GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PREPARATORY EXAMINATION

2023

10601

MATHEMATICAL LITERACY

(PAPER 1)

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TIME: 3 hours

MARKS: 150

11 pages + an addendum of 7 pages

MATHEMATICAL LITERACY: Paper 1

10601E

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X05

This question paper consists of 11 pages.
An addendum with 7 pages is included as an insert in the question paper.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of FOUR questions. Answer ALL the questions.
2. Use the ANNEXURES in the ADDENDUM to answer the following questions:
   - ANNEXURE A for QUESTION 1.2
   - ANNEXURE B for QUESTION 3.1
   - ANNEXURE C for QUESTION 3.2
   - ANNEXURE D for QUESTION 3.3
   - ANNEXURE E for QUESTION 4.1
3. Number your answers correctly according to the numbering system used in this question paper.
4. An approved calculator (non-programmable and non-graphical) may be used, unless stated otherwise.
5. Show ALL calculations clearly.
6. Round-off ALL final answers appropriately according to the given context, unless stated otherwise.
7. Indicate units of measurement, where applicable.
8. Start EACH question on a NEW page.
9. Write neatly and legibly.

QUESTION 1

1.1 Brian is planning a trip to Canada to visit his uncle. His uncle is a professional tour guide and takes people to various places on sightseeing trips. The tours take place in difficult terrain in Canada. The costs for the tours vary and below you will find all the information for a full week's stay with sightseeing.

OPTION 1	OPTION 2
One-week backpacker sightseeing: **C$12,000** Excluding flights	One-week hotel stay sightseeing: **C$20,000** Excluding flights

Brian's father, Dominique, will cover all Brian's expenses for the trip, including flights and accommodation. Dominique will also give Brian R24 500 for spending and additional expenses.

Brian needs to fly from OR Tambo International airport in Johannesburg to Toronto Pearson International airport in Canada. Brian found a direct return flight costing R16 879, including all taxes.

According to the current exchange rate, 1 Canadian dollar (C$) will cost R13, 48.

Use the information above to answer the questions that follow.

1.1.1 Identify the exchange rate between the two currencies. (2)

1.1.2 Brian did some calculations to determine the cost for sightseeing. He states that only his stay (on the cheaper option) will cost R161 760. Prove, by showing all calculations, how he arrived at this amount. (2)

1.1.3 Determine how much money, in rand, Brian's father will spend on his return flight and spending money. Round-off your final answer to the nearest hundred. (3)

1.1.4 Write down the cost of the return flight in words. (2)

1.1.5 Brian plans to spend only 85% of his spending money while on his trip and save the rest. Determine how much money Brian will spend during his trip. (3)

1.1.6 Show how Brian's total savings, after his spending, adds up to R3 675,00. (2)

1.1.7 Write down the formula that is used to determine the probability of an event. (2)

1.1.8 There are 6 adult male tourists, 9 adult female tourists and two female babies on the tour. Determine the total number of possible outcomes. (2)

1.1.9 On his return to South Africa, Brian will invest R3 675 at 15% simple interest per year, for a period of one year. Define the term *interest* in this context. (2)

1.2 The Grade 12 learners learn about taxation during their Mathematical Literacy lesson. Thato then looked at corporate taxation in different countries. ANNEXURE A shows the global corporation tax levels in perspective for 2021.

Study ANNEXURE A and answer the questions that follow.

1.2.1 Identify the mode of the overall global corporation levels for 2021. (2)

1.2.2 Identify Quartile 1 (Q_1) and Quartile 3 (Q_3) of the overall global corporation tax levels for 2021. (2)

1.2.3 Select the correct answer in brackets to complete the following sentence:

The median is also known as… (a) (Quartile 1; Quartile 3; Range; Quartile 2) as it represents … (b) (50%; 25%; 75%) of the data. (2)

1.2.4 Which countries represent the lower quarter of global corporation tax levels in perspective? (2)

1.2.5 State the meaning of selecting a country in Quartile 3 with regard to probability. (2)
[30]

QUESTION 2

2.1 Johnson is a physiotherapist. He was contacted by SARU (the South African Rugby Union) to give the 7s rugby players a massage during the rugby tournament that was held in Cape Town during December 2022. Johnson hires 13 *masseuses to perform this duty.

Number of sessions per day	1	2	3	4	5	8	10
Number of masseuses	13	26	39	52	65	**A**	130
Income in Rand	1 755	3 510	**B**	7 020	8 775	14 040	17 550

*Masseuse: A person who provides a professional massage.

Study the table above and answer the questions that follow.

2.1.1 Show, by means of calculations, that the income for a single massage is R135. (2)

2.1.2 Calculate the values of **A** and **B**. (4)

2.1.3 Complete the following formula to calculate the total income per session.

Income = … × … (2)

2.1.4 Prove that the total income for the weekend, if they start working on Friday and finish on Sunday, is R78 975. There are 15 sessions per day. (6)

2.1.5 Johnson pays each masseuse R1 000 for the weekend and R50 per massage. He needs to rent a room at the Cape Town stadium to perform these massages, which costs R4 800 per day. Calculate his total expenses and express the total income to total expenses as a ratio in unit form. (6)

2.2 HRM Domestic is a company that helps domestic workers to find jobs. They ensure that domestic workers are not underpaid for the work they do. Income is based on hourly, weekly and monthly rates. Workers work 45 hours per week and 195 hours per month.

Minimum income rates (in Rand)		
	January – December 2021	**January – December 2022**
Hourly	19,09	**C**
Weekly	859,05	1 043,55
Monthly	3 722,55	4 522,05

Study the table above and answer the questions that follow.

2.2.1 Determine the value of **C**, the minimum hourly rate for 2022. (2)

2.2.2 Determine the percentage increase in monthly income, rounded-off to one decimal place.

Use the following formula:

$$\textbf{Percentage increase} = \frac{\textbf{New income} - \textbf{Old income}}{\textbf{Old income}} \times \textbf{100}$$

(3)

2.2.3 Steffi asked if she could work overtime to earn extra money. The person she works for agreed that she could work on Saturdays for R200 per day for only 5 hours. Determine her hourly wage for that day and state whether she was paid the correct minimum wage per hour for the 2022 year. (3)

PLEASE DETACH THIS ADDENDUM WITH 7 PAGES.

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ADDENDUM

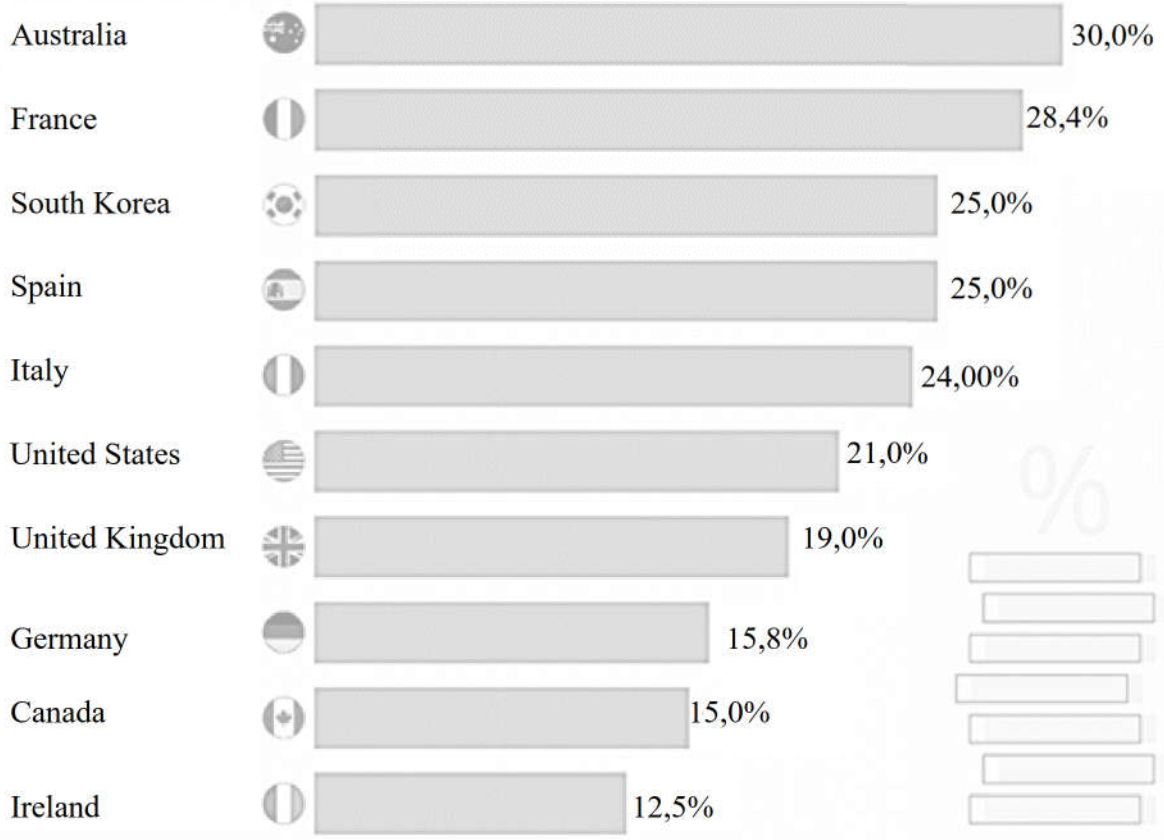
7 pages

ANNEXURE A

QUESTION 1.2

Global corporation tax levels in perspective

Corporate income tax rate in selected OECD countries in 2021 *



* Shows the basic central government statutory (flat or top marginal) corporate income tax rate

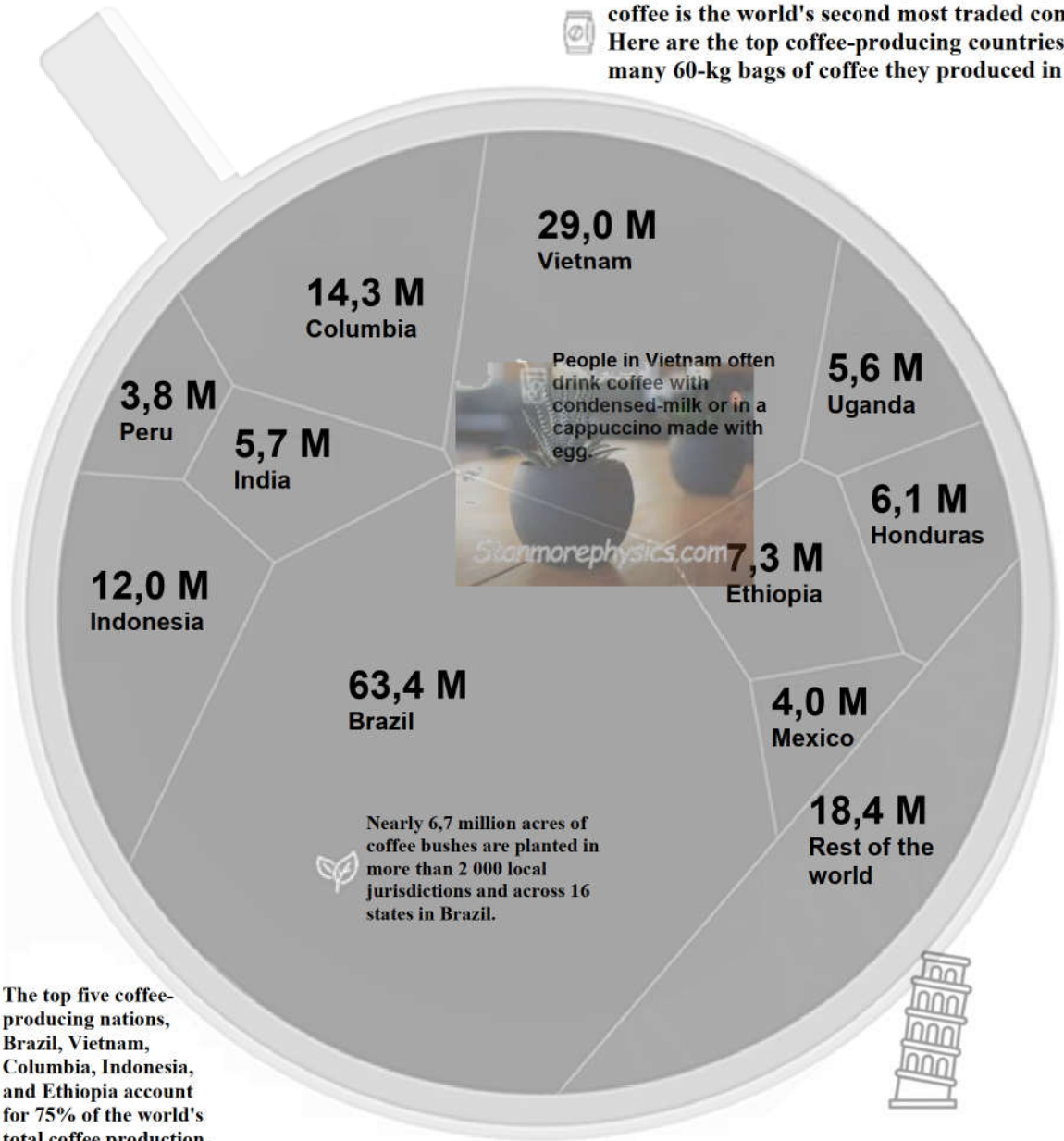
Source: OESO

ANNEXURE B

QUESTION 3.1

Top Coffee Producing countries from around the world

With about half a trillion cups consumed per year, coffee is the world's second most traded commodity. Here are the top coffee-producing countries, and how many 60-kg bags of coffee they produced in 2020.



The top five coffee-producing nations, Brazil, Vietnam, Columbia, Indonesia, and Ethiopia account for 75% of the world's total coffee production.

CAPITALIST

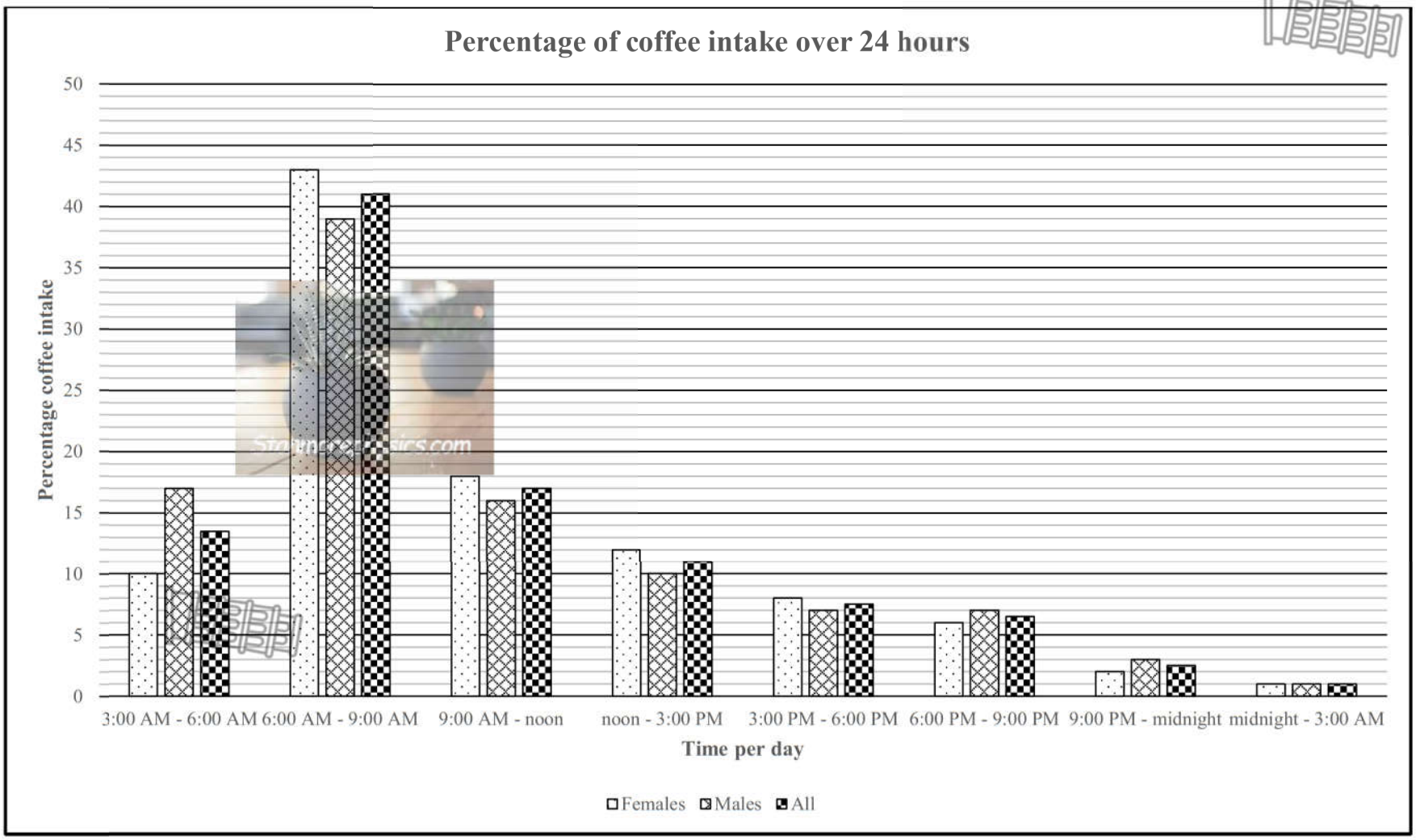
0RESEARCH * WRITING Anschool Deshmukh, Raol Amores / DESIGN Amy Kuo

Nisuakapitalist @visualkop visualcapitalist.com

Source: International Coffee Organisation

ANNEXURE C

QUESTION 3.2



ANNEXURE D

QUESTION 3.3

Nutrient content of animal-based milk and plant-based milk substitutes								
		Protein (g)	**Calcium (mg)**	**Vitamin D**	**Vitamin A**	**Fibre (g)**	**Sugar (g)**	**Calories**
Animal-based milk products	**Full cream milk with added vitamin D**	8	276	124	395	0	12	149
	No fat milk with added vitamins A and D	8	299	115	500	0	12	83
Plant-based milk products	**Soy milk, fortified**	7	301	119	503	1	1	80
	Hemp milk, fortified	3	499	101	499	1	1	73
	Almond milk, fortified	1	451	101	499	1	2	39
	Coconut milk, fortified	<1	451	101	499	0	6	74
	Rice milk, fortified	<1	283	101	151	<1	13	113

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ANNEXURE E

QUESTION 4.1

2023 tax year (1 March 2022 – 28 February 2023)

Bracket Number	Taxable income (R)	Rates of tax (R)
1	1 – 226 000	18% of taxable income
2	226 001 – 353 100	40 680 + 26% of taxable income above 226 000
3	353 101 – 488 700	73 726 + 31% of taxable income above 353 100
4	488 701– 641 400	115 762 + 36% of taxable income above 488 700
5	641 401 – 817 600	170 734 + 39% of taxable income above 641 400
6	817 601 – 1 731 600	239 452 + 41% of taxable income above 817 600
7	1 731 601 and above	614 192 + 45% of taxable income above 1 731 600

2022 tax year (1 March 2021 – 28 February 2022)

Bracket Number	Taxable income (R)	Rates of tax (R)
1	1 – 216 200	18% of taxable income
2	216 201 – 337 800	38 916 + 26% of taxable income above 216 200
3	337 801 – 467 500	70 532 + 31% of taxable income above 337 800
4	467 501 – 613 600	110 739 + 36% of taxable income above 467 500
5	613 601 – 782 200	163 335 + 39% of taxable income above 613 600
6	782 201 – 1 656 600	229 089 + 41% of taxable income above 782 200
7	1 656 601 and above	587 593 + 45% of taxable income above 1 656 600

Tax Rebates

Tax Rebate	Tax Year	
	2023	2022
Primary	R16 425	R15 714
Secondary (65 and older)	R9 000	R8 613
Tertiary (75 and older)	R2 997	R2 871

Tax Thresholds

Age	Tax Year	
	2023	2022
Under 65	R91 250	R87 300
65 and older	R141 250	R135 150
75 and older	R157 900	R151 100

END





2.3 Mr Navidad works for Letspack. He is a salesman who travels widely to advertise the products that Letspack sells. He drives a 2018 Ford Ranger bakkie that has a current value of R259 900. He travels 1 500 km on average per month. Travel allowance can only be claimed the following month after the number of kilometres travelled have been submitted for claims. His monthly travel allowance consists of a predetermined amount for the current value of the vehicle as well as fuel and maintenance costs.

Current value of the vehicle:	Fixed Travelling Claim (R/Annum)	Fuel Claim (c/km)	Maintenance Claim (c/km)
Does not exceed R95 000	29 836	131,7	40,9
Exceeds R95 000, but does not exceed R190 000	52 889	147,0	51,1
Exceeds R190 000, but does not exceed R285 000	76 033	159,7	56,3
Exceeds R285 000, but does not exceed R380 000	96 197	171,8	61,5
Exceeds R380 000, but does not exceed R475 000	116 438	183,8	72,3
Exceeds R475 000, but does not exceed R570 000	137 735	210,8	**D**
Exceeds R570 000, but does not exceed R665 000	159 031	218,0	105,5
Exceeds R665 000	159 031	218,0	105,5

Study the table above and answer the questions that follow.

2.3.1 Calculate Mr Navidad's monthly fixed travelling claim. (3)

2.3.2 Mr Navidad is thinking of buying a newer model vehicle that has a value of R480 000. Calculate the missing value (**D**), that will represent Mr Navidad's monthly maintenance cost if he decides to buy this vehicle. The amount for his maintenance claim is R1 329. (3)

2.3.3 Mr Navidad decides not to buy the newer vehicle. He states that he could claim back R8 825 after tax is deducted for his monthly travel allowance. He will be taxed at 25% of the actual amount that he can claim. Show by means of calculations whether his statement is valid.

You may use the following formula:

Claim = Monthly fixed travelling claim + (km driven × fuel claim) + (km driven × maintenance claim) (6)

[40]

QUESTION 3

3.1 The top coffee-producing countries around the world produce coffee for half a trillion cups of coffee per year. ANNEXURE B shows the top coffee-producing countries and how many 60-kg bags of coffee they produced in 2020.

Study ANNEXURE B and answer the questions that follow.

3.1.1 Determine the range of the top coffee-producing countries from around the world, including the rest of the world. (2)

3.1.2 Determine the median of the top coffee-producing countries from around the world. (3)

3.1.3 Determine the interquartile range (IQR) for the top coffee-producing countries from around the world, including the rest of the world. (4)

3.1.4 Which TWO countries represent the bottom 25% of the top coffee-producing countries from around the world? Explain what this means. (4)

3.1.5 What type of graph is used to show the top coffee-producing countries from around the world? (2)

3.1.6 Show, with calculations, that the top 5 coffee-producing countries produce an average of at least 74% of the world's coffee. (4)

3.1.7 Determine the probability of randomly selecting a country from the top coffee-producing countries from around the world, excluding the rest of the world, that produced more than 20 million 60-kg bags of coffee in 2020. Write down your final answer as a percentage. (3)

3.2 Half a trillion cups of coffee are consumed per year throughout the world. European coffee drinkers consume most of the coffee produced and the Americans are second.
Refer to the graphic representation on ANNEXURE C which displays the percentage intake of coffee over 24 hours.

Use the information in ANNEXURE C and answer the questions that follow.

3.2.1 Which of the following options (X, Y or Z) best describes the data process that was performed before the representation could be drawn. Write down only the letter X, Y or Z.

X Summarising data

Y Posing a question

Z Organising data (2)

3.2.2 Can the data collected be classified as numerical or categorical data? (2)

3.2.3 If this data was collected using a questionnaire, list 3 possible questions that could have been asked. (3)

3.2.4 Describe the general trend of coffee intake for males in comparison to females, over a 24-hour period. (3)

3.2.5 Explain, with justification, whether the data presented is discrete or continuous. (3)

3.2.6 The data represented in the graph on ANNEXURE C comes from one specialised coffee brand in America. The survey was done while the customers waited for their coffee. Explain if this data is biased or valid for the whole world of coffee drinkers. (3)

3.3 Many people are moving to alternatives of animal-based dairy (milk) products for health reasons. When doing so, the necessary good nutritional properties have to be considered: A high concentration of protein, calcium, vitamins D and A, fibre, low calories and low sugar is the best choice.

Refer to ANNEXURE D which shows the nutrient content of animal-based milk and plant-based milk substitutes and answer the question below.

Draw up a comparison table of the plant-based milk products and determine which product will fulfil the need in providing the best source of maximum protein, calcium, vitamin D, vitamin A and fibre as well as the lowest amount of sugar and calories. (4)

[42]

QUESTION 4

4.1 Lelo is a 68-year-old woman who works for Andiswa Traders. She is the CEO (Chief Executive Officer) of the company and earns a gross salary of R37 480 per month. She contributes an amount of R2 614, 88 towards her pension fund every month.

Refer to ANNEXURE E and answer the questions that follow.

4.1.1 Prove that her annual gross income is R449 760. (2)

4.1.2 Pension fund contributions are non-taxable. Determine her annual taxable income. (3)

4.1.3 Use ANNEXURE E, which shows the tax brackets and personal income tax contributions for 2022 and 2023, to determine how much tax Lelo paid monthly in the 2022 tax year. (8)

4.1.4 Bongiwe is a business owner and is 77 years old. Bongiwe earns a monthly gross income of R13 123, 28. Lelo claims that Bongiwe paid tax in 2022 but is not supposed to make any contributions towards his personal income tax in 2023. Show, with calculations, whether her statement is correct. (4)

4.1.5 Show, with calculations, how the fixed amount of R73 726 in Tax Bracket 3 was calculated for the tax year 2023. (4)

4.2 Marshall completed his studies and started a new job. He earns a monthly gross income of R14 935. He needs to buy a vehicle to drive to work and back daily.

He would like to buy a small second-hand car from ABS Dealership that offers finance on vehicles. He is interested in a Hyundai (2013 model) that is available at R79 000 cash. He can buy the car on credit, where he will be paying a deposit of R10 000 and 60 monthly instalments of R1 985. This amount does not include insurance for the vehicle.

4.2.1 What is the total amount that Marshall will repay for this vehicle if he decides to buy it on credit? (3)

4.2.2 Marshall claims that he could save more than R40 000 if he buys the car for cash compared to buying it on credit. Evaluate his statement by means of calculations to determine whether he is correct. (3)

4.2.3 A loan offer is available from Trust Bank. They offer a loan of R90 000 at an interest rate of 10% per annum, compounded quarterly. The maximum period of the loan is 36 months.

(a) Marshall decides to take the loan over a period of two years. Determine how much he would repay after 9 months. (6)

(b) Marshall is considering buying a new vehicle in a few years. He needs to take inflation into consideration. The expected inflation rate for the next 3 years is as follow:

Year	2024	2025	2026
Inflation as %	1,25	0,5	1,05

A new Hyundai is currently priced at R139 800. Determine how the 2023 price of the Hyundai will change over the next two years and whether it would be wise for him to wait. (5)

[38]

TOTAL: 150

END