basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P1

NOVEMBER 2023

MARKS: 150

TIME: 3 hours

Stanmorephysics

This question paper consists of 14 pages and an addendum with 3 annexures.

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INSTRUCTIONS AND INFORMATION

1. This question paper consists of FIVE questions. Answer ALL the questions.
2. Use the ANNEXURES in the ADDENDUM to answer the following questions:

   ANNEXURE A for QUESTION 2.1
   ANNEXURE B for QUESTION 2.2
   ANNEXURE C for QUESTION 4.2
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 according to the given context, unless stated otherwise.
8. Indicate units of measurement, where applicable.
9. Diagrams are NOT necessarily drawn to scale, unless stated otherwise.
10. Write neatly and legibly.

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QUESTION 1

1.1 Spotify is a legal way to listen to music using the internet. It is also referred to as streaming music online.

TABLE 1 below shows different categories of users and items streamed for three different sessions (A, B and C) on 18 February 2023, using the Spotify mobile app*.

TABLE 1: STREAMING PER CATEGORY ON 18 FEBRUARY 2023

CATEGORIES	SESSION		
	A	B	C
Free users	8 120 031	8 120 908	8 120 970
Paid users	690 160	690 164	690 164
Number of songs	88 704 344	88 705 985	88 706 141
Number of music artists	6 089 733	6 089 852	6 089 862
Music albums	12 929 392	12 929 939	12 929 976

[Adapted from https://stats.fm]

NOTE:
*app = application

Use TABLE 1 above to answer the questions that follow.

1.1.1 State whether the values used for the different categories in the table are discrete or continuous data. (2)

1.1.2 The number of music albums streamed during session B was 12 929 939.

Write down this number in words without using numerals. (2)

1.1.3 Identify the session during which the second largest number of music artists were listened to. (2)

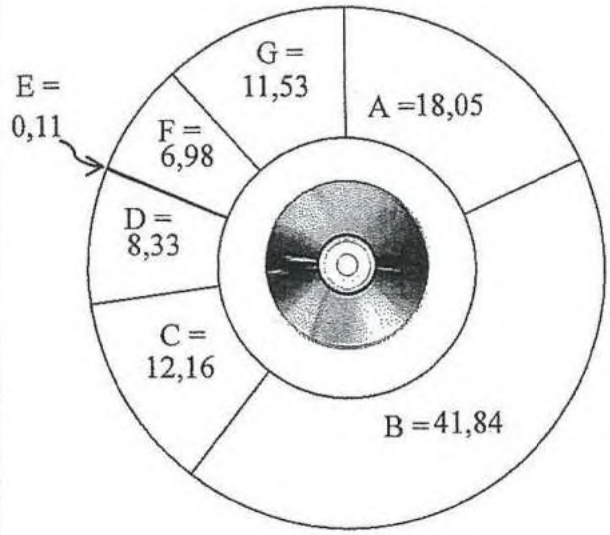
1.1.4 Calculate the increase in the number of songs streamed over the three sessions. (2)

1.1.5 Determine, as a unit ratio, in the form 1 : ..., the number of paid users to the number of free users during session A. (3)

1.2 A recent article stated that a music artist gets less than 10% from the sale of a music CD in South Africa.

The pie chart below shows how the money, in rand, for one music CD is distributed.

DISTRIBUTION OF MONEY, IN RAND, FROM THE SALE OF ONE MUSIC CD



A = Record labels net profit

B = Received by music store

C = Tax

D = Amount artist receives per music CD

E = Received by writer of ONE song on music CD

F = Distribution cost

G = Press cost of music CD at record label

[Adapted from https://mybroadband.co.za]

NOTE: CD = compact disc to store and play digital audio recordings

Use the pie chart above to answer the questions that follow.

1.2.1 Give the acronym for value-added tax. (2)

1.2.2 Determine the total price for ONE music CD. (3)

1.2.3 Calculate the amount that the music artist receives for one music CD as a percentage of the amount received by the music store. (3)

1.2.4 Determine the amount of money a music artist will make if he sells 210 000 copies of his music CD. (2)

1.2.5 Calculate how many music CDs must be sold for a writer, who writes ONE song, to receive R16,50. (2)

1.3 Many music artists use their own vehicles to travel to and perform at music concerts. They are advised to spend 25%, or less, of their gross monthly income on monthly repayments for a vehicle.

TABLE 2 shows the price of a vehicle, the monthly repayment and the gross monthly income required to qualify for vehicle financing.

TABLE 2: PRICE OF A VEHICLE, MONTHLY REPAYMENT AND GROSS MONTHLY INCOME REQUIRED

PRICE OF VEHICLE	MONTHLY REPAYMENT	GROSS MONTHLY INCOME REQUIRED
R150 000	R3 207,82	R12 831
R200 000	R4 245,74	R16 982
R300 000	R6 321,57	R25 286
R500 000	R10 473,24	R41 892
R750 000	R15 662,83	R62 651
R1 000 000	R20 852,42	R83 409
R2 000 000	R41 610,78	R166 443
R5 000 000	R103 885,84	R415 543

[Adapted from https://businesstech.co.za]

Use TABLE 2 above to answer the questions that follow.

1.3.1 Define the term *gross monthly income.* (2)

1.3.2 Complete the following statement:

An artist, with a gross average monthly income of R83 409, qualifies for a vehicle priced at … (2)

1.3.3 Round off the monthly repayment of a vehicle costing R2 000 000 to the nearest thousand. (2)

[29]

QUESTION 2

2.1 David is a 68-year-old man who works at a grocery store in Swellendam.

ANNEXURE A shows an extract of David's Bank Statement for the period 1 November 2022 to 1 December 2022. Some amounts have been omitted.

Use ANNEXURE A to answer the questions that follow.

2.1.1 Write down the type of account David has. (2)

2.1.2 Determine the total amount paid for service fees (##). (3)

2.1.3 David's net salary paid into his account is labelled **A**.

He has two insurance policies.

David stated that his total monthly payments for insurance is more than a $\frac{1}{4}$ of his net salary.

Verify, showing ALL calculations, if his statement is CORRECT. (7)

2.1.4 The fixed monthly service fee of R110,00 on 30/11/2022 includes VAT of 15%.

The same service fee, excluding VAT, was charged on 30/11/2017.

Determine the service fee amount, including VAT, that would have been paid on 30/11/2017. (5)

2.2 David's average monthly taxable income is R8 978,00, which includes monthly interest earned on his investments.

He does not earn any bonuses nor is he a member of a medical aid fund.

TABLE 3 on ANNEXURE B shows the income tax table for the 2022/23 tax year and the tax rebates over a three-year period.

2.2.1 Identify which income tax bracket will be used to calculate David's annual tax. (3)

2.2.2 David claims that he should NOT be paying any income tax.

Verify, showing ALL calculations, whether his claim is valid. (6)

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2.3 TABLE 4 shows the financial overview of Swellendam Municipality (in R'000), including the income and expenditure, the original budgeted amount, the adjusted budgeted amount and the actual amount.

Due to over- or under-spending, this original budgeted amount is reviewed during the year and adjusted accordingly.

TABLE 4: FINANCIAL OVERVIEW OF SWELLENDAM MUNICIPALITY

INCOME R'000			
DETAILS	**Original budgeted amount**	**Adjusted budgeted amount**	**Actual amount**
Grants	71 396	111 769	68 286
Taxes, levies and tariffs	180 456	...	180 702
Other	61 940	48 152	68 594
TOTAL	**313 792**	**340 688**	**317 582**
EXPENDITURE R'000			
	Original budgeted amount	**Adjusted budgeted amount**	**Actual amount**
TOTAL	322 891	316 678	**Z**
NET SURPLUS/DEFICIT R'000			
	Original budgeted amount	**Adjusted budgeted amount**	**Actual amount**
TOTAL	**(9 099)**	**24 010**	**Y**

[Adapted from Annual Report Swellendam Municipality]

Use TABLE 4 above to answer the questions that follow.

2.3.1 Identify the item that was overbudgeted for by more than R40 million. (2)

2.3.2 Determine the adjusted budgeted amount for the taxes, levies and tariffs. (3)

2.3.3 Give a reason why the amount (9 099) is shown in brackets. (2)

2.3.4 Show how the total net surplus/deficit amount for the original budgeted amount was calculated. (3)

2.3.5 The actual total expenditure (**Y**) shows a net surplus amount of 2,53% of the total income.

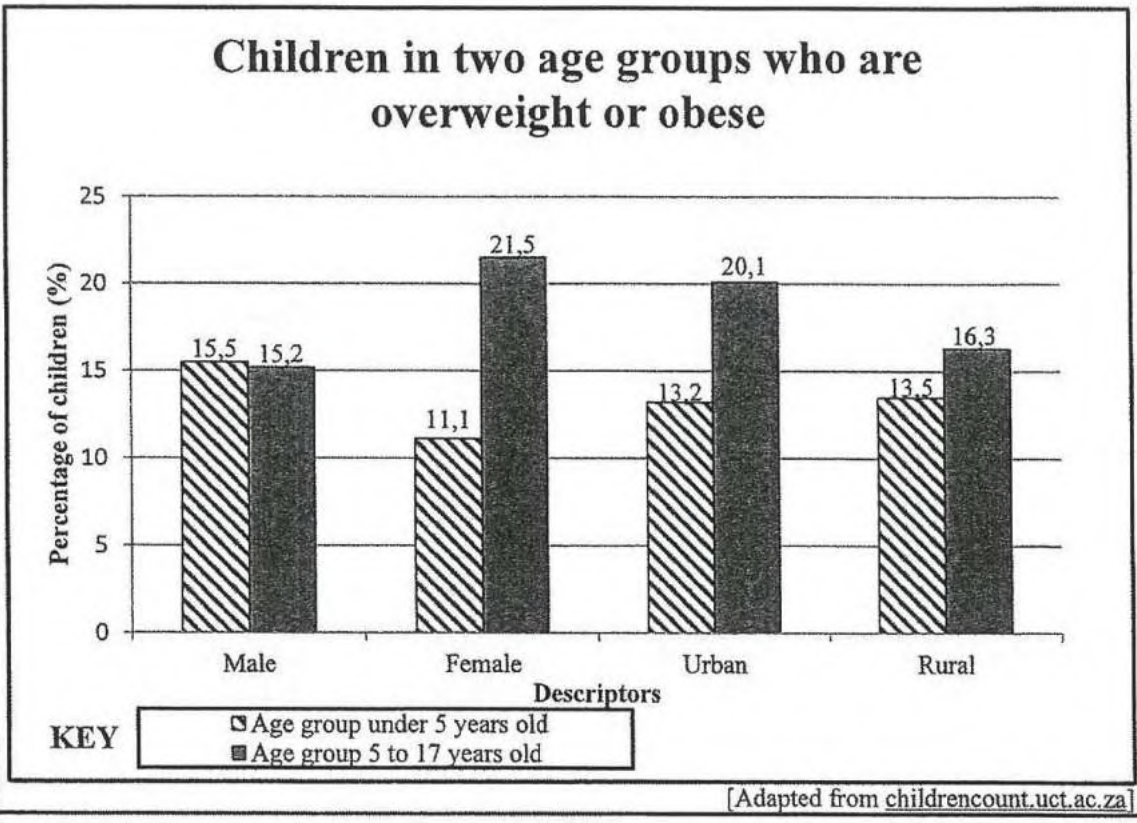
Show, by means of calculations, that the table value of the actual amount for the total expenditure (**Z**) to the nearest whole number is R309 547. (4)

[40]

QUESTION 3

3.1 Overnutrition occurs when there is an excessive intake of dietary energy, resulting in overweight or obese people.

The double bar graph below shows the percentages of children in two age groups who are overweight or obese in South Africa. The following descriptors have been used: male, female, urban and rural.



[Adapted from childrencount.uct.ac.za]

Use the graph above to answer the questions that follow.

3.1.1 Identify the only descriptor where the age group 5 to 17 years old are fewer than the age group under 5 years old. (2)

3.1.2 Determine the difference in percentages of the two age groups for the female descriptor. (3)

3.1.3 Compare and comment on the urban and rural descriptors of the two age groups. (3)

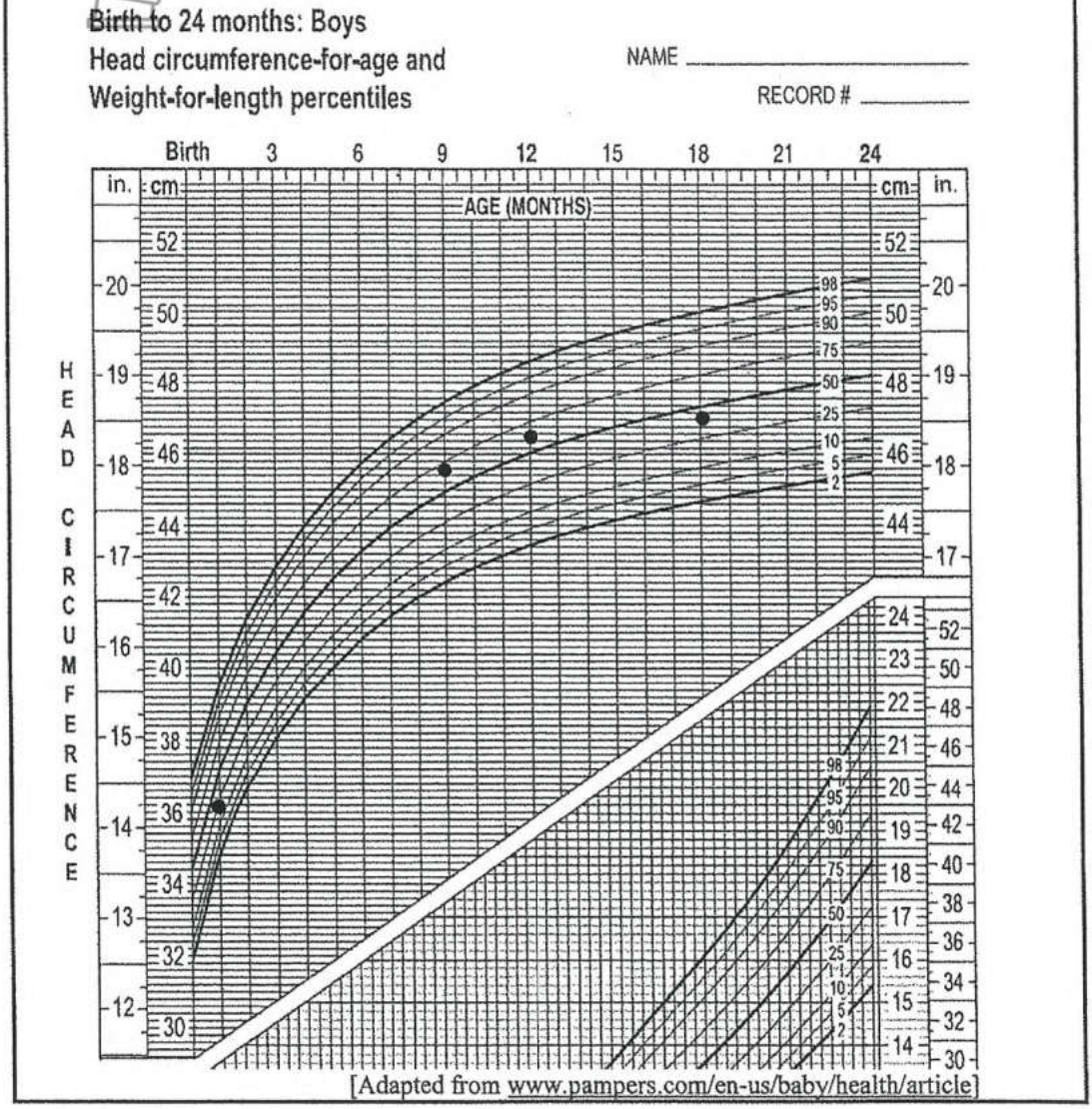
3.1.4 In a rural school, there are 795 learners in the age group 5 to 17 years old.

Calculate the number of learners who are NOT overweight or obese. (3)

3.1.5 Determine the probability, as a fraction, of randomly selecting a female who is under 5 years old and not overweight or obese. (3)

3.2 Shown below is a growth chart for boys, from birth to 24 months. Also shown on this chart is the head circumference-for-age and part of the weight-for-length-percentiles.

The measurements for a boy at 1, 9, 12 and 18 months have been plotted on the chart by a nurse at the clinic.



[Adapted from www.pampers.com/en-us/baby/health/article]

Use the growth chart above to answer the questions that follow.

3.2.1 Write down, in inches, the measurement of the boy at 9 months. (2)

3.2.2 Identify the month(s) in which the boy was below the 50th percentile. (2)

3.2.3 Another boy of the same age has a head circumference of 48 cm at 18 months.

State whether this boy falls in a higher or lower percentile than the boy whose details have been plotted on the growth chart. (2)

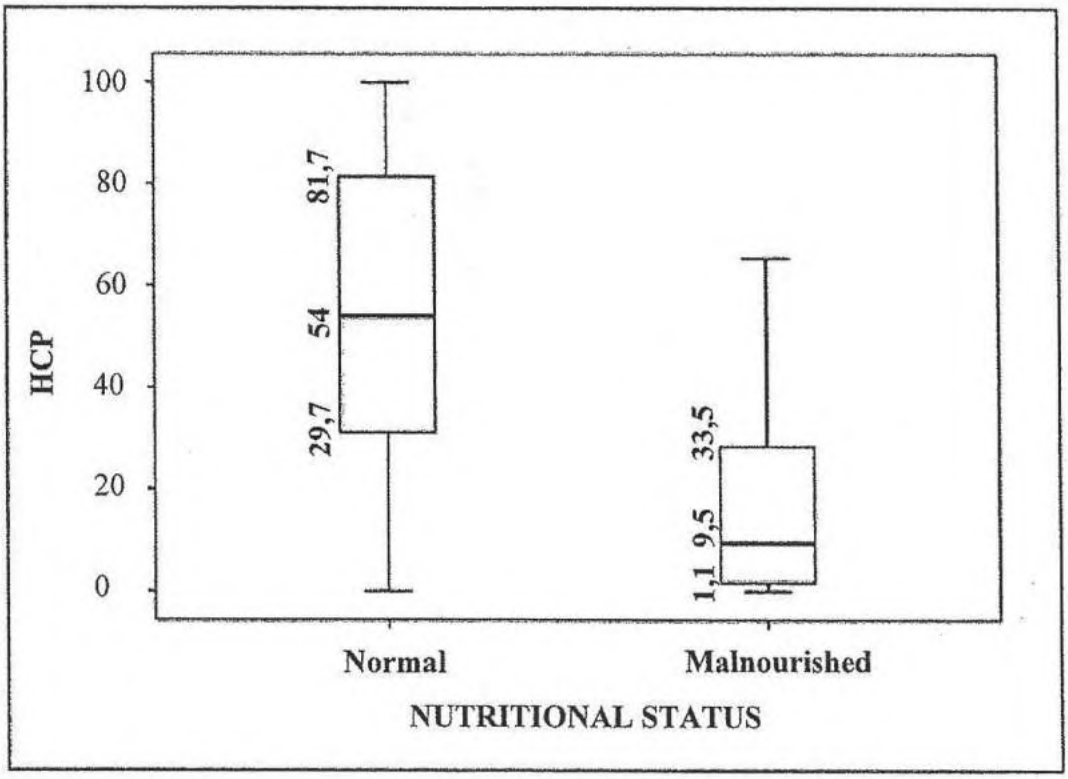
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3.3 A study was done to investigate the relationship between the head circumference and the nutritional status of some children under 2 years old. The box and whisker plots below show the head circumference percentiles (HCP) of these children based on their nutritional status.

A total of 142 children were included in this study.

- 9,15% were malnourished.
- 129 children had normal nutritional status.
- There was a greater representation of younger children with more than 50% between 1 and 8 months of age.

HEAD CIRCUMFERENCE PERCENTILES IN NORMAL AND MALNOURISHED CHILDREN UNDER TWO YEARS OLD



[Adapted from https://www.lidsen.com]

Use the information and the box and whisker plots above to answer the questions that follow.

3.3.1 Write down the percentage of malnourished children with a head circumference below the 33,5 percentile. (2)

3.3.2 Calculate the number of children that were below the median head circumference in the children with normal nutritional status. (3)

3.3.3 Comment on the selection of the sample of children selected. (2)
[27]

QUESTION 4

4.1 The Swartz family received news that their daughter was selected to go on a sports tour to Bloemfontein. They compared the in-store and online prices of two supermarkets for items needed to prepare meals for the bus tour.

TABLE 5 below shows the in-store and the online prices of P&P store and W&W store for some items.

TABLE 5: PRICE (IN RAND) OF TWO STORES IN-STORE VS ONLINE PRICES

	P&P STORE		W&W STORE	
ITEMS	**In-store price R**	**Online price R**	**In-store price R**	**Online price R**
Apples	16,50	16,50	14,99	21,99
Bread	6,50	6,99	11,95	13,45
Cabbage	10,99	10,99	12,99	12,99
Coca-Cola	13,50	15,99	15,95	15,95
Eggs	12,95	12,95	20,99	20,99
Cake flour	32,99	30,99	13,95	14,95
Mealie-meal	17,49	17,48	18,95	19,95
Margarine	17,95	16,95	23,99	23,99
Milk	22,79	22,79	27,95	27,95
Rice	18,29	18,29	22,95	24,95
Sugar	23,90	26,99	29,95	29,95
Tea	14,89	14,89	15,95	15,95
Delivery		50,00		50,00
Total	**208,74**	**261,80**	**230,56**	**293,06**

[Adapted from www.businesstech.co.za]

Use TABLE 5 above to answer the questions that follow.

4.1.1 Write down the modal in-store price for P&P store. (2)

4.1.2 Determine the number of items where the in-store and online prices are the same for the W&W store. (2)

4.1.3 A one-way trip to the P&P store is R15 per person.

Calculate how much Mrs Swartz would be saving if she bought all the items listed in the table directly from the store rather than shopping online. (4)

4.1.4 Determine the median price of the listed items for in-store shopping in the W&W store. (4)

4.1.5 Calculate the probability of randomly selecting an item from the P&P store where the in-store price is exactly the same as the online price. (3)

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4.2 The Swartz family also decided to buy and resell doughnuts in packets of four in order to fund the tour. They sourced the prices of doughnuts at four stores.

Their target was to sell 100 packets of doughnuts. The fixed cost for the buying and re-packaging of the doughnuts was R201,00.

The graphs for the income and expenses for the buying, re-packaging and selling of the packets of doughnuts, as well as the store prices of the doughnuts, are given in ANNEXURE C.

[Adapted from www.eatout.co.za]

Use ANNEXURE C and the information above to answer the questions that follow.

4.2.1 Write down the name of the store that offers the third lowest price. (2)

4.2.2 The total cost for buying and re-packaging 50 packets of doughnuts is R701,00.

Determine, with calculations, from which store they bought the doughnuts. (6)

4.2.3 Mr Swartz stated that the break-even point was reached before the sale of 20 packets.

State, with a reason, whether you agree or disagree with his statement. (3)

4.2.4 If the selling price increased, write down, with a reason, whether the break-even point would now be lower or higher. (3)

4.2.5 Determine the percentage profit they would make if all 100 packets of doughnuts were sold.

You may use the formula:

$$\textbf{Percentage profit} = \frac{\textbf{Total Income} - \textbf{Total Expenses}}{\textbf{Total Expenses}} \times 100\%$$

(4)
[33]

QUESTION 5

5.1 People take flights daily, either locally, nationally or internationally.

TABLE 6 below shows the average daily flights taken in the top 10 countries, the top 10 aircraft operators for 2022 and the percentage (%) change from 2019. Some values have been omitted.

TABLE 6: TOP 10 COUNTRIES AND AIRCRAFT OPERATORS

COUNTRY	Average daily flights		AIRCRAFT OPERATORS	Average daily flights	
	2022	% change from 2019		2022	% change from 2019
United Kingdom	4 728	– 20%	Ryanair Group	2 566	+ 9%
Germany	4 293	– 25%	Easy Jet Group	1 347	– 20%
Spain	4 277	– 9%	Turkish Airlines	1 249	– 7%
France	3 763	**A**	Lufthansa Airlines	1 067	– 29%
Italy	3 201	– 12%	Air France Group	952	– 21%
Turkey	2 634	– 8%	KLM Group	709	– 18%
Netherlands	1 431	– 15%	Wizz Air Group	667	+ 13%
Greece	1 327	– 1%	British Airways Group	**B**	– 30%
Norway	1 283	– 10%	Vueling	547	– 10%
Switzerland	1 125	– 15%	SAS Group	536	– 35%

[Adapted from www.eurocontrol.int/sites]

Use TABLE 6 above to answer the questions that follow.

5.1.1 Write down the aircraft operator whose average daily flights increased the most since 2019. (2)

5.1.2 France operated 4 290 average daily flights in 2019.

Determine missing value **A**, rounded to the nearest whole number. (4)

5.1.3 Calculate the range for the % change from 2019 for the aircraft operators. (3)

5.1.4 Calculate missing value **B**, if the mean number of flights for aircraft operators for 2022 is 1 028,2. (4)

5.1.5 Determine the probability, as a decimal, of randomly selecting an aircraft operator whose average daily flights increased from 2019 to 2022. (3)

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5.2 Timothy will fly from the United States of America to Mandatory Palestine to play in a tournament. Before he leaves, he wants to exchange $2 580 for New Israeli shekel (NIS).

The currency used in Mandatory Palestine is the New Israeli shekel (NIS).

TABLE 7: CURRENCY CONVERSION FACTORS FOR FOUR COUNTRIES ON 19 MARCH 2023

CURRENCY	UNITS PER NIS	NIS PER UNIT
Thai baht (฿)	9,3223584	0,107269
Jordanian dinar (JOD)	0,19368367	5,16306
South African rand (ZAR)	5,0428413	0,198301
United States dollar (US$)	0,27317867	3,66061

[Adapted from www.xe.com/currencyconverter]

Use TABLE 7 and the information above to answer the questions that follow.

5.2.1 State whether the New Israeli shekel (NIS) is stronger or weaker than the South African rand (ZAR). (2)

5.2.2 Calculate the amount Timothy will receive in New Israeli shekel (NIS). (3)
[21]

TOTAL: 150

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MATHEMATICAL LITERACY P1

ADDENDUM

NOVEMBER 2023

MARKS: 150

This addendum consists of 4 pages with 3 annexures.



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ANNEXURE A

QUESTION 2.1

EXTRACT OF DAVID'S BANK STATEMENT FOR THE PERIOD 1 NOVEMBER 2022 TO 1 DECEMBER 2022

BANK STATEMENT/TAX INVOICE

ELITE CHEQUE ACCOUNT Account number: 1108 762 250 2

Details	Debits (R)	Credits (R)	Date	Balance (R)
Balance brought forward				2 169,55
Service fee ##	1,60–		11 22	2 167,95
Overdraft fees	58,25–		11 25	2 109,70
Excess interest	9,35–		11 25	2 100,35
Salary		A	11 30	10 078,41
Debicheck debit order	1 557,45–		11 30	8 520,96
ATM cash withdrawal	3 000,00–		11 30	5 520,96
ATM cash withdrawal	180,00–		11 30	5 340,96
Withdrawal service fees ##	69,00–		11 30	5 271,96
Fixed monthly service fee ##	110,00–		11 30	5 161,96
Debicheck debit order	335,62–		12 01	4 826,34
Insure PLA insurance premium	940,39–		12 01	3 885,95
Santam insurance premium	940,39–		12 01	2 945,56
Membership fee – rewards	25,00–		12 01	2 920,56
Electronic transfer credit card	1 307,76–		12 01	1 612,80

These fees include VAT at 14% until 31 March 2018 and at 15% from 1 April 2018.

[Adapted from original bank statement]

KEY: 11 30 = 30/11/2022

ANNEXURE B

QUESTION 2.2

TABLE 3: 2022/23 TAX YEAR (1 March 2022–28 February 2023)

	ANNUAL TAXABLE INCOME (R)	RATES OF TAX (R)
A	1–226 000	18% of taxable income
B	226 001–353 100	40 680 + 26% of taxable income above 226 000
C	353 101–488 700	73 726 + 31% of taxable income above 353 101
D	488 701–641 400	115 762 + 36% of taxable income above 488 700
E	641 401–817 600	170 734 + 39% of taxable income above 641 400
F	817 601–1 731 600	239 452 + 41% of taxable income above 817 600
G	1 731 601 and above	614 192 + 45% of taxable income above 1 731 600

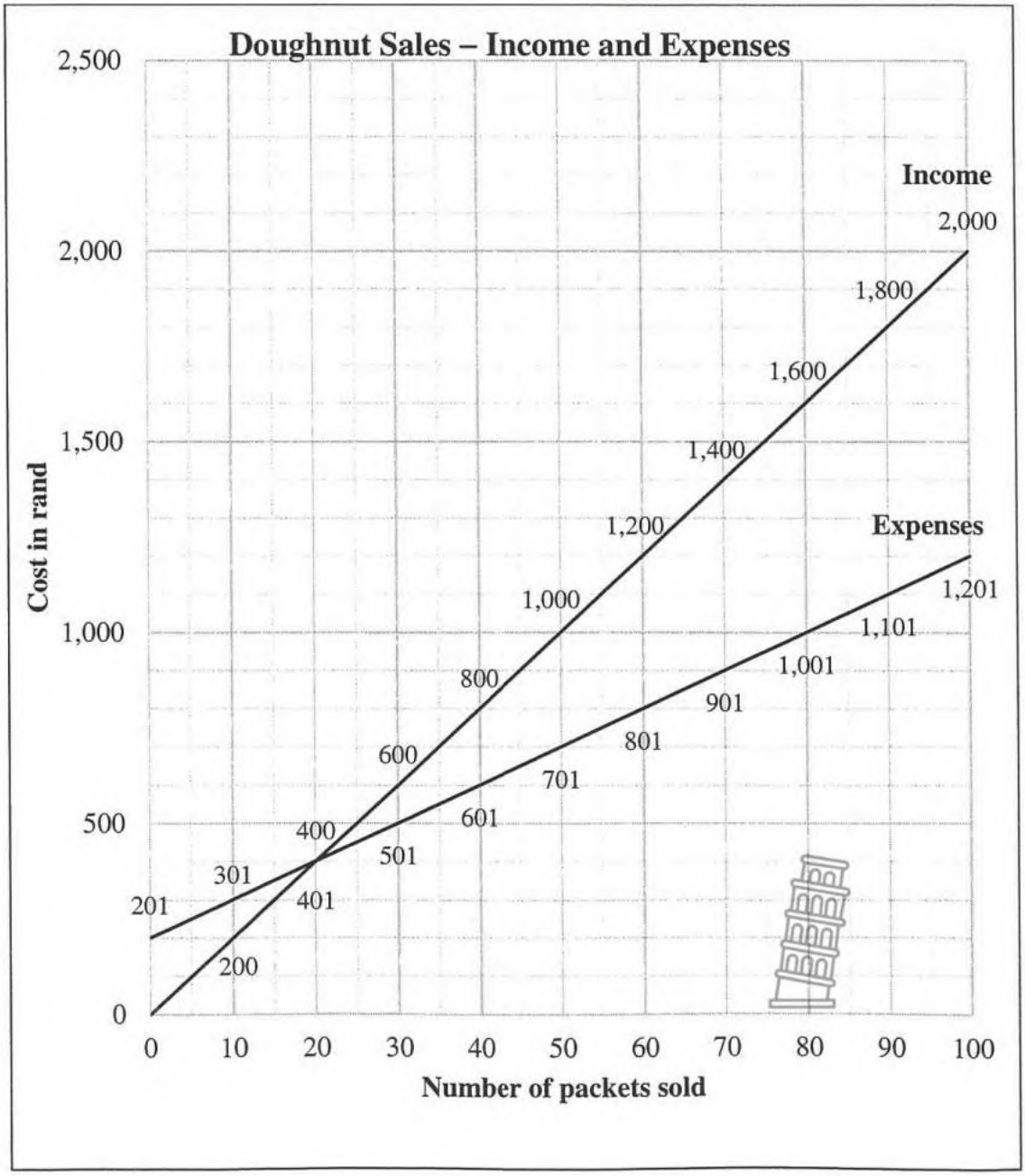
TAX REBATE	TAX YEAR		
	2022/23	2021/22	2020/21
Primary	R16 425	R15 714	R14 958
Secondary (65 years and older)	R9 000	R8 613	R8 199
Tertiary (75 years and older)	R2 997	R2 871	R2 736

[Adapted from www.sars.gov.za]

ANNEXURE C

QUESTION 4.2

P&P store (R4,99 each)	W&W store (R5,95 each)	SPR store (R3,49 each)	FLM store (R2,50 each)
			



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