8)

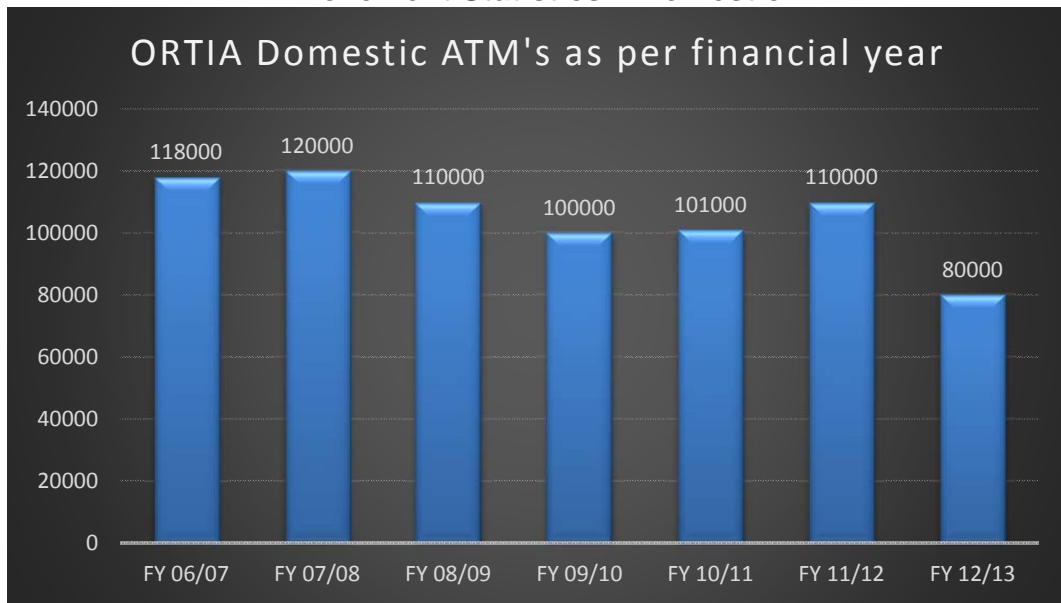
4.2 The following graphs show the number of international and domestic aircrafts that have landed at and left O.R. Tambo International Airport per year.



Note: FY stands for Financial Year and ATM is Air Traffic Movement.

- 4.2.1 Which year saw the greatest number of air traffic movement in international flights and how many were there? (2)
- 4.2.2 Which year saw the lowest number of air traffic movement in international flights and how many were there? (2)
- 4.2.3 Calculate the range of the international air traffic movement, over the past 7 financial years. (2)

Movement Statistics – Domestic



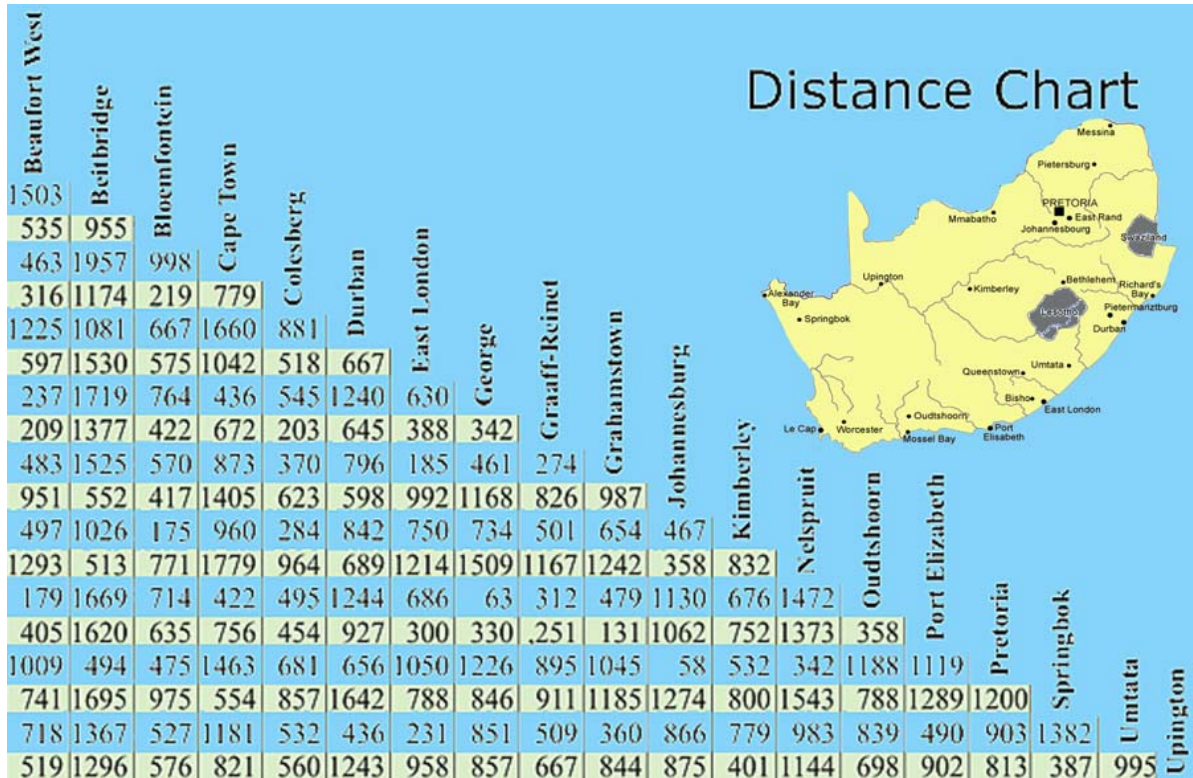
Note: FY stands for Financial Year and ATM is Air Traffic Movement.

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

- 4.2.4 Calculate the mean average of the domestic air traffic movement, over the past 7 financial years. (3)
 - 4.2.5 Which years had the same number of domestic air traffic movement? (2)
 - 4.2.6 Arrange the domestic air traffic movement in ascending order and find the median. (3)
- [32]**

QUESTION 5

5.1 You decide to rent a car and drive from Johannesburg to Cape Town via Upington:



5.1.1 Use the table above to calculate how many km's you will cover on the trip. Show all working. (3)

5.1.2 The car you are renting has a fuel consumption of 11 kilometres per litre. Fuel costs R13,85 per litre. Calculate the cost of your fuel for the trip. (4)

5.1.3 If it takes you 18 hours and 30 minutes to make the trip from Johannesburg to Cape Town via Upington, calculate the average speed that you will be travelling at. (Round off to the nearest km/h)
Use the formula below to help you:

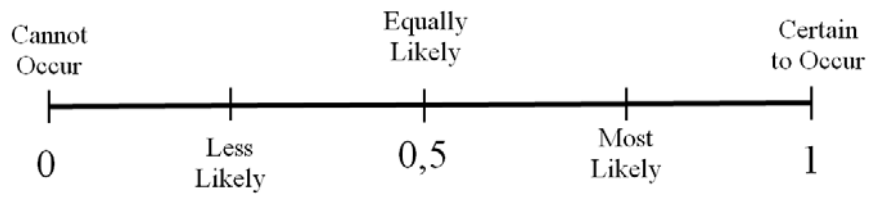
$$\text{Distance} = \text{Speed} \times \text{Time} \tag{4}$$

5.2 5.2.1 On your journey you stop to have a chicken burger for lunch. The probability of having cheese with your burger is $\frac{1}{2}$. The probability of having tomato sauce on your burger is $\frac{1}{6}$. Calculate the probability of having cheese and tomato sauce on your burger. (3)



5.2.2 If you can choose from the following sauces for your burger: 1000 island, tomato, mustard, cheese and BBQ, what is the probability that you choose tomato sauce? (2)

5.2.3 Where does the answer for Question 5.2.2 fall in the probability scale shown below?



(2)

5.3 The following table shows the number of meals ordered for the first 16 paying customers.

1	2	2	3	4	5	5	8
1	1	3	4	1	1	2	2

5.3.1 Draw up a frequency tally table to represent the data above. (4)

5.3.2 If the owner of the shop would like to see which of the number of meals is most popular, which measure of central tendency should he use: median; mean or mode and why? (2)

[24]

Total: 150 marks