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HERITAGE HOUSE

PRELIMINARY EXAMINATION: 25 AUGUST 2023

MATHEMATICAL LITERACY: PAPER 1

GRADE 12

EXAMINER:	C Sam	MARKS:	150
MODERATOR:	L Mudzamiri	TIME:	3 HOURS

NAME & CLASS:

INSTRUCTIONS:

- This question paper consists of:
 - 18 pages which includes 1 page at the back for extra calculations or rough work.
- Read the questions carefully.
- Answer ALL the questions on the question paper.
- Diagrams are not necessarily drawn to scale.
- You may use an approved non-programmable and non-graphical calculator unless otherwise stated.
- Answers should be **rounded off to two decimal places** unless otherwise stated, or if the context requires rounding up or down.
- Clearly show ALL calculations. Answers only will NOT necessarily be awarded full marks.
- It is in your own interest to write legibly and to present your work neatly.

➤ **Source: Adapted from IEB Supplementary Mathematical Literacy Paper 1 May 2023**

QUESTION	1	2	3	4	5	TOTAL
ACTUAL						
POSSIBLE	33	30	31	38	18	150

QUESTION 1

[33]

“The multibillion-rand, Oceans Mall officially opened its doors to shoppers last year, 15 November 2022. The project created 6,000 jobs during construction and 2,500 permanent jobs and is classified as a catalytic development by the City of Durban. The mall features two large, state-of-the-art anchor tenants - Woolworths and Checkers. Over 97% of the mall’s 120 stores are let and are filled with both well-known national and sought-after international brands.”

[Source: <https://www.bizcommunity.com/Article/196/460/233552.html>]



Anesu Cele is a junior manager employed by the Oceans Mall Checkers.

a) He receives a copy of his salary slip via email.

OCEANS MALL CHECKERS

Oceans Mall
Lagoon Drive
uMhlanga
4320

Employee Name: Anesu Cele
Period: 2023/08/01 to 2023/08/31
ID Number: 9701220136098
Employee Number: E012
Employment Date: 01 December 2022
Employee Address: 40 Adelaide Drive
 Glen Ashley
 Durban North
 4051
Banking Details: ABSA, Cheque Account
 51236670

Income:		Deductions:	
Basic Salary:	28 900,16	Tax:	Question 5 (ii)
Laptop Allowance:	1 100,00	UIF:	177,12
Medical Aid:	1 300,00	Union Fees	25,00
Housing Allowance:	850,00	Momentum RA:	1 800,00
Total Income:	Question 5 (i)	Total Deductions:	6 006,37
		Nett Pay:	Question 5 (iii)

Note: RA is Retirement Annuity

1. Calculate the number of months Anesu has been working at Checkers. (2)

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2. Give the address of his employer. (2)

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3. List 2 monthly deductions that Anesu pays from his salary. (2)

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4. Calculate the amount that Anesu receives for housing per year. (2)

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5. Calculate the following missing values:

- i. Total Income (2)

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- ii. Tax (2)

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- iii. Nett Pay (2)

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6. Calculate what percentage of Anesu's basic salary goes towards his RA contribution each month. (3)

7. What does the acronym UIF stand for? (2)

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8. When would Anesu be able to claim from UIF? Give 2 reasons. (2)

- b) "A B-BBEE certificate is a document verifying your business' performance with regards to black economic empowerment in South Africa, as determined by your company size, sector code and the points accrued across each of the five elements of the BEE." [Source: <https://honeycomb-bee.co.za/b-bbee-certification>]

As junior manager, Anesu must determine the demographics of the staff at Oceans Mall Checkers to establish if Checkers is B-BBEEC compliant. Anesu gave his staff a survey to complete. Use the summary of the survey results below to answer the questions that follow:

Table 1: Summary of Survey Results

Staff Gender: Male: 25 Female: 29 Staff Age: 18 – 25 years: 7 26 – 39 years: 32 40 – 55 years: 10 56 – 65 years: 5	Staff Home Language: English: 17 IsiZulu: 31 Afrikaans: 6 Staff Race: Black: 32 Coloured: 11 White: 9 Indian: ?
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1. Determine the number of staff that completed this survey. (2)

2. State what the maximum age of an employee could be. (2)

3. Determine the percentage of staff that have IsiZulu as their home language. (2)

4. State which gender of the staff is in the minority. (2)

5. Calculate the percentage probability of a staff being Indian. (4)

QUESTION 2**[30]**

“The Oceans Mall was designed to cater for all walks of life and geared for all tastes, including the sophisticated and affluent shopper. The mall includes a high-end Platinum Walk which features premium international fashion brands such as Dolce & Gabbana, Burberry, and Versace.” [Source: <https://famousdurban.co.za/oceans-mall-a-feast-of-shopping/>]

- a) The following table shows the various cardholders that buy at the top 10 shops in the Oceans Mall for the month.

Table 2: Summary of different cardholders at Oceans Mall in August 2023

Rank	Shop	Platinum Card	Black Card	Gold Card	Total
1	Checkers	3 406	2 829	2 591	8 827
2	Woolworths	2 610	2 613	2 613	7 836
3	Dis-Chem	1 769	1 886	2 029	5 684
4	Clicks	662	632	545	1 838
5	Vodacom	581	804	1 016	2 401
6	Browns	475	450	497	1 422
7	Pandora	435	482	731	1 648
8	Old Khaki	311	274	281	866
9	Gucci	256	274	333	863
10	Burberry	245	358	515	1 118
	Total	10 749	10 603	11 151	32 504

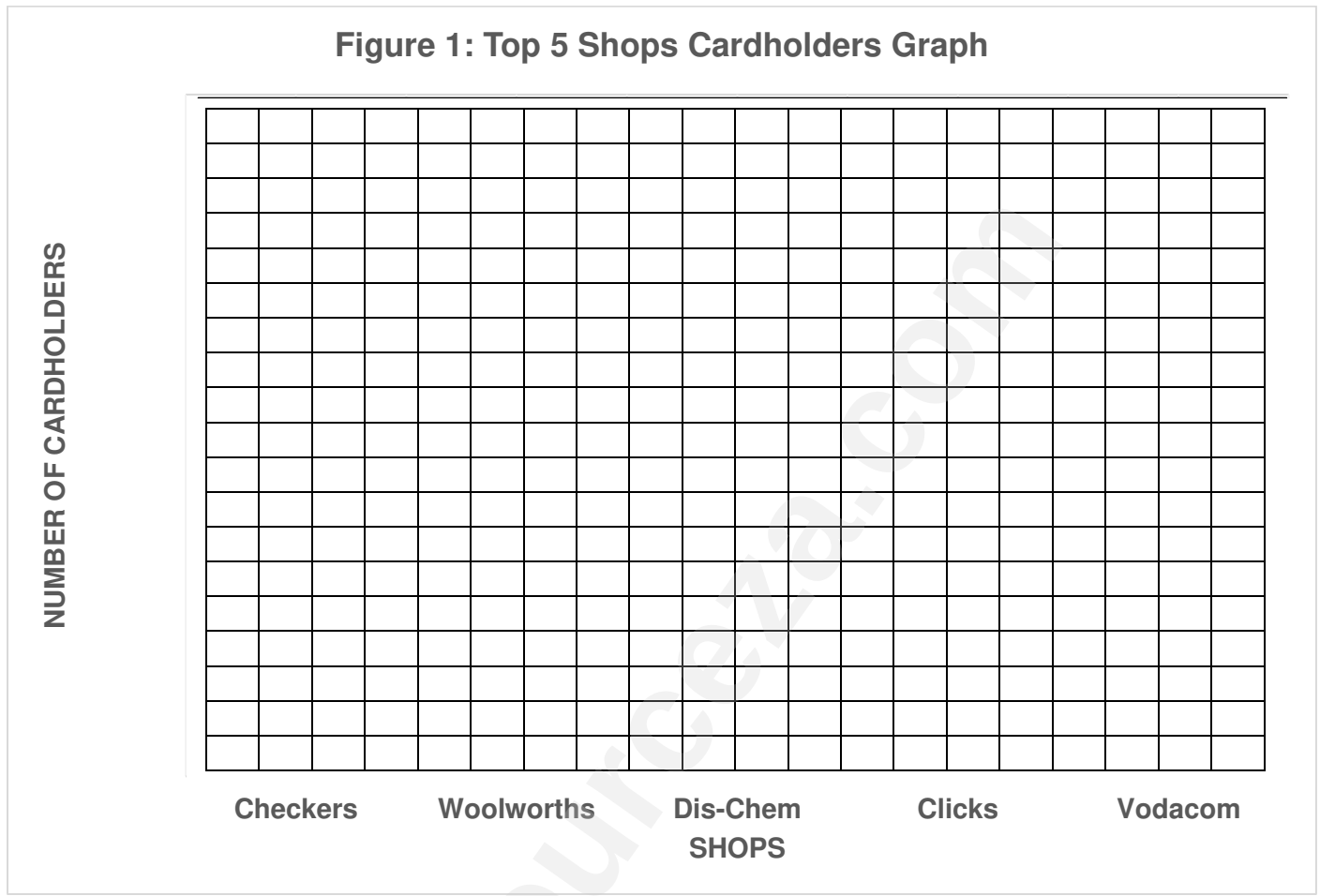
1. Calculate the mean of the total number of cardholders for these top 10 shops. (2)

2. Determine the median number of platinum cardholders for these top 10 shops. (2)

3. Calculate the range of gold cardholders for these top 10 shops. (2)

4. Name the shop or shops that received the least number of black cardholders. (2)

- b) Use the cardholder table to draw an appropriate graph for the top 5 shops on the grid below. Your graph should show the number of each type of card (platinum, black, and gold) used by customers in the top 5 shops in rank order. (7)



- c) Vivian Reddy covered an amount of R1,3 billion, which was 75% of the total cost of the Oceans Mall. The balance of the cost was covered by the Chinese Government. [Source: <https://osgamers.com/frequently-asked-questions/who-owns-oceans-mall>]

1. Determine what **fraction** of the cost was covered by the Chinese Government. (2)

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2. Calculate the actual amount covered by the Chinese Government.

Give your answer in numbers.

(4)

3. Hence, calculate the total cost of the Oceans Mail.

(2)

4. Use the exchange rate table to convert your answer in Question **(c3)** from Rands (R) to Chinese Yuan (CNY). Round off your answer to the nearest million Yuan. (5)

1 SA Rand	0,053 US Dollar
1 US Dollar	7,23 Chinese Yuan

5. Write your answer in Question **(c4)** in words.

(2)

QUESTION 3**[31]**

The Oceans Mall has a car wash called Oceans 11 which is situated in the basement level of the parking lot.

- a) Use the table below which shows the approximate monthly expenses involved to answer the questions that follow:

Expense	Amount (R)	Percentage %
Rent	180 000	52
Equipment	30 000	9
Water & Electricity	B	A
Labour	48 000	14
Marketing	20 000	6
Miscellaneous	10 000	3
Total	C	

1. Calculate the value of "A" if it is twice the percent of Equipment. (2)

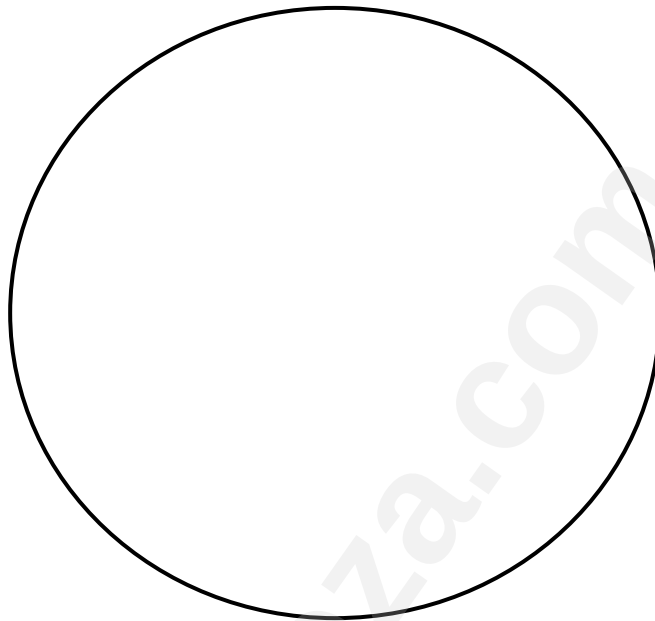
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2. Hence, calculate the value of "B". (2)

3. Calculate the value of "C", the total expenses. (2)

4. Draw a pie chart using the above table values. Include all graph elements when completing the pie chart. (6)

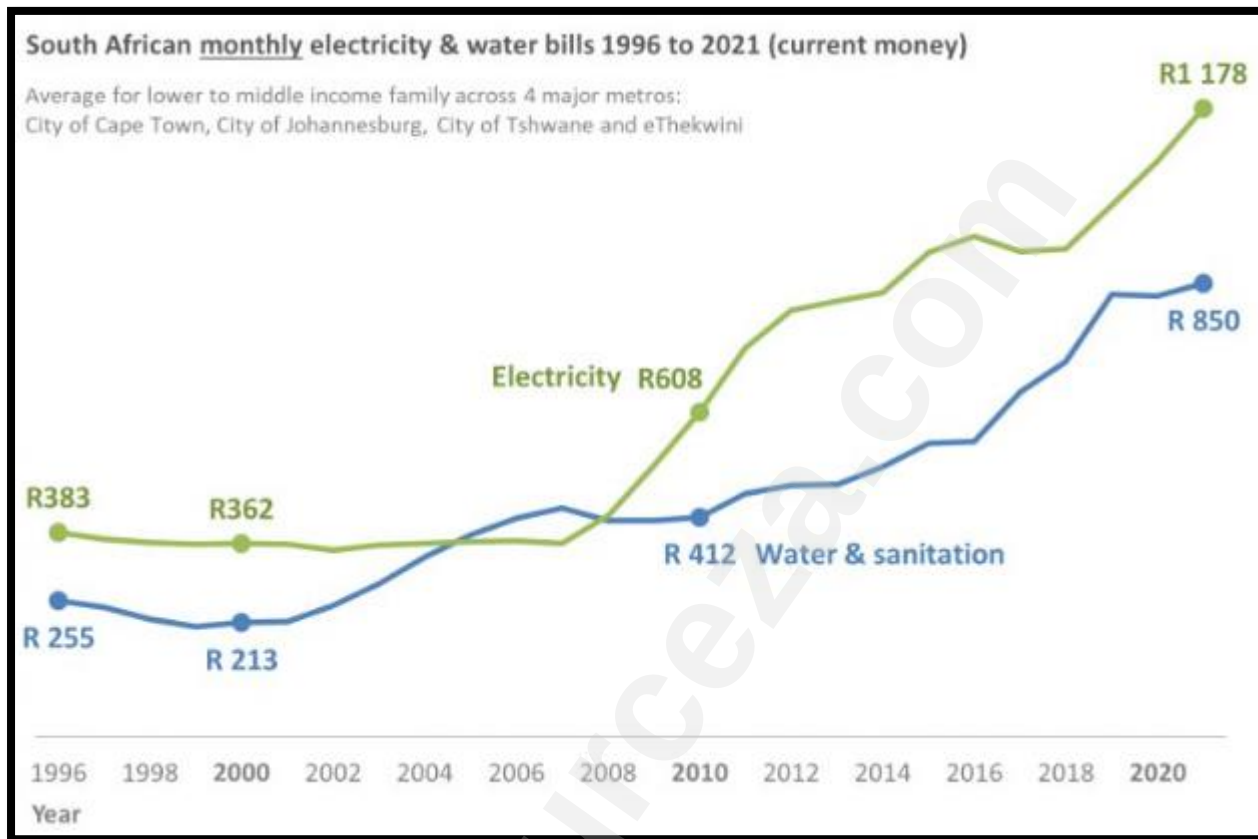
Figure 3: _____



5. If Oceans 11 has a profit margin of 150%, use your answer in Question **(a3)** to calculate the approximate total income they make for the month. (3)

6. If 2 489 vehicles are washed, using your answer in Question **(a5)** calculate how much Oceans 11 charges each customer. Round off your answer to the nearest Rand. (3)

- b) The owner of Oceans 11 car wash, Mr Riley Saunders, considers the average domestic Electricity, Water and Sanitation expenses of the lower to middle income customers and tries to create a more affordable car wash package for them. He studies the graphs below to get a better understanding of the price increments from 1996 to 2020.



[Source: <https://poweroptimal.com/the-price-of-water-and-electricity-in-south-africa-a-tale-of-two-tragedies/#chapter1>]

Use the graph to answer the following questions.

1. If the cost of Water and Sanitation in 2020 includes VAT, calculate amount of VAT paid. (3)

2. Calculate the percentage change of the price of Electricity between the years 2010 and 2020. (3)

3. Riley claims that the price of Electricity is directly proportional to the price of Water and Sanitation. State if his claim is true or false and use values and dates to justify your answer. (3)

4. Is the data discrete or continuous? Explain your answer. (2)

5. Give one way in which the graph above can be improved such that it is easier to understand. (2)

QUESTION 4**[38]**

“The Radisson Blu Hotel forms the first phase of the Oceans Umhlanga mega development which is a five-star hotel that boasts 206 hotel rooms, 95 suites, a 36,000 square metre mall, and about 500 apartments.” [Source: <https://www.l2b.co.za/Construction-News/Five-star-Radisson-Hotel-debuts-at-Oceans-Umhlanga>] The hotel has a shuttle service of luxury cars for their guests. The owner would like to purchase several hybrid engine vehicles due to the increasing petrol price in South Africa and the concerns over climate change. (A hybrid engine combines at least one electric motor with a gasoline engine to move the car, and its system recaptures energy via regenerative braking.)

a) The cash price of the new top of the range Crossover Lexus UX 250h comes in at R703 130,44 exclusive of VAT.

1. Calculate the amount of VAT payable on this Lexus UX 250h. (2)

2. Hence, determine the total cash price of this Lexus UX 250h. (2)

b) The car can be financed on hire purchase loan agreement with most South African banks as follows:

Hire Purchase	
Deposit: 10% of cash price inclusive of VAT	
Monthly repayments: R17 890,00	
Payment period: 5 years	

1. Calculate the total cost of purchasing this car on hire-purchase. (3)

2. Calculate the loan amount that should be taken on this car. (2)

3. Hence, determine the interest rate when purchasing this car on hire-purchase. (3)

$$\text{Interest rate} = \frac{\text{Total Repayments} - \text{Loan Amount}}{\text{Loan Amount}} \times 100\%$$

c) Financial experts recommend that you do not spend more than 20% of your gross monthly salary on a vehicle repayment. Show, using calculations, that you will need to earn more than R89 000,00 pm to afford the monthly repayments of R17 890,00. (3)

d) Vivian Reddy compares the fuel consumption of the non-hybrid and the hybrid Lexus UX 250 models. Use the information below to answer the questions that follow.

	
Lexus UX 250 Nonhybrid/ Petrol	Lexus UX 250 Hybrid
R 778 600,00	R808 600,00
6,2L/100km	4,5L/100km

[Source: <https://www.lexus.co.za/ranges/UX>]

Petrol price: R22,89 per Litre

1. Vivian comes up with the following two formulae for the two different Lexus UX 250 models.

- *Cost of using petrol model* = $R1,41918 \times \text{number of km}$
- *Cost of using hybrid model* = $R30\,000 + R1,03005 \times \text{number of km}$

i. Show, using calculations, how he determined the rate of R1,41918/km for the petrol model. (3)

- ii. Show, using calculations how he determined the fixed cost (which is the difference between the petrol and hybrid model) of R30 000 for the hybrid model. (2)

2. Use the formulae given in Question (d1) to complete the table below: (6)

Number of km	0 km	10 000 km	20 000 km	C
Cost of fuel: petrol model	R0	R14 191,80	B	R141 918,00
Cost of fuel: hybrid model	R30 000	A	R50 601	R133 005,00

3. Use the completed table in Question (d2) to plot both cost graphs on the same set of axes below. (5)

Figure 2: _____

4. Write down, from the graphs, the number of kilometres and the cost for which both vehicles will be the same. (2)

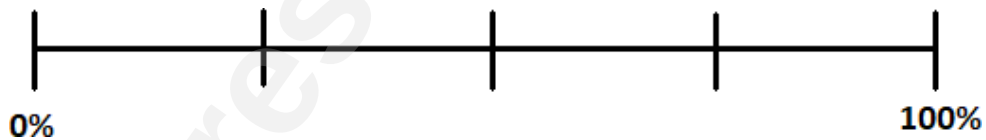
- e) To garner publicity and foot traffic, the Radisson Blu Hotel is running a competition to win a car. They sold 720 tickets.



1. Calculate the percentage probability of winning the Mercedes-Benz GLC Coupe` if you only bought 1 ticket. (2)

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2. Indicate on the probability scale below: (3)
- Using the letter “A” where you would read off an event that is highly likely to occur.
 - Using the letter “B” where you would read off the likelihood of Question (e1) occurring.



QUESTION 5**[18]**

In South Africa, when any property is sold, **transfer duties** need to be paid by the person purchasing the property. This is a government tax which is paid to SARS. Use the information below to answer the following questions.

2024 (1 March 2023 – 29 February 2024)

Value of the property (R)	Rate
1 – 1 100 000	0%
1 100 001 – 1 512 500	3% of the value above R1 100 000
1 512 501 – 2 117 500	R12 375 + 6% of the value above R 1 512 500
2 117 501 – 2 722 500	R48 675 + 8% of the value above R 2 117 500
2 722 501 – 12 100 000	R97 075 + 11% of the value above R2 722 500
12 100 001 and above	R1 128 600 + 13% of the value exceeding R12 100 000

[Source: <https://www.sars.gov.za/tax-rates/transfer-duty/>]

You would like to purchase an apartment in the Umhlanga Arch with a market value of R3 000 000 and sell your apartment in Morningside for R1 050 000.

- a) Explain how the person buying your apartment in Morningside will benefit by only paying R1 050 000. Support your answer with values from the tax table above. (2)

- b) Show, using calculations, how much tax you would need to pay to SARS if you bought the Umhlanga Arch apartment. (4)

- c) The Real Estate Agent claimed that if the current owners of the Umhlanga Arch apartment reduced their asking price by 5%, you would save exactly R16 500 in transfer costs. Verify, showing all calculations, whether the Real Estate Agent's claim is valid. (6)

- d) The Real Estate Agent stated that a person buying a house for R13 000 000 will end up paying almost 10% (rounded to the nearest whole number) of the value of the property in transfer costs. Is the statement accurate? Justify your answer with calculations. (6)

TOTAL: 150 MARKS

[illegible]