basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL
SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P2

FEBRUARY/MARCH 2015

MARKS: 150

TIME: 3 hours

This question paper consists of 13 pages, 4 annexures and 2 answer sheets.

Please turn over

INSTRUCTIONS AND INFORMATION

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

2. Answer QUESTION 1.6.1 on ANSWER SHEET 1 and QUESTION 3.3 on ANSWER SHEET 2. ANNEXURES to assist you with the answering of QUESTION 2.1, QUESTION 2.2, QUESTION 3.2 and QUESTION 5.2 are attached. Write your centre number and examination number in the spaces on the ANSWER SHEETS. Hand in the ANSWER SHEETS 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 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

Lindiwe is the sole owner of a shop in Tzaneen that sells handbags, hair extensions and cosmetics.

Lindiwe's products
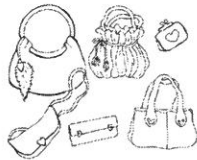
Handbags **Hair extensions** **Cosmetics**

Lindiwe kept the record of the income and expenses for the first quarter of 2014 below. For income tax purposes all the amounts were rounded off to the nearest rand. All the expenses for March were omitted as shown in the statement below:

INCOME AND EXPENSE STATEMENT FOR THE FIRST QUARTER OF 2014

	January R	February R	March R
Turnover[1]	189 189	197 012	221 261
Less: Cost of sales	142 702	150 349	162 215
Gross income	**46 487**	**46 663**	**59 046**
Less: Expenses[2]	26 602	27 727	34 238
Rent	11 025	12 600	_ _ _ _ _
Salary[3]	9 715	9 715	_ _ _ _ _
Packaging	965	679	_ _ _ _ _
Telephone	252	240	_ _ _ _ _
Transport cost	4 645	4 493	_ _ _ _ _
Net income	**19 885**	**18 936**	**24 808**

1. The income generated from the sale of products.
2. The expenses are for the rent, salaries, packaging, telephone and transport costs.
3. Does not include Lindiwe's salary.

1.1 Calculate Lindiwe's transport cost for March if:

- The rent amount remained unchanged from February
- An additional person, earning a monthly salary of R6 556, was employed from 1 March 2014
- The packaging cost was 46,425% less than the January packaging cost
- The ratio of the telephone cost for February : March = 8 : 11 (10)

1.2 Determine, showing ALL calculations, for which month the percentage mark-up on the cost of sales for the first quarter of 2014 was the highest.

You may use the following formula:

$$\text{Percentage mark-up} = \frac{\text{Gross income}}{\text{Cost of sales}} \times 100\%$$

(5)

1.3 Based on the statement for the first quarter of 2014, Lindiwe projected that her annual **net** income for 2014 would be R254 516.

Verify, showing ALL calculations, whether this projected amount is valid. (4)

1.4 The scaled layout of Lindiwe's shop and a photograph of a part of the shop are shown below.

The areas marked **A** to **G** represent the layout of the different products on display in the store. The photograph was taken by a person standing between area **F** and area **G**.

Layout of Lindiwe's shop
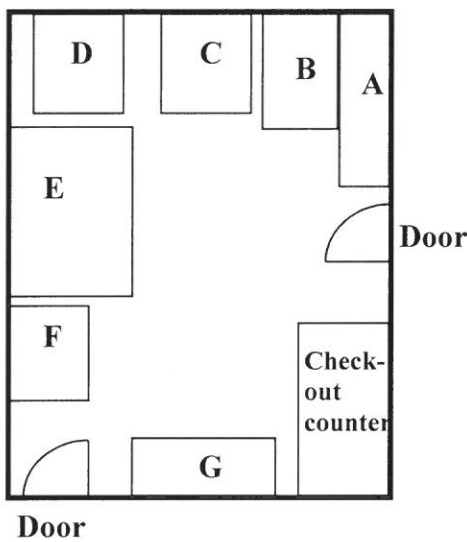
Photograph of part of Lindiwe's shop

Part of the door on the right-hand side

Scale: 1 : 100

1.4.1 Identify which product is displayed in area **A**. (2)

1.4.2 Use the given scale to determine the actual width of the store. (3)

1.5 One of the products that Lindiwe sells is an aqueous cream used for cleansing and moisturising, as shown in the picture alongside.

The aqueous cream is sold in 100 mℓ jars. The cylindrical jars are filled with cream to a height of 4 cm.

Picture of a cylindrical jar of aqueous cream
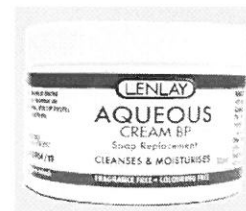
Calculate (in cm) the diameter of the jar.

You may use the formula:

Volume of a cylinder = $\pi \times (\text{radius})^2 \times \text{height}$, where $\pi = 3{,}142$

NOTE: 1 mℓ = 1 cm^3 (5)

1.6

> Lindiwe wanted to go on holiday for five days. Since she does not have a car, she investigated the possibility of renting one. She requested a quotation from PriceCheck using the Internet. She compared three rental deals and found that all of them charged a basic fee which included free kilometres. A fixed rate per kilometre for any additional kilometres travelled was also charged.
> She constructed the following formulae for the different rental deals:
>
> Ford Figo (with 200 km free per day):
> **Total rental cost = R1 264,40 + R 1,39 × a** , where a = additional km travelled.
>
> Opel Corsa (with 500 km free):
> **Total rental cost = R1 299,70 + R 1,75 × a** , where a = additional km travelled.
>
> Toyota Yaris (with 200 km free per day):
> **Total rental cost = R1 359,40 + R 1,21 × a**, where a = additional km travelled.
>
> The graphs representing the total car rental cost for a maximum of 2 000 km for the Ford Figo and the Toyota Yaris have been drawn on ANSWER SHEET 1.

Use the information above and ANSWER SHEET 1 to answer the following questions:

1.6.1   Draw on ANSWER SHEET 1 another line graph representing the total rental cost for a maximum of 2 000 km for the Opel Corsa.   (4)

1.6.2   After how many kilometres will the total rental cost for an Opel Corsa be the same as that for a Toyota Yaris?   (2)

1.6.3   Lindiwe estimates that she will cover a distance of 1 850 km for her whole trip. Determine which ONE of the three rental deals will be the most economical for her to choose.   (2)

[37]

QUESTION 2

2.1   Elizabeth visited Darwin in Australia and used a tourist map, shown on ANNEXURE A, to help her find her way during her stay. She stayed in a hotel in Bennett Street.

Use the map on ANNEXURE A to answer the following questions:

2.1.1   In which general direction is the central business district (CBD) from the airport?   (2)

2.1.2   Elizabeth walked from her hotel along the Esplanade to do some sight-seeing.

Name TWO places of interest that she will see along the Esplanade.   (2)

2.1.3   Elizabeth then walked back to her hotel and hired a taxi to take her to the Casuarina Shopping Centre. The taxi driver told her he would travel along Bennett Street and continue on Tiger Brennan Drive and on Vanderlin Drive until they reached the shopping centre.

Elizabeth looked at her map and noted that there was a much shorter route to the shopping centre.

Describe this shorter route to the shopping centre.   (4)

2.1.4   She used Google Maps on the Internet and noted that the distance from Bennett Street to the Casuarina Shopping Centre is 12,4 km showing a travelling time of 18 minutes, as shown in the picture below:
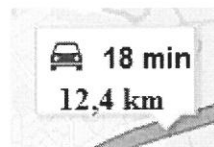
Determine, showing ALL calculations, whether the information shown by Google Maps indicates that the travel time is due to slow traffic flow.

You may use the formula:

Distance = average speed × time   (4)

2.2   A client is concerned that she is paying too much in banking fees. She presently has a Transact savings account at FANS Bank. She uses a debit card from her bank that is linked to this account.

TABLE 1 below shows an extract from her October Bank Statement.

TABLE 1: October Bank Statement – Transact savings account

Date	Description		Debit (R)	Credit (R)
01/10/14	Balance brought forward			127 400,27
01/10/14	Debit card purchase: Groceries		560,42	
01/10/14	Debit order: Uncapped Data Sim	#	599,00	
02/10/14	Debit card purchase: Pharmacy		356,35	
03/10/14	Debit order: Vehicle finance	#	6 999,00	
03/10/14	Debit order: Vehicle insurance	#	1 659,27	
03/10/14	Debit card purchase: Butcher		378,25	
05/10/14	Debit order: Paid TV channel	#	731,23	
05/10/14	Debit order: Home loan	#	11 782,81	
06/10/14	Branch cash deposit	#		4 500,00
08/10/14	ATM cash withdrawal	#	500,00	
11/10/14	Debit card purchase: Tasty Restaurant		537,90	
11/10/14	Debit card purchase: Beauty salon		328,35	
15/10/14	ATM cash withdrawal	#	500,00	
18/10/14	Debit card purchase: Jewellery store		3 399,90	
22/10/14	ATM cash withdrawal	#	500,00	
25/10/14	Debit card purchase: Hardware store		859,67	
29/10/14	ATM cash withdrawal	#	500,00	
31/10/14	Total Banking Service Fees for October		167,75	
31/10/14	Salary deposit			43 784,25
# Transactions for which banking service fees are charged.				

[Adapted from a Bank Statement]

Use TABLE 2 on ANNEXURE B showing the monthly banking service fees payable for the Transact and the Plus accounts of FANS Bank and TABLE 1 above to answer the following questions:

2.2.1   Verify, showing ALL calculations, whether the total banking service fees for October, as shown on the statement, is correct.   (9)

2.2.2   The client stated: 'I am paying more than three times the minimum monthly service fee for bank fees for this account!' Verify the validity of her statement.   (3)

2.2.3   Calculate the client's total banking service fees using her October statement if she had a Plus' account.   (3)

2.2.4   The client used her cash withdrawal amounts to pay for her weekly expenses for airtime, petrol, electricity and meals.

Suggest TWO cost effective ways that she could use to save on cash withdrawal fees.   (4)

[31]

QUESTION 3

3.1 | Greenland is an island between the Arctic Ocean and the North Atlantic Ocean. Some facts about Greenland:

- Total land area: 2 166 086 square km.
- 81% of Greenland is ice-capped.*
- The coastline is 44 087 km.
- North-south length of approximately 2 655 km or 1 650 miles and an east-west length of 1 290 km.
- Population of 56 370.
- Nuuk is the capital city.
- Qaanaaq is the northern-most town which is best known for its Inuit culture and for the 24 hours midnight sun that lasts for from 25 April to 18 August.

[Midnight sun is a time of the year when the sun never sets because Greenland is so far north.]

*Area fully covered by ice.

[Source: wikipedia.org]

Use the information above to answer the following questions:

3.1.1   Calculate the conversion factor used to convert kilometres to miles.   (2)

3.1.2   Explain why the total land area of Greenland cannot be calculated by merely multiplying the north-south length by the east-west length.   (2)

3.1.3   A tourist to Qaanaaq would like to experience the midnight sun. Calculate the total number of days during which it is possible to experience the midnight sun.   (4)

3.2   A map showing the population distribution in Greenland is given on ANNEXURE C.

Use this map and the information in QUESTION 3.1 to answer the following questions:

3.2.1   Calculate the population density of Greenland.

You may use the following formula:

$$\text{Population density} = \frac{\text{total number of persons living on the island}}{\text{ice-free area (in km}^2\text{)}}$$ (4)

3.2.2   Estimate the size of the indigenous population who lived in Nuuk during 2003.   (3)

3.2.3   Determine the number of towns which have a population of less than 2 000.   (2)

3.3   TABLE 3 on ANSWER SHEET 2 shows the temperature data for Ivituut.

      3.3.1   Determine the range for the minimum temperatures for Ivituut.   (2)

      3.3.2   Complete the bar graph on ANSWER SHEET 2 that represents the maximum and minimum temperatures for Ivituut, by drawing the missing bars.   (6)

                    [25]

QUESTION 4

4.1   During April 2010 Dina, who lived in Limpopo, was studying in Gauteng. She intended getting her driver's licence and analysed the data on learner's licences issued in South Africa as illustrated in TABLE 4 below.

TABLE 4: Total number of learner's licences issued per province in South Africa from 1 April 2009 to 31 March 2010

PROVINCE	CATEGORY OF LEARNER'S LICENCES ISSUED 1 APRIL 2009 TO 31 MARCH 2010			TOTAL
	MOTORCYCLE	**LIGHT VEHICLE**	**HEAVY VEHICLE**	
Gauteng	20 533	102 191	293 094	**415 818**
KwaZulu-Natal	4 407	44 637	142 529	**191 573**
Western Cape	15 816	95 681	78 147	**189 644**
Eastern Cape	3 857	38 940	68 793	**111 590**
Free State	3 174	18 500	56 020	**77 694**
Mpumalanga	2 769	11 206	79 077	**93 052**
North West	2 558	15 025	66 265	**83 848**
Limpopo	1 317	8 234	98 151	**107 702**
Northern Cape	1 470	7 757	20 623	**29 850**
Totals	**55 901**	**342 171**	**902 699**	**1 300 771**

[Source: December 2010 Road TrafficReport]

Use TABLE 4 to answer the following questions:

4.1.1   Determine the probability, in decimal form, of randomly choosing a person who was issued a light vehicle learner's licence.   (3)

4.1.2   Compare, showing ALL calculations, the ratios of the number of light vehicle learner's licences issued to the number of heavy vehicle learner's licenses issued for both Limpopo and Gauteng.   (5)

4.1.3   Explain, showing ALL calculations, why there is a bigger difference in the percentage of all learner's licenses issued in Gauteng compared to learner's licences issued in Limpopo.   (4)

4.1.4   Dina used the data in TABLE 4 and performed the following calculation:

$$\text{Probability} = \frac{102\,191}{415\,818} \approx 25\%$$

She then stated: 'The probability of passing a light vehicle learner's licence test in Gauteng is approximately 25%.'

Explain why Dina's statement or calculation is INCORRECT.   (3)

4.2 Twenty-four-year-old Keitumetse owns a 2002 Solo 1.6i car which has a book value of R41 100. He obtained his driver's licence on 14 March 2013. He insured this car with the ABC Insurance Company where he pays a monthly insurance premium of R230,43.

TABLE 5 below shows the insurance company's terms and conditions that come into effect when a claim is made and the excess* amounts the claimant must pay.

TABLE 5: Excess amounts for 2002 Solo 1.6i

BASIC EXCESS PER CLAIM	EXCESS AMOUNT
Compulsory	5% of loss or damage with a minimum of R2 000
Theft/Hijacking	10% of loss with a minimum of R3 000
Windscreen/Window	20% of loss or damage with a minimum of R350
Loss of keys	R100
Additional Excess	
Driver under 25 years old	R1 000,00
Driver attained a driver's licence less than 2 years ago	R2 000,00

* Excess is the amount of money the insurance company deducts from your claim amount.

[Source: www.abc.co.za]

4.2.1 Give a valid reason why an additional excess amount is charged if the car involved in the accident is driven by a person who has had a driver's licence for less than 2 years. (2)

4.2.2 Keitumetse was involved in a car accident and the value of the damage to his car was R13 400,50. There were no broken windows and the key was not lost.

(a) Calculate the total excess as a percentage of the claim amount that Keitumetse will have to pay. (5)

(b) Keitumetse's 50-year-old father, a licensed driver with 15 years' driving experience, remarked: 'I am sure that if you had been my age the company would have paid more than 80% of the claim amount.'

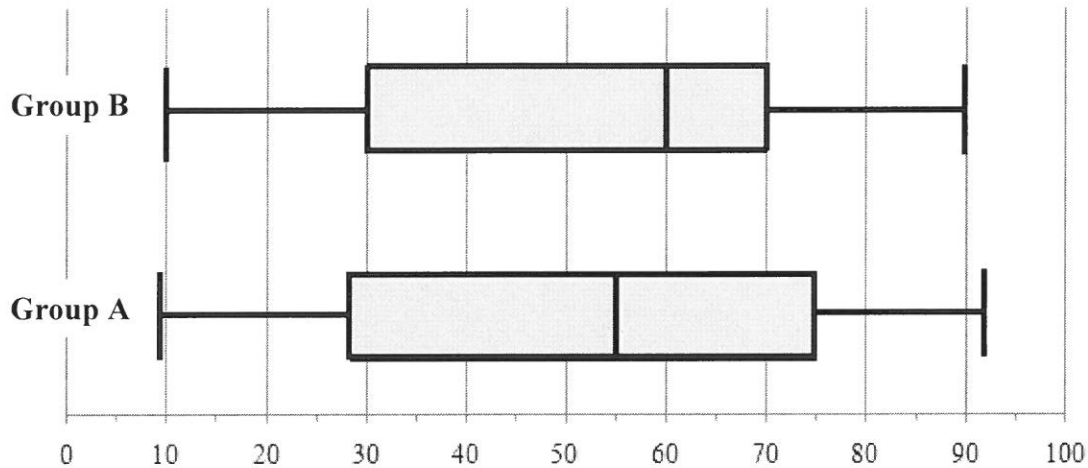Verify, showing ALL calculations, whether his remark is CORRECT. (5)

[27]

QUESTION 5

5.1

The two Economics groups, **A** and **B**, at Mphohadi College of Education compared their September 2014 examination results to see which group performed better.

The results of the examination for the two groups are represented by two box and whisker diagrams below:

The arranged percentage marks of group **A** are given below:

9	14	14	19	21	23	33	35	37	37	42	**P**
55	56	57	**Q**	59	75	75	77	78	80	81	92

5.1.1   Calculate the missing values **P** and **Q**, if the mean percentage mark of group **A** is 49,25.   (5)

5.1.2   Calculate the probability of randomly selecting a learner from group **A** who obtained a percentage mark of less than 80%.   (2)

5.1.3   Explain which group performed better in the examination if both the medians and the interquartile ranges are compared.   (7)

5.2 | Mphohadi College wants to build new houses for the lecturers. They obtained basic plans from the Internet as shown on ANNEXURE D.

They consulted an architect who made some comments about the plan.

5.2.1   Explain, giving TWO reasons each, why the architect commented on the following:

(a)   Some of the doors open the wrong way.   (3)

(b)   The toilet pans are not correctly positioned.   (3)

5.2.2   The side elevation plan shows two windows and a door.

Which rooms on the plan are represented by these windows?   (2)

5.2.3   On the plan the dimensions of the floor of Bedroom 2 are as follows:

Length = 33 mm and width = 28 mm

According to the building regulations of the local municipality the area of a window must be at least 11,5% of the floor area of the room.

The actual window is 220 cm wide. Calculate (to the nearest cm) the minimum height of the window.

You may use the formula:

Area of a rectangle = length × width   (8)
                                               [30]

                   TOTAL: **150**

ANNEXURE A

QUESTION 2.1

DARWIN

Central Business District

Information			Hospital	15,5 km
P	Post Office		Leanyer Recreational	
B	Bus Transit Centre		Park	16 km
H	Hospital		Palmerston	21,5 km

DISTANCES FROM POST OFFICE

Airport	12 km
Berrimah	12,5 km
Casuarina Shopping	
Centre	13 km
East Point	7,5 km

[Source: tropicaldarwin.com]

Not to Scale
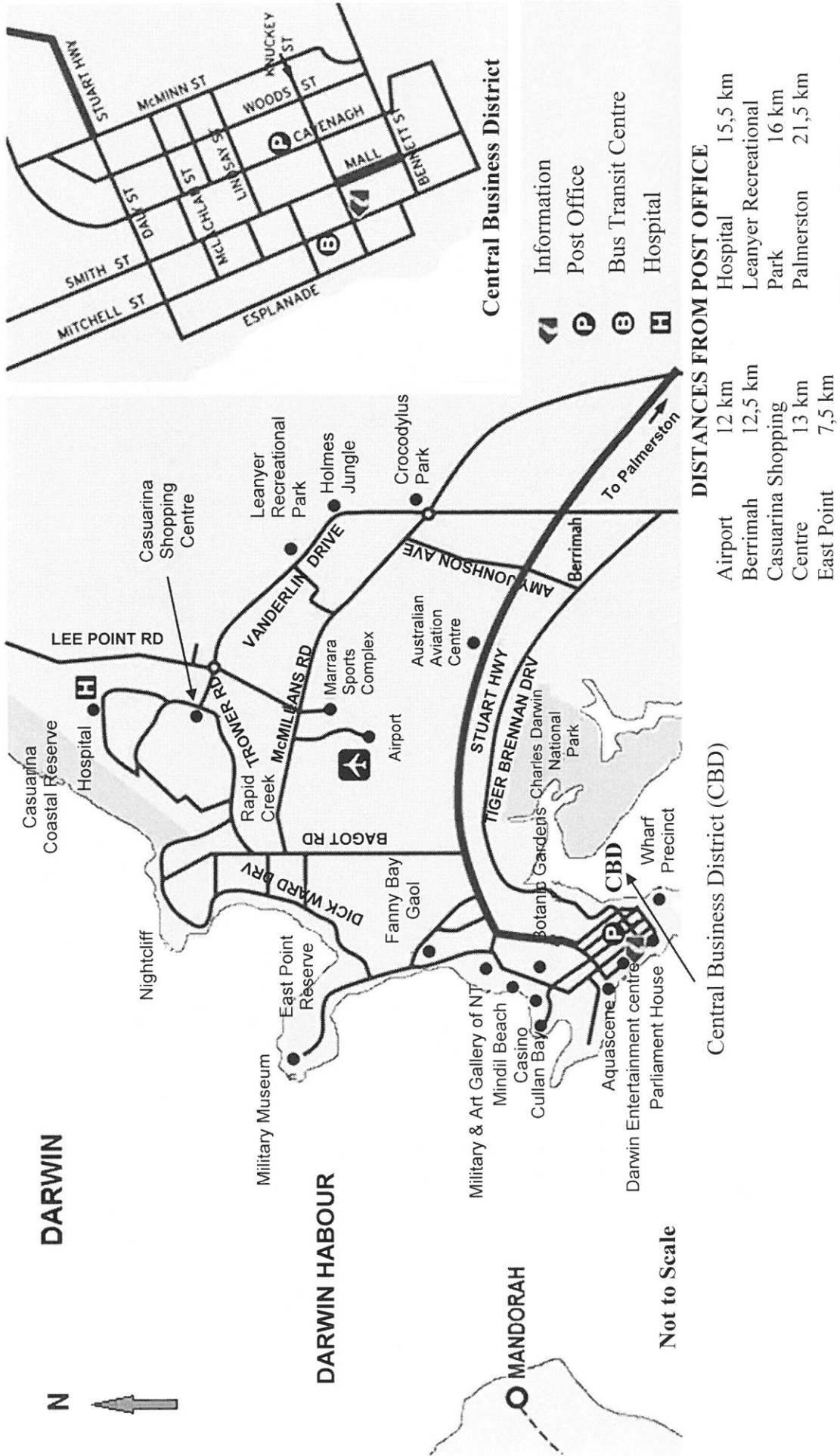
ANNEXURE B

QUESTION 2.2

TABLE 2: **Monthly banking service fees for the Transact and Plus Accounts of FANS Bank**

	TRANSACT ACCOUNT	PLUS ACCOUNT
Fixed monthly fee	R0,00	R104,00
Cash deposits		
At FANS bank's ATM	R4,00 + 1,2% of value of deposit	Maximum 3 free transactions[3]
Other banks	R10,70 + 1,2% of value of deposit	
At the branch	R11,00 + 1,35% of value of deposit	Maximum 2 free transactions[3]
Cash withdrawals		
At FANS bank's ATM[1]	R3,50 + 1,10% of value of withdrawal	Maximum 8 free transactions[3]
In the branch	R33,00 + 1,10% of value of withdrawal	Maximum 2 free transactions[3]
Payments		
Electronic account payment using the ATM	R5,00	Unlimited free transactions
Debit card purchase	Free	Unlimited free transactions
Debit order	R12,00 per debit order	Unlimited free transactions
Minimum monthly service fee[2]	R53,00	

1   Where no FANS Bank ATM is available or if the ATM is offline, the FANS Bank ATM cash withdrawal fee applies.
2   The minimum monthly service fee will be charged if the total combined service fees do not exceed R53,00.
3   Transactions in excess of the specified maximum will attract Transact fees.

ANNEXURE C

QUESTION 3.2

POPULATION DISTRIBUTION OF GREENLAND
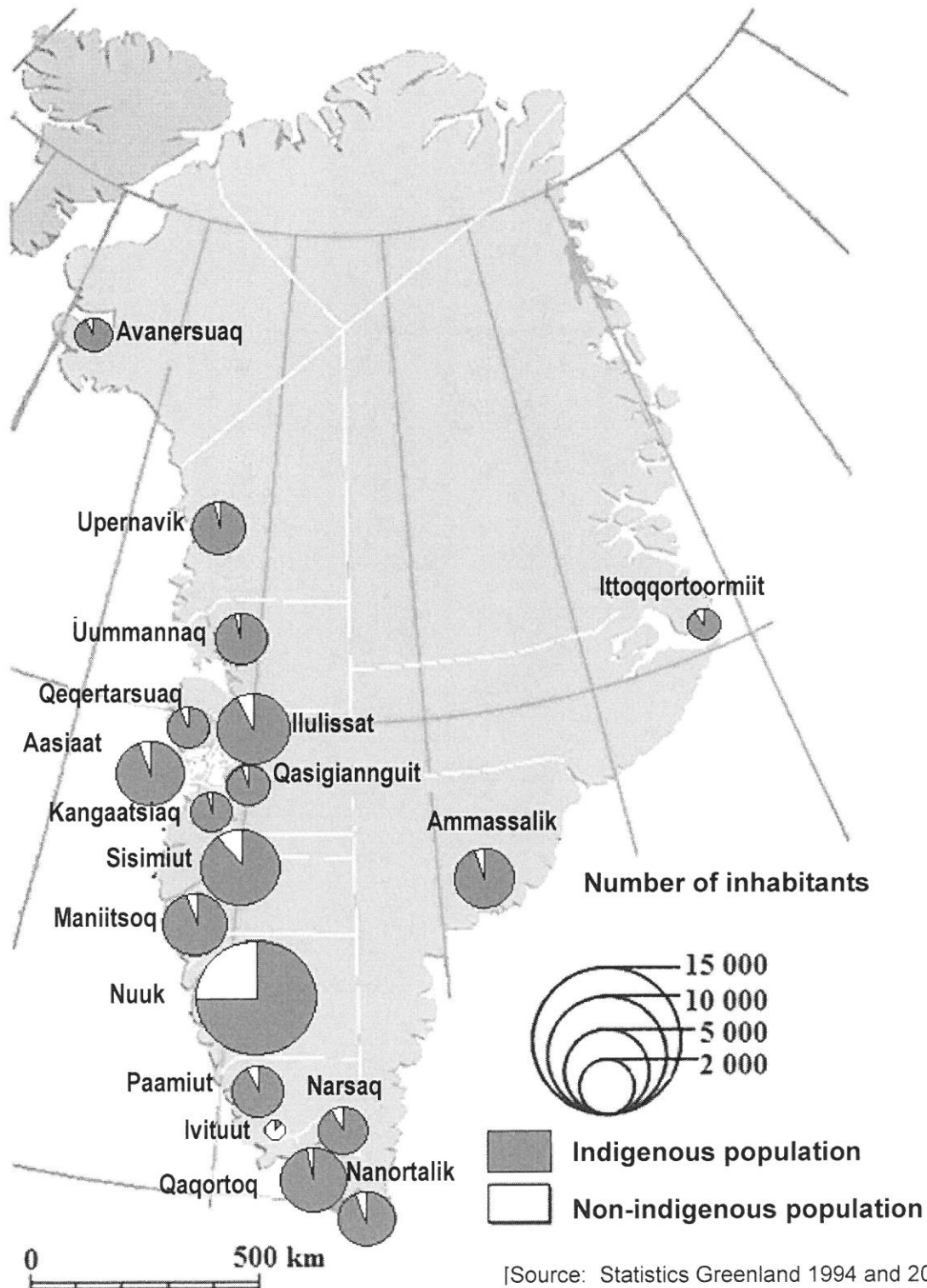
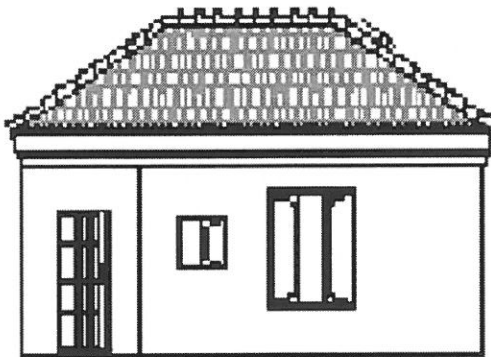[Source: Statistics Greenland 1994 and 2002]
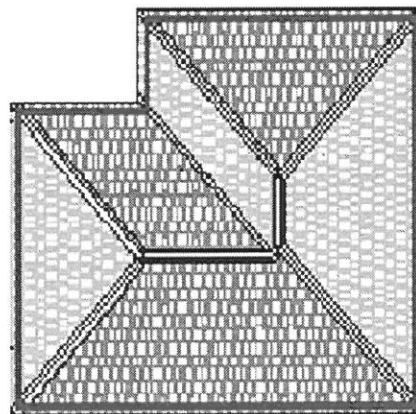
ANNEXURE D

QUESTION 5.2

House Floor Plan   **Scale: 1 : 125**
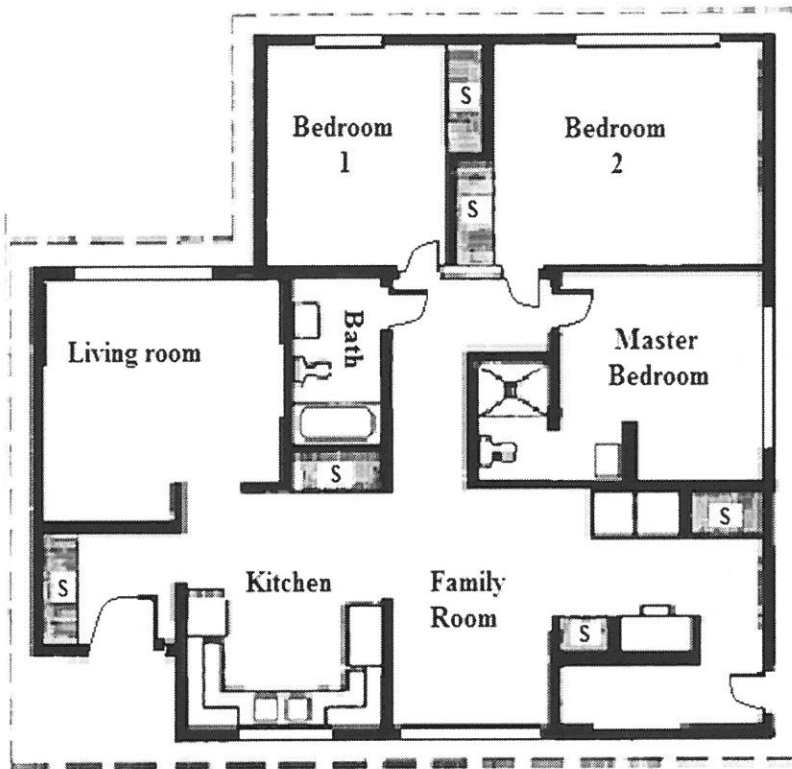
Key

Door	
Toilet pan	
Shower	
Window	
Walls	
S	Storage space

Side Elevation

Roof Plan

[Source: www.homerenovations.about.com]

CENTRE NUMBER:

EXAMINATION NUMBER:

ANSWER SHEET 1
QUESTION 1.6.1

Total car rental cost for a maximum of 2 000 km

Key

............Toyota Yaris

------Ford Figo
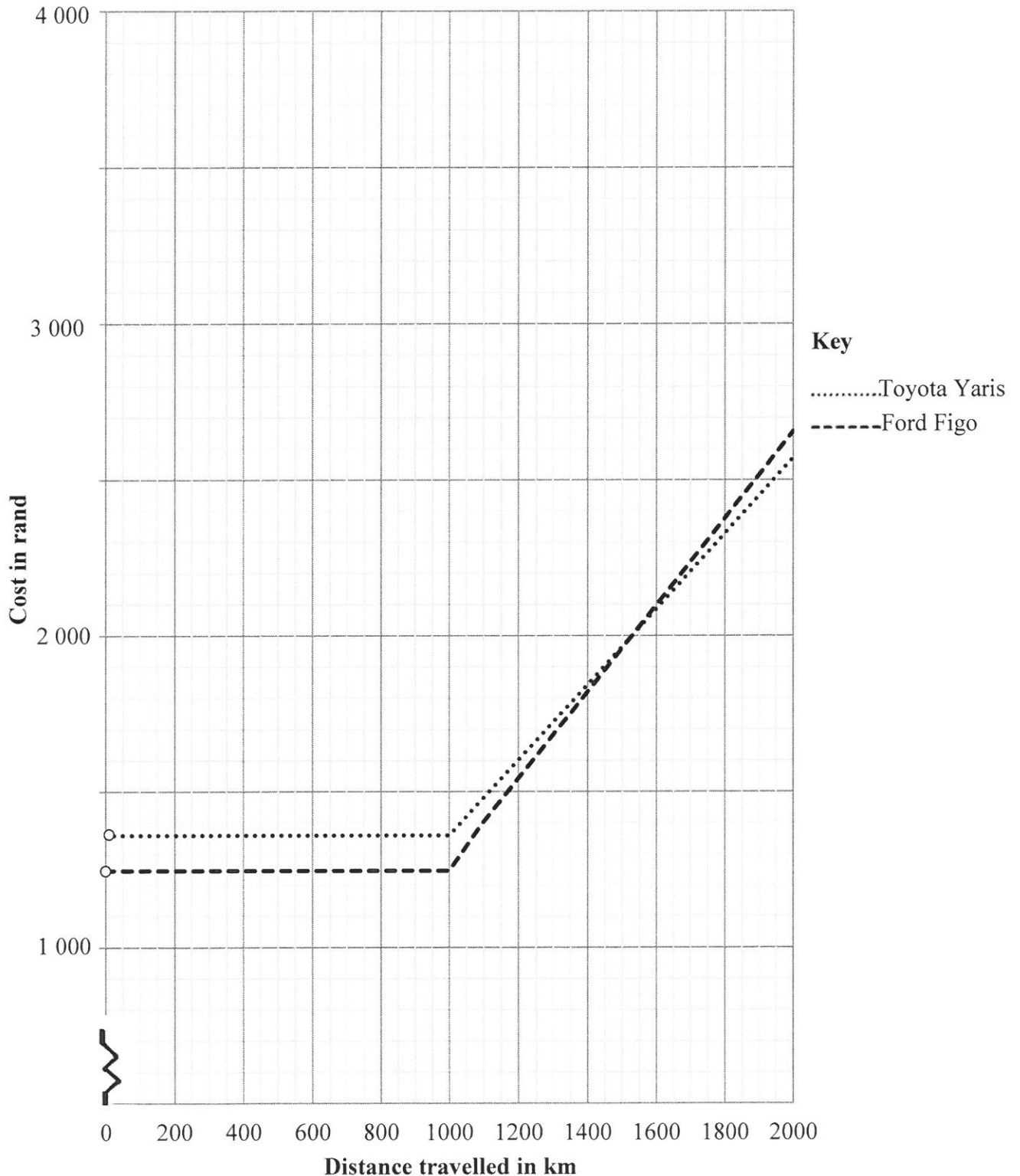
CENTRE NUMBER:
EXAMINATION NUMBER:

ANSWER SHEET 2
QUESTION 3.3

TABLE 3: Temperature data for Ivituut

Temperature data for Ivituut in °C													
	Months of the Year												Annual
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Maximum	13,3	14,4	15,6	16,1	23,3	30,1	23,3	21,7	21,1	19,4	17,8	15,6	30,1
Minimum	−27,8	−28,9	−27,2	−20,6	−10,6	−2,2	0,6	−1,7	−5,6	−12,8	−17,8	−26,7	−28,9

[Source: Sistema de ClasificaciónBioclimática Mundial]

Monthly maximum and minimum temperature data for Ivituut