FINAL COLLECTIVE RESPONSE

TAS MATHS LITERACY REVIEW

NSC 2023 – PAPER 1 & 2

HOSTED BY **GRETEL LAMPE**

PRESENTED BY **SUSAN NICOL**

GUESTS **BRONWYN ADONIS-MAARMAN (AMESA)**
PANEL REVIEWERS

AMESA

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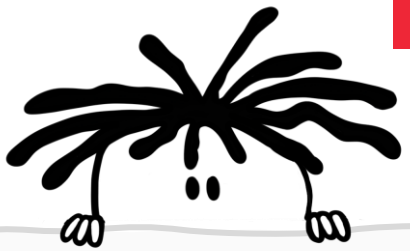
OVERVIEW



- ✓ General Overview of Paper 1 & 2
- ✓ Challenging Questions – Paper 1: Proposed Memo & Comments
- ✓ Challenging Questions – Paper 2: Proposed Memo & Comments
- ✓ General Overall Recommendations

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GENERAL OVERVIEW OF PAPERS

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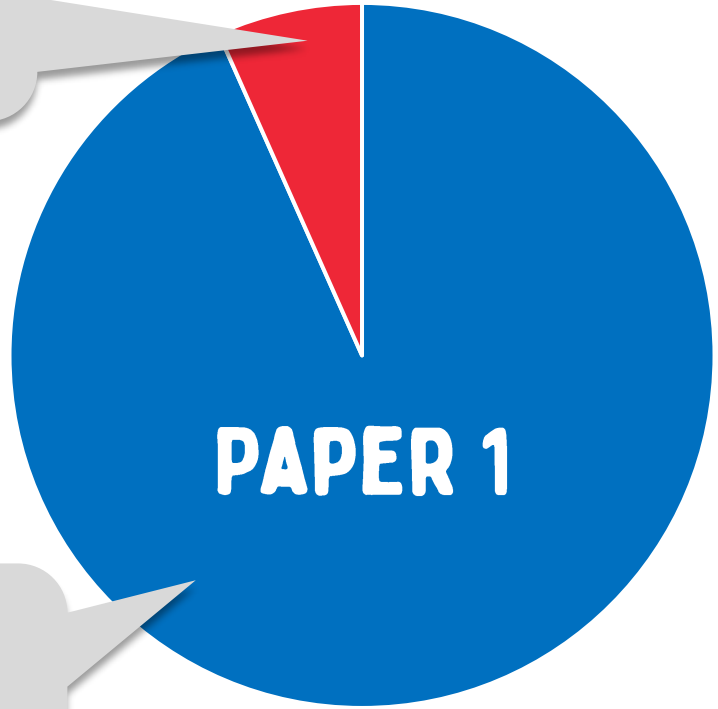
Unfair

- Language was a challenge
- Translation issues between P1 & P2

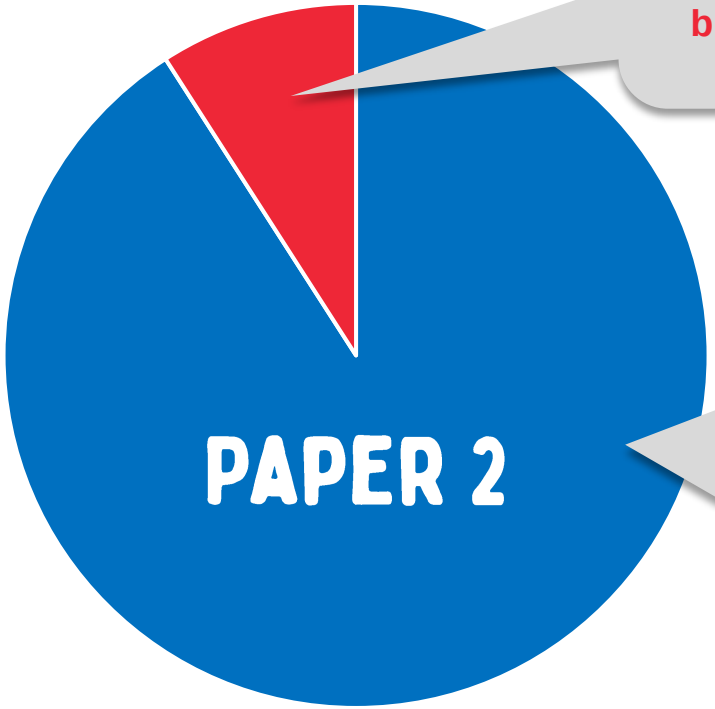


Fair

- Paper was of a good standard
- Contexts were fresh and appropriate

Unfair

- Difficult paper
- Translation issues between P1 & P2

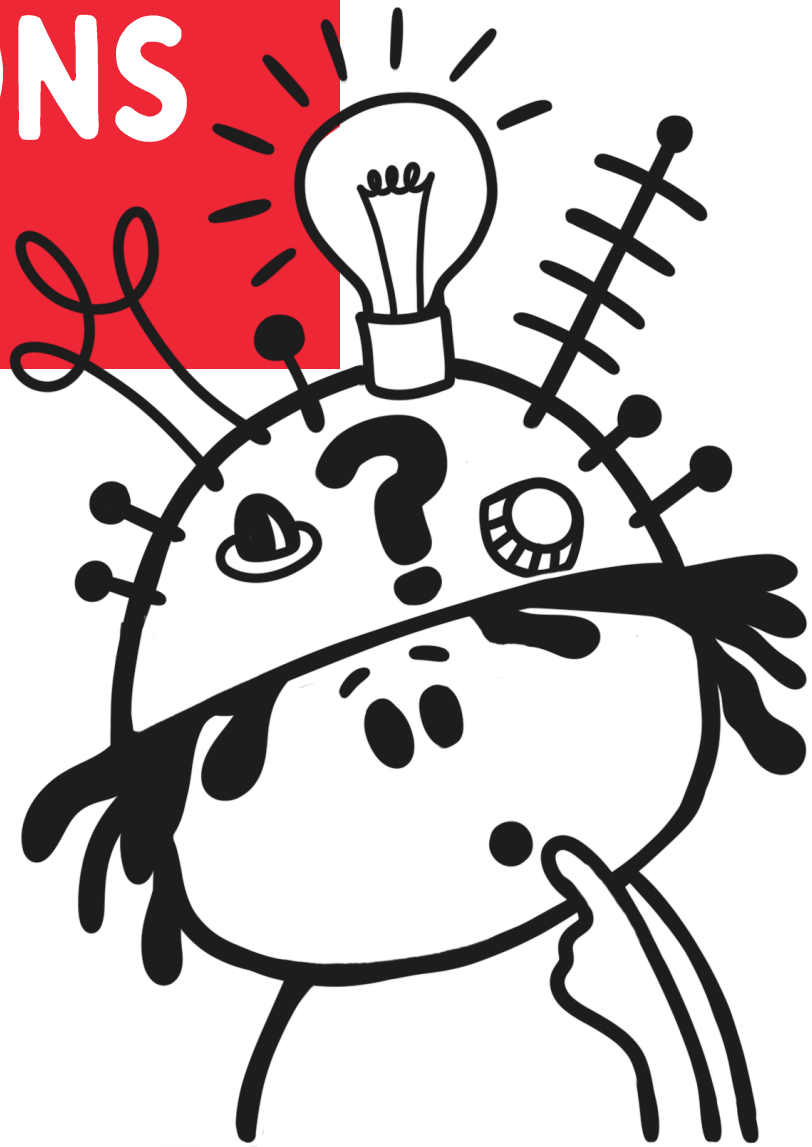


Fair

- Happy that typical questions practiced in class were examined
- Questions were engaging

CHALLENGING QUESTIONS

PAPER 1



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QUESTION 1.1.5

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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

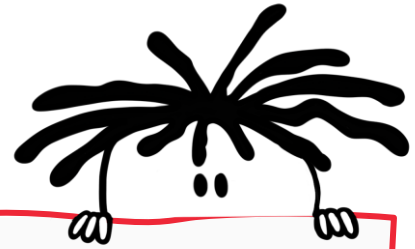
CATEGORIES	SESSION		
	A	B	C
Free users	8 120 031	8 120 908	8 120 970
Paid users	690 160	690 164	690 164
Number of songs	88 704 344	88 705 985	88 706 141
Number of music artists	6 089 733	6 089 852	6 089 862
Music albums	12 929 392	12 929 939	12 929 976

[Adapted from https://stats.fm]

NOTE:
*app = application

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)

Paid users : Free users
690 160 : 8 120 031
1 : 11,7654…
≈ 1 : 11



COMMENTS

- Given discrete data (no. of users) should the ratio be rounded off – and if so, rounded up or down?
- Isn't this question a Level 2 question – when the whole of Question 1 should be Level 1 questions only?

REVIEW OF QUESTION 1

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Q 1.1

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[Adapted from https://stats.fm]

NOTE:
*app = application

1.1.4 Calculate the increase in the number of songs streamed over the 3 sessions. (2)

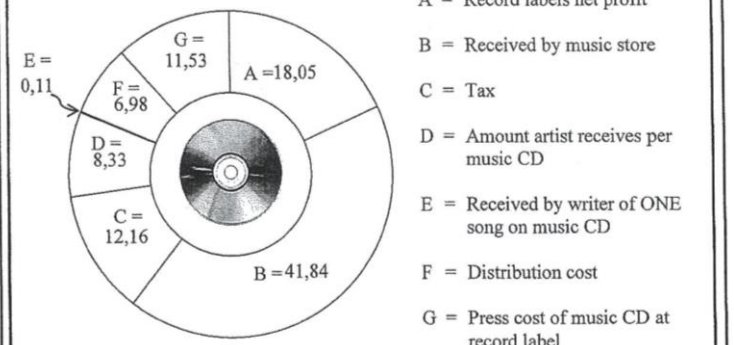
- **The fact that learners would need to calculate the range between Session A and C could be challenging**

Q 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



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

NOTE: CD =

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

- **The word 'acronym' could be unfamiliar for 2nd language learners.**
- **2nd language learners may be more familiar with 'abbreviation'**

QUESTION 2.1.4

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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.

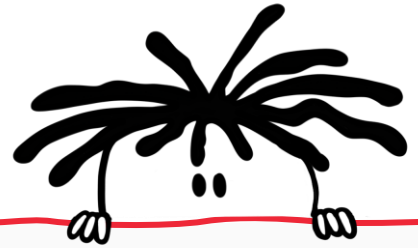
2.1.4 The fixed monthly service fee of R110,00 on 30/11/2022 includes VAT of 15%.

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)

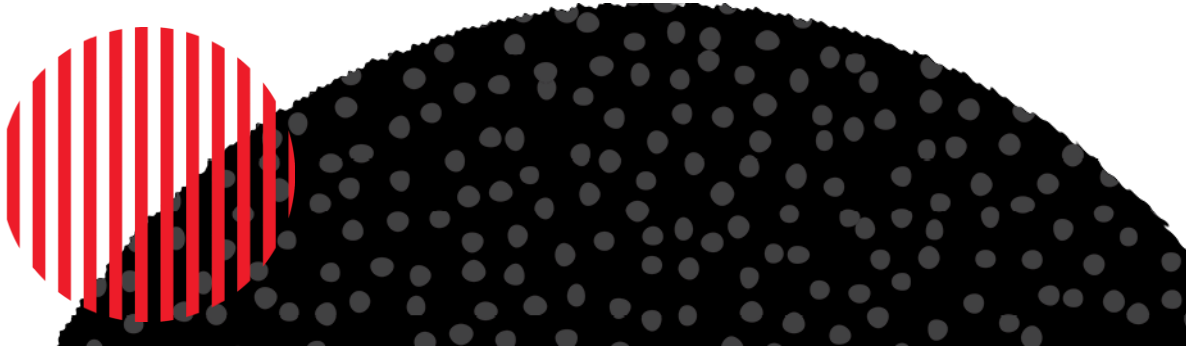
Same service fee (of R110 excl. 15% VAT in 2022)
= R110 ÷ 1,15
= R95,65

Service fee (incl. 14% VAT in 2017)
= R95,65 x 1,14
= R109,04



COMMENTS

- Reverse VAT calculation will be a challenge for lots of learners
- The dates and link to the 14% vs 15% VAT will confuse many learners



QUESTION 2.3.3

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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]

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

(9 099) in brackets indicates a deficit/loss, i.e. Expenditure > Income to the value of R9 099 000

Loss = Expenditure – Income (in thousands)
= R322 891 – R313 792
= R9 099

Q 2.3.4

COMMENTS

- It will be difficult for some learners to firstly understand how the 3 separate tables (income, expenditure & net surplus/deficit) all relate to each other; and then to extract the required information for the specific question
- A lot of information to unpack and interpret in one question

REVIEW OF QUESTION 2

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Q 2.2

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

	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]

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

- **Many teachers enjoyed the fact that the learners were asked to work with the first tax bracket of '18% of taxable income' – as they don't often ask that**

2.2.2 David claims that he should NOT be paying any income tax. Verify, showing ALL calculations, whether his claim is valid. *(6)*

- **The tax calculation results in a negative answer (i.e. SARS owes him money) – which would have confused many learners.**
- **Many teachers thought that the tax threshold should be given, so that the learners could make more sense of the question**

Q 2.3

…s the financial overview of Swellendam Municipality (in R'000), …come and expenditure, the original budgeted amount, the adjusted …t and the actual amount.

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

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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]

- **Complex language usage (e.g. 'over-budgeted' and 'adjusted budgeted') in this question – especially for 2nd language learners**
- **Learners could be confused as to whether they should report their answers in thousands or not**

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)*

- **The wording could be very confusing as the question refers to 'The actual total expenditure (Y)…'; when 'Y' is represented as the 'Actual Amount' in the 'Net Surplus/Deficit' table**

QUESTION 3.1.3

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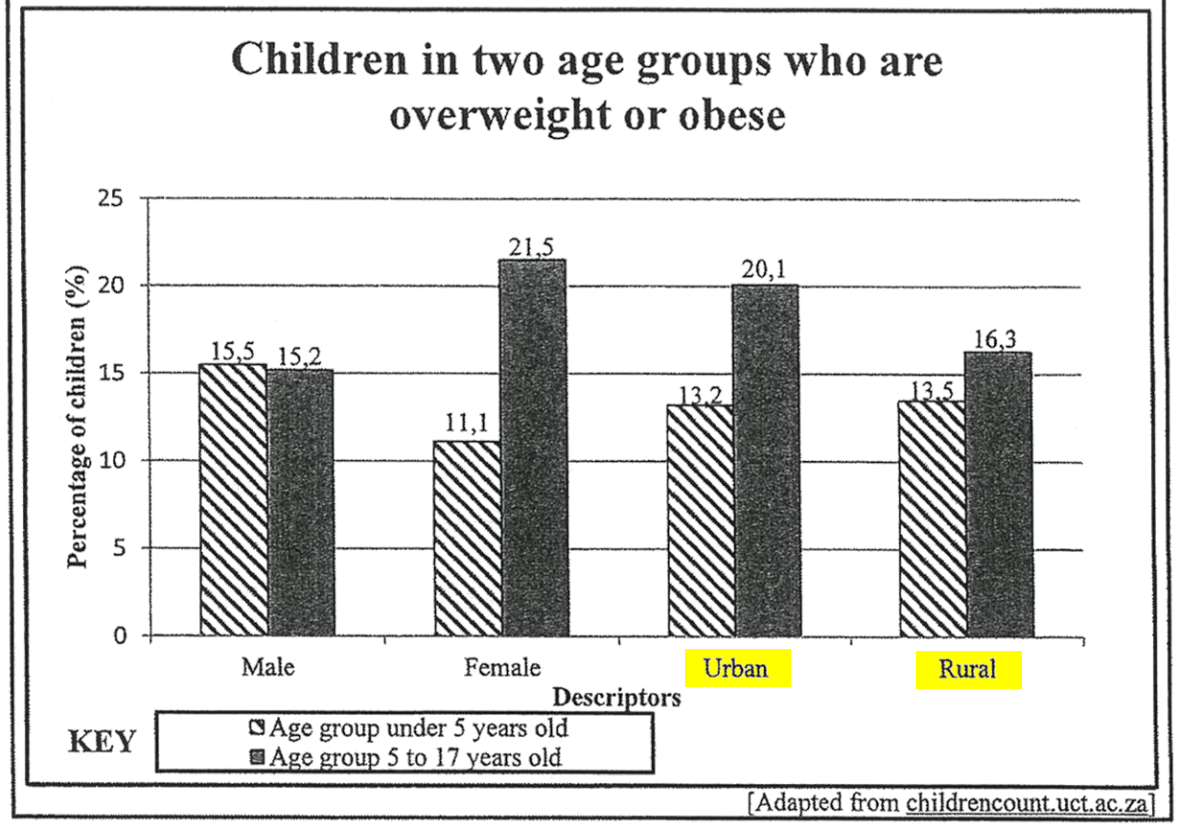
Overnutrition occurs when there is an excessive intake of dietary energy, resulting in overweight or obese people.

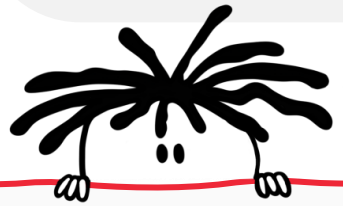
The double bar graph below shows the percentages of children in two age groups who are overweight or obese in South Africa. The following descriptors have been used: male, female, urban and rural.



[Adapted from childrencount.uct.ac.za]

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

- **Urban & Rural: 5 – 17 years old are more overweight/obese than the under 5 year olds (20,1% vs 13,2% and 16,3% vs 13,5% respectively)**
- **5 – 17 years olds: Urban descriptor is 3,8% higher than the rural descriptor (20,1% – 16,3%)**
- **Urban: Difference between under 5 year olds and the 5 – 17 year olds is 6,9% (20,1% - 13,2%)**
- **Rural: Difference between under 5 year olds and the 5 – 17 year olds is 2,8% (16,3% - 13,5%)**



COMMENTS

- How many comments are needed for this question?
- How would you allocate the marks, since it is a 3 mark question?

QUESTION 3.1.4

THE ANSWER SERIES *Your Key to Exam Success*

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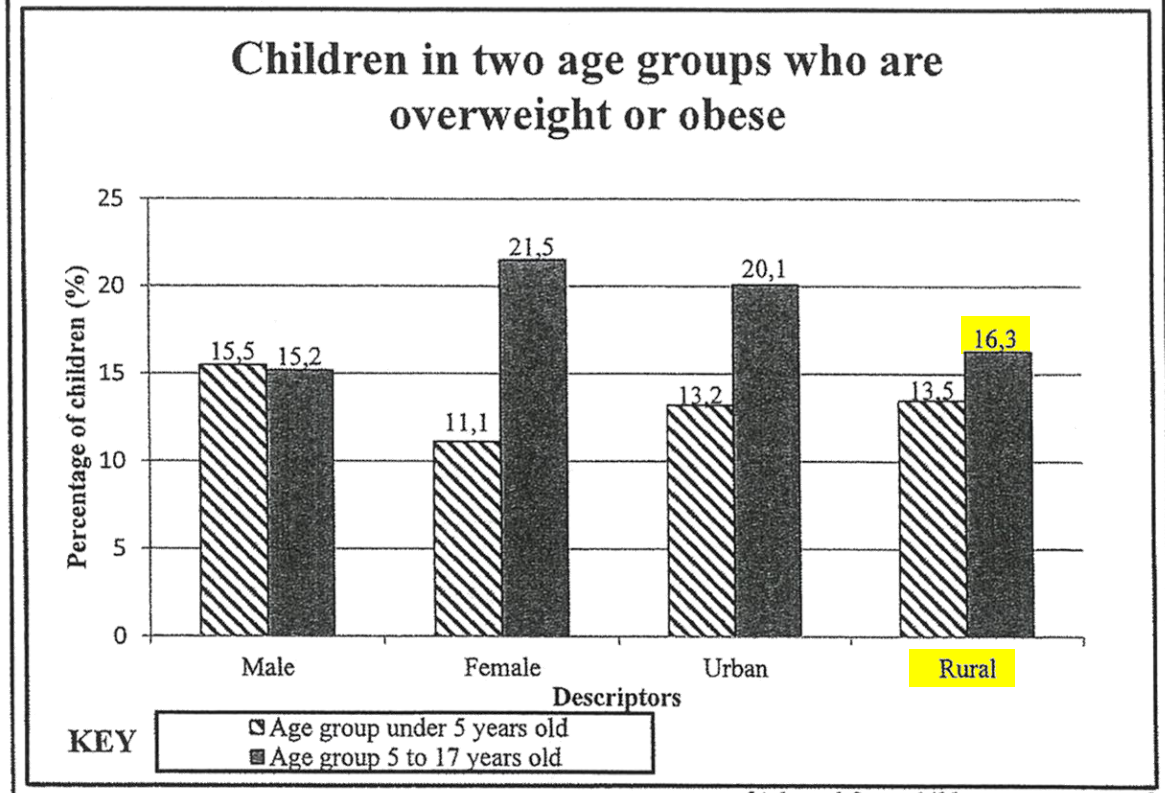


[Adapted from childrencount.uct.ac.za]

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)

Rural 5 – 17 year olds: % NOT overweight

= 100% - 16,3 %

= 83,7%

∴ Number of rural, NOT overweight 5 – 17 years olds

= $\frac{83,7}{100}$ x 795

= 665,415

≈ 665 learners

COMMENTS

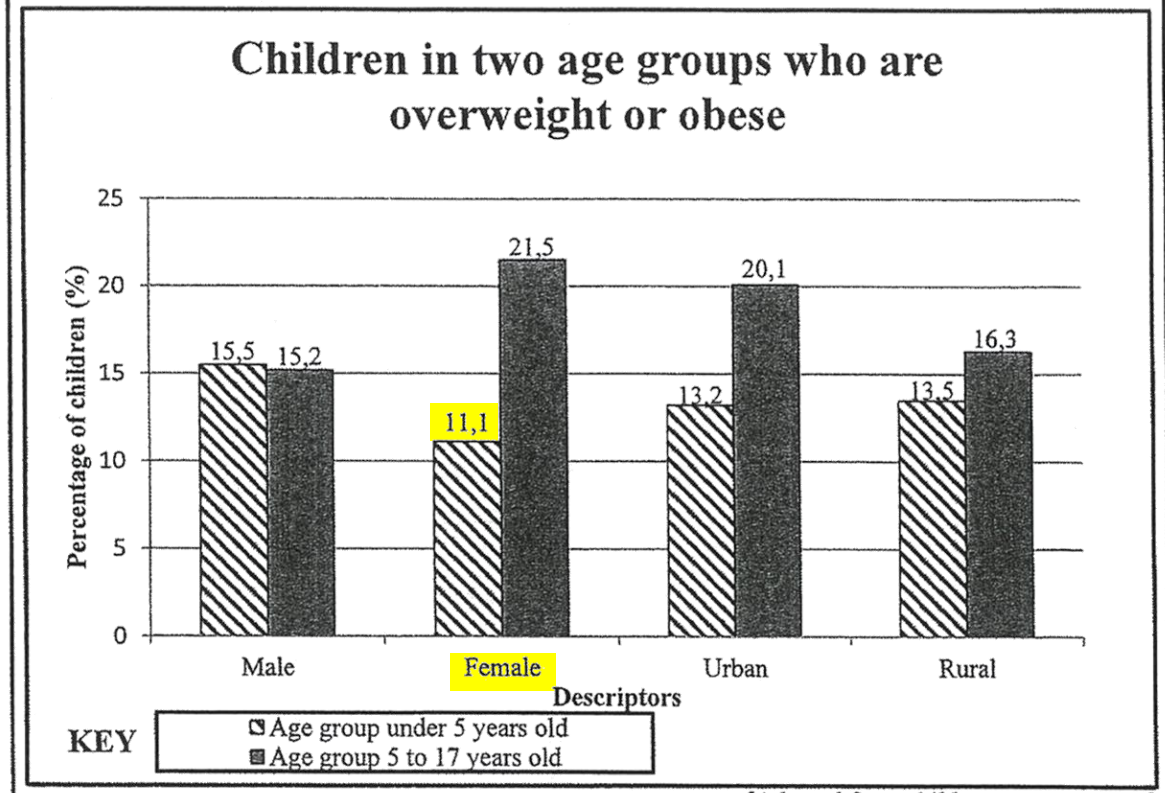
- Learners need to understand that 'NOT = 100% - actual'

QUESTION 3.1.5

THE ANSWER SERIES *Your Key to Exam Success*

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]

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)

% Female under 5 years & NOT overweight

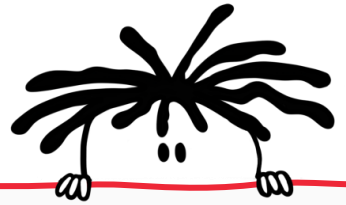
= 100% - 11,1%

= 88,9%

∴Probability (expressed as a fraction)

$$= \frac{88,9}{100}$$

$$= \frac{889}{1\,000}$$



COMMENTS

- Again, learners need to understand that 'NOT = 100% - actual'

QUESTION 3.2.2

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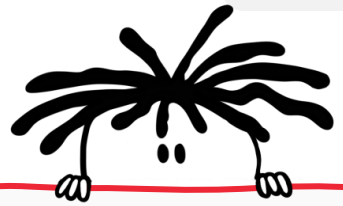
Shown below is a growth chart for boys, from birth to 24 months. Also shown on this chart is the head circumference-for-age and part of the weight-for-length-percentiles.

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

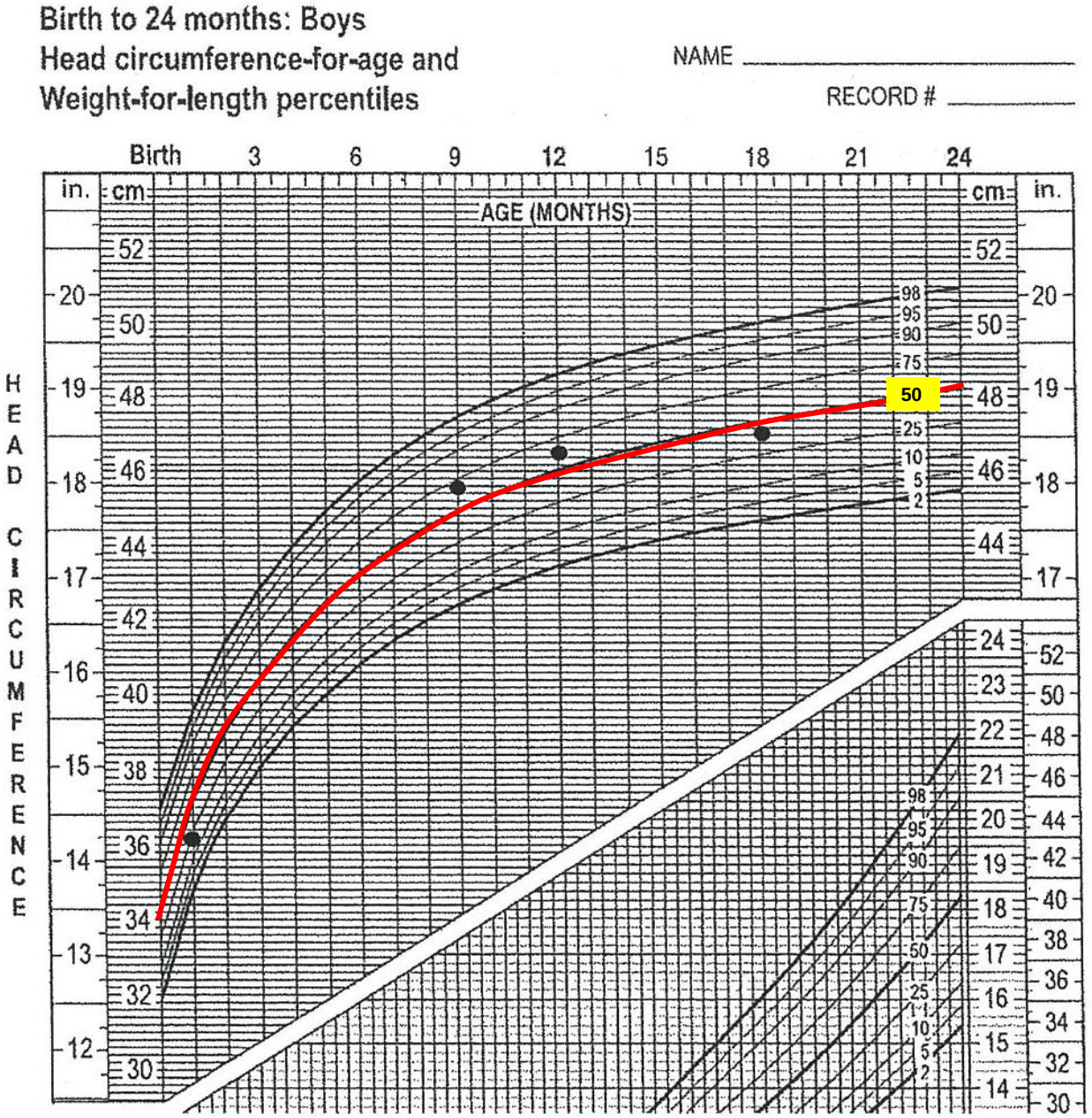
3.2.2 Identify the month(s) in which the boy was below the 50th percentile. (2)

Month(s) < 50th percentile:
1- 8 months & 18 – 24 months



COMMENTS

- **Growth chart is too small – especially for special needs learners**
- **The intervals on the growth chart were not clearly aligned with the bars**
- **It wasn't clear to identify the months or time periods required – so more points could have been plotted on the graph**
- **If learners needed to report the growth periods or more than 1 month, then the mark allocation of 2 marks seems too little?**



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

QUESTION 3.3.1

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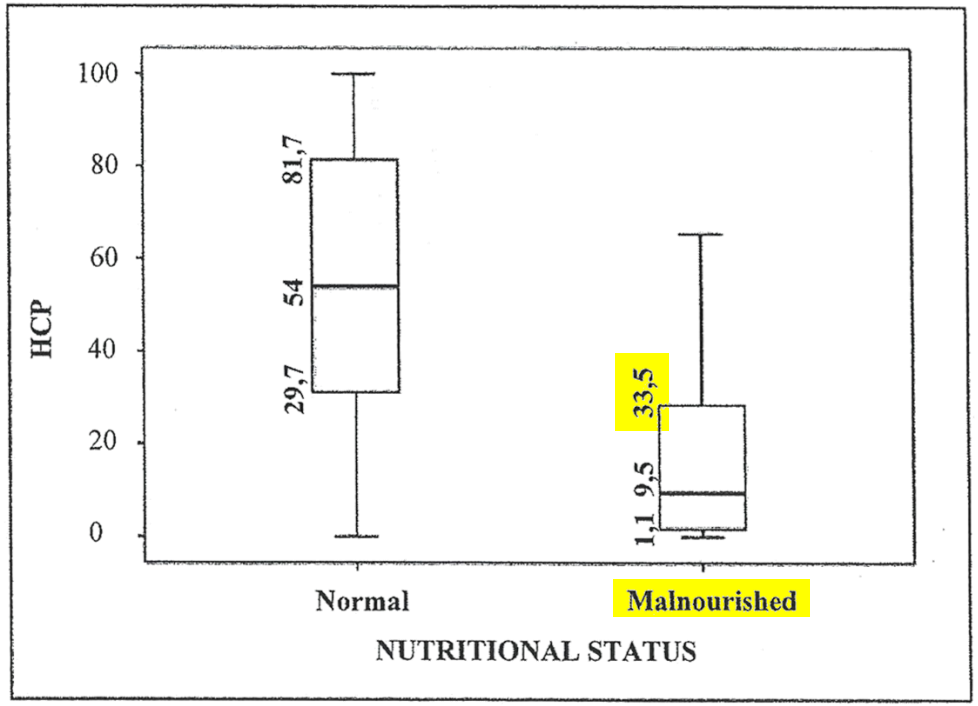
A study was done to investigate the relationship between the head circumference and the nutritional status of some children under 2 years old. The box and whisker plots below show the head circumference percentiles (HCP) of these children based on their nutritional status.

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



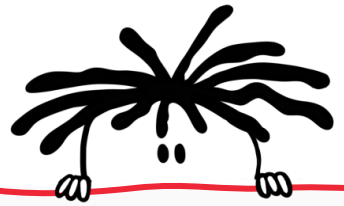
[Adapted from https://www.lidsen.com]

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

Malnourished children HCP < 33,5 percentile = 75% (Q3)

OR

75% of 9,15%?



COMMENTS

- **The '9,15% were malnourished' is a confusing and unnecessary piece of information**
- **Note the sample size was quite small to extrapolate general information about a population**

QUESTION 3.3.2

THE ANSWER SERIES *Your Key to Exam Success*

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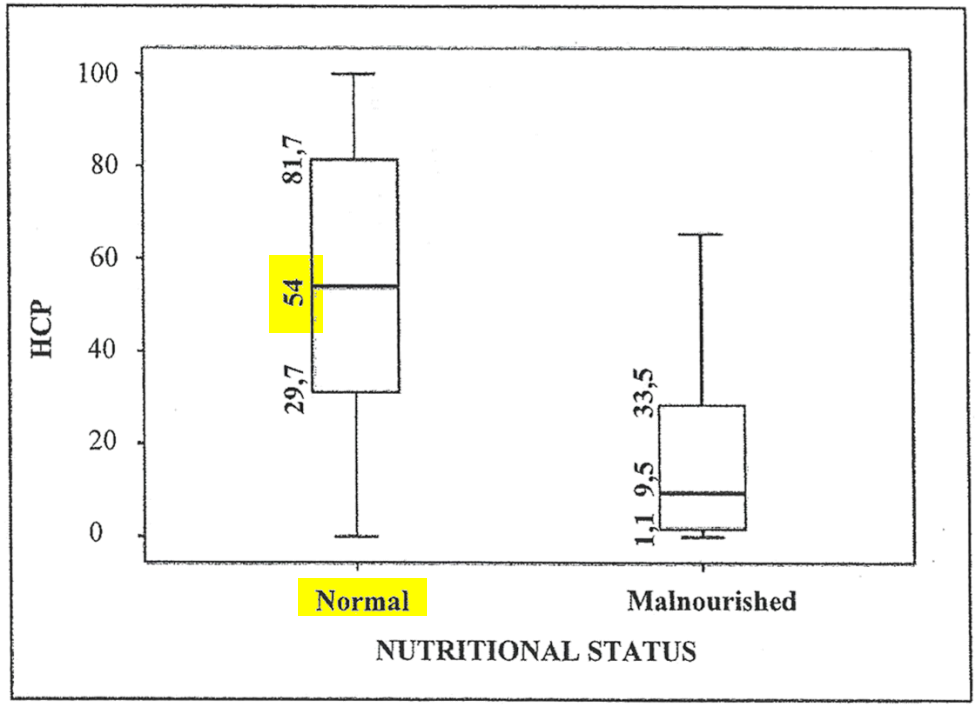


[Adapted from https://www.lidsen.com]

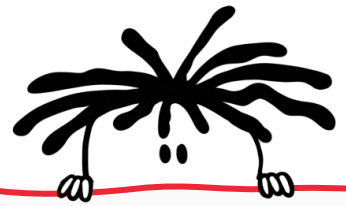
3.3.2 Calculate the number of children that were below the median head circumference in the children with normal nutritional status. (3)

Number of children < median HC with normal nutritional status

$= \frac{50}{100} \times 129$

$= 64,5$

≈ 64 children



COMMENTS

- **Discrete data is given, so do we round up or down for the number of children?**
- **Combining head circumference percentiles with percentages of box-and-whisker plots is very confusing i.e. Q2 = 50% but the HCP at Q2 = 54th percentile**

QUESTION 3.3.3

THE ANSWER SERIES *Your Key to Exam Success*

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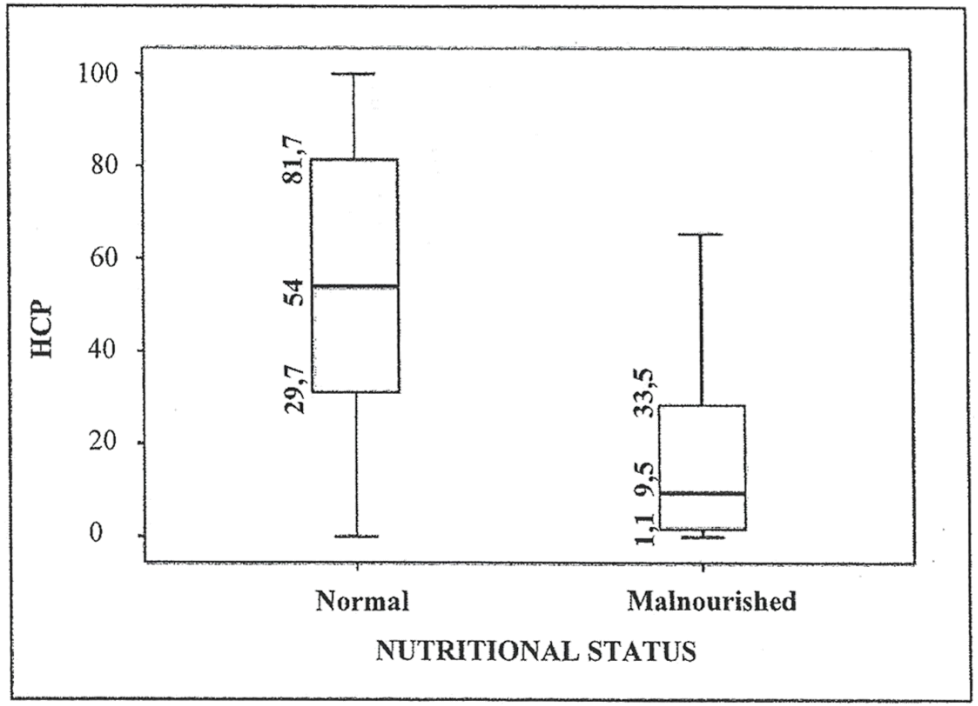


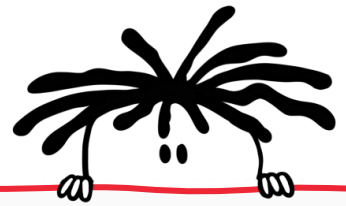
[Adapted from https://www.lidsen.com]

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

Sample is not representative of every age group.

OR

Sample is skewed – as 50% of data represents 1 – 8 months while the other 50% represents 9 months – 2 years.



COMMENTS

- **How much information is needed when commenting on this question?**

REVIEW OF QUESTION 3

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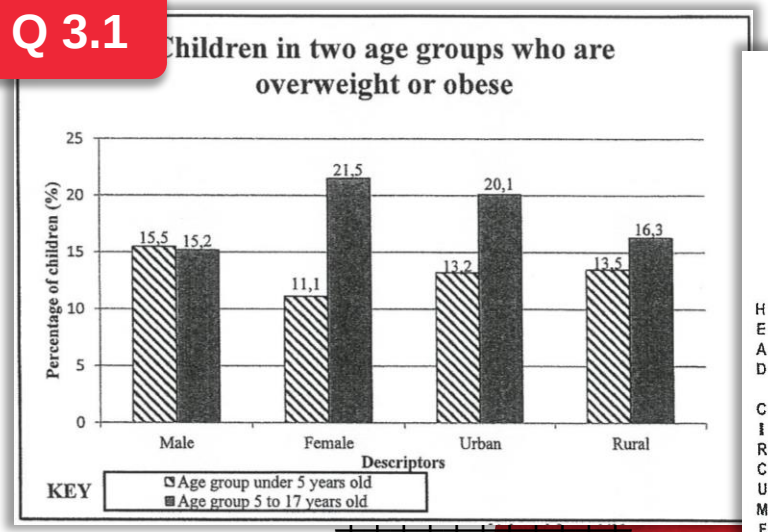
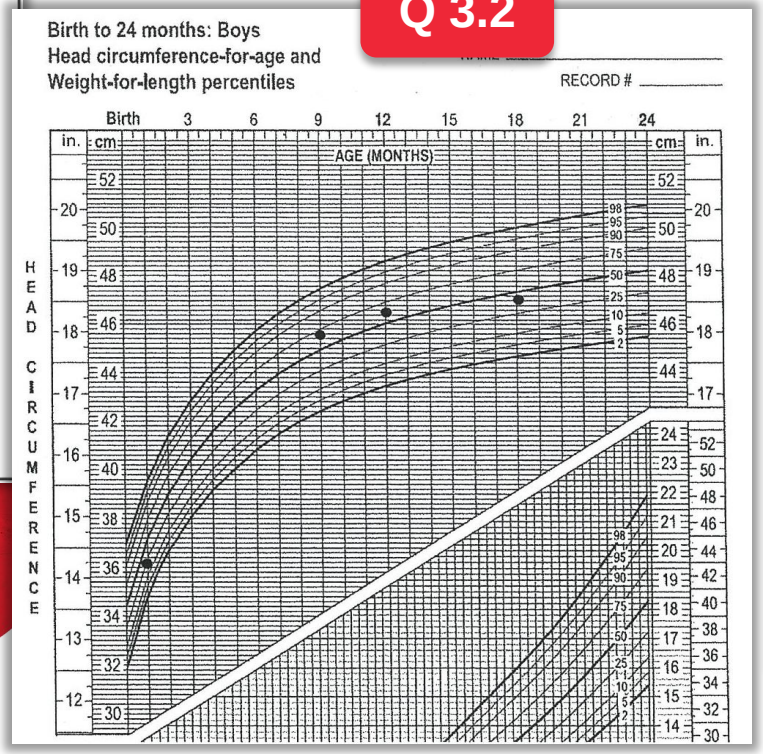
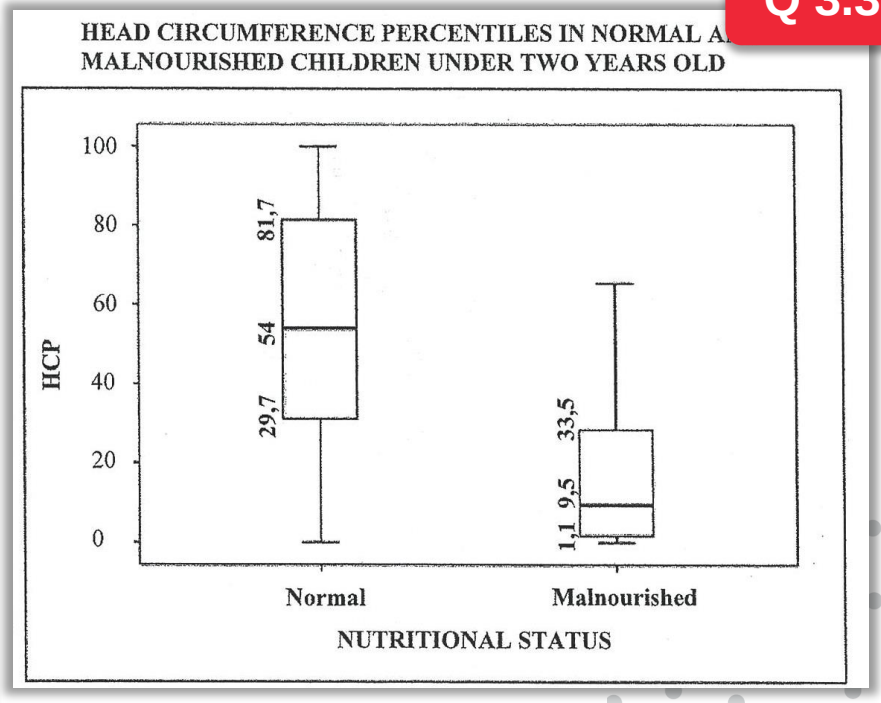
Q 3.1

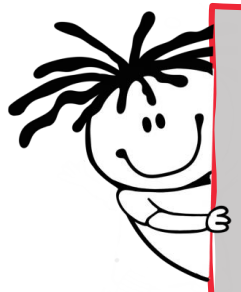


Q 3.2



Q 3.3





- **Question 3, as a whole, was 'heavy' with 3 graphics that needed interpretation and a thorough understanding to answer the questions**
- **There were elements of confusion and unnecessary information**
- **Learners would have spent a lot of time on this question**
- **2nd language learners may have battled to express themselves adequately when dealing with these difficult concepts**

QUESTION 4.1.1

THE ANSWER SERIES *Your Key to Exam Success*

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.

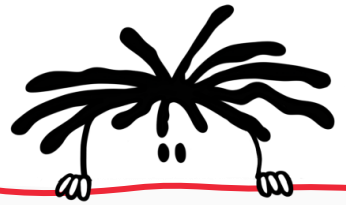
TABLE 5: PRICE (IN RAND) OF TWO STORES IN-STORE VS ONLINE PRICES

	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]

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

Modal in-store price for P&P store: None



COMMENTS

- **There was no mode – was this an error?**
- **Learners may have wasted time re-checking and re-checking to find a mode**

QUESTION 4.2.2

THE ANSWER SERIES *Your Key to Exam Success*

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]

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)

Total no. of doughnuts = 4 x 50 packets = 200 doughnuts

Total cost = Variable costs + Fixed costs

R701 = (No. of doughnuts x Cost per doughnut) + R201

R500 = 200 x Cost per doughnut

∴ Cost per doughnut = R500 ÷ 200

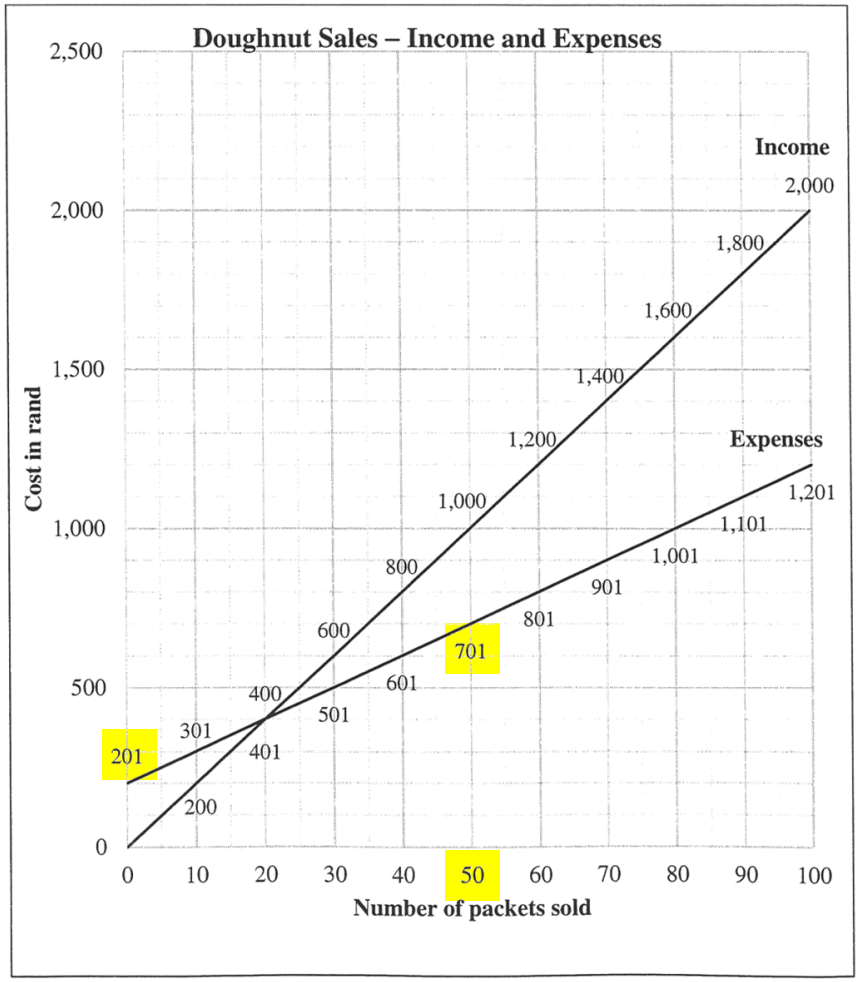
= R2,50

∴ Doughnuts were bought from the FLM store

COMMENTS

- **Learners needed to remember the formula: 'Total cost = Variable cost + Fixed cost'**
- **Learners could easily have not thought to calculate the number of doughnuts**
- **The reverse equation calculation could have proved challenging**
- **Many learners would have forgotten to answer which store the doughnuts were bought at**

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



Adapted from www.eatout.co.za

QUESTION 4.2.4

THE ANSWER SERIES *Your Key to Exam Success*

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]

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)

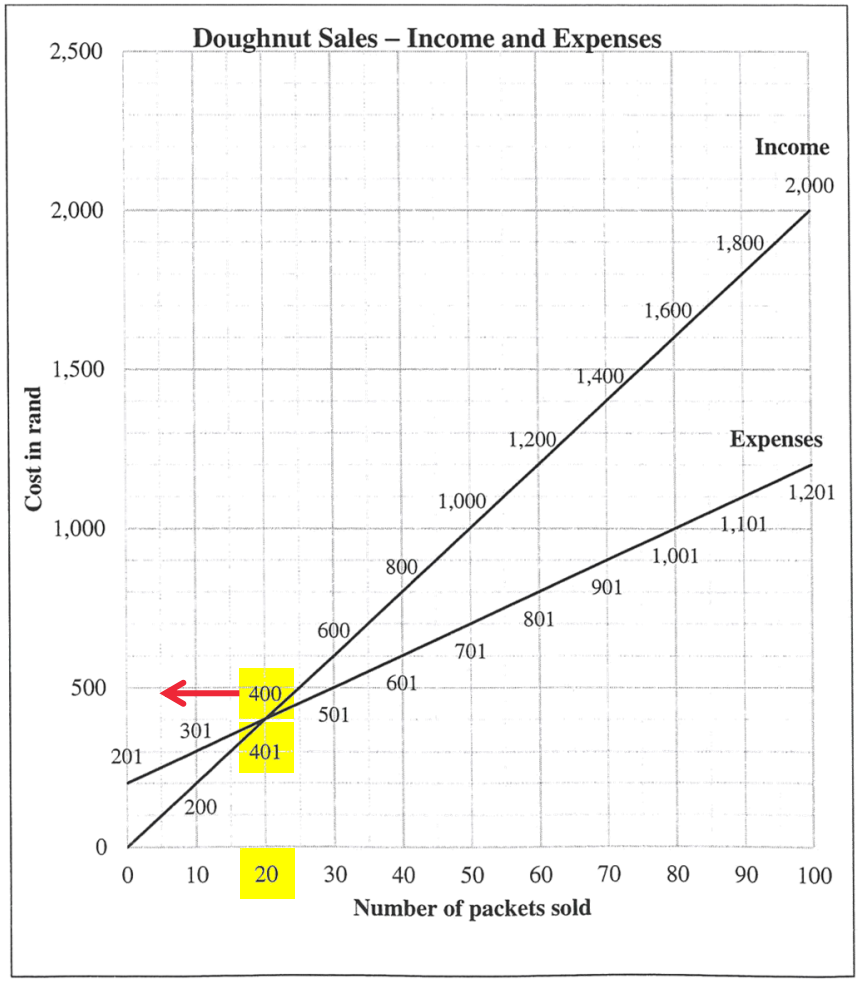
Break-even point would be lower if the selling price increased.

- **Income straight line would have a steeper slope, so it would intersect the expenses straight line graph sooner – before 20 packets**
- **If the selling price increases, then the income climbs faster.**
  ∴The break-even point is reached quicker, as fewer packets of doughnuts need to be sold

COMMENTS

- **Learners needed to draw on knowledge, apply and reason in order to determine the changes to the graphs and the implications for the break-even point**

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



Adapted from www.eatout.co.za

REVIEW OF QUESTION 4

THE ANSWER SERIES *Your Key to Exam Success*

Q 4.1

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
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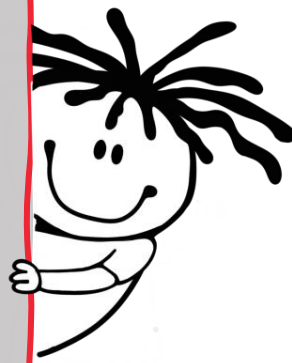
Rice	18,29	18,29	22,95	24,95
Sugar	23,90	26,99	29,95	29,95
Tea	14,89	14,89	15,95	15,95
Delivery		50,00		50,00
Total	**208,74**	**261,80**	**230,56**	**293,06**

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)*

- **Since Mrs Swartz and her daughter were mentioned, learners may have calculated the cost to the store for 2 people**
- **Additionally, the 'per person' was irrelevant and confusing for the learners**



QUESTION 5.1.2

THE ANSWER SERIES Your Key to Exam Success

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]

5.1.2 France operated 4 290 average daily flights in 2019.

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

$$\% \text{ change (A)} = \frac{\text{Flights in 2022} - \text{Flights in 2019}}{\text{Flights in 2019}} \times 100\ \%$$

$$= \frac{3\ 763 - 4\ 290}{4\ 290} \times 100\ \%$$

$$= \frac{-\ 527}{4\ 290} \times 100\%$$

$$= -\ 12{,}284\ldots\%$$

$$\therefore A \approx -\ 12\%$$

COMMENTS

- Learners would need to remember the % change formula
- The negative % change would have confused many learners

QUESTION 5.1.3

THE ANSWER SERIES Your Key to Exam Success

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Switzerland	1 125	– 15%	SAS Group	536	– 35%

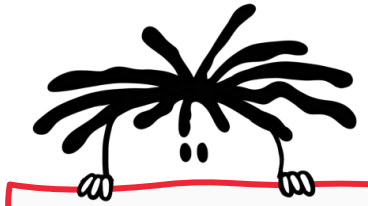
[Adapted from www.eurocontrol.int/sites]

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

Rate % change for 2019 aircraft operators = 13% - (- 35%)

= 13% + 35%

= 48%



COMMENTS

- **Learners needed to have a good understanding of positive and negative numbers to correctly calculate the range**
- **Subtracting negative numbers would have been a problem for many**

QUESTION 5.1.4

THE ANSWER SERIES Your Key to Exam Success

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

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Norway	1 283	– 10%	Vueling	547	– 10%
Switzerland	1 125	– 15%	SAS Group	536	– 35%

[Adapted from www.eurocontrol.int/sites]

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

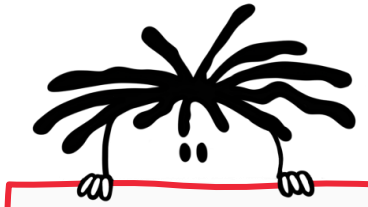
$$\text{Mean} = \frac{\text{Sum of all values}}{\text{No. of values in data set}}$$

$$1\,028{,}2 = \frac{2\,566 + 1\,347 + 1\,249 + 1\,067 + 952 + 709 + 667 + B + 547 + 536}{10}$$

$$10\,282 = 9\,640 + B$$

$$\therefore B = 10\,282 - 9\,640$$

$$= 642$$



COMMENTS

- Learners needed to remember the mean formula
- Reverse calculation to find B would have been a challenge

REVIEW OF QUESTION 5

THE ANSWER SERIES *Your Key to Exam Success*

Q 5.2

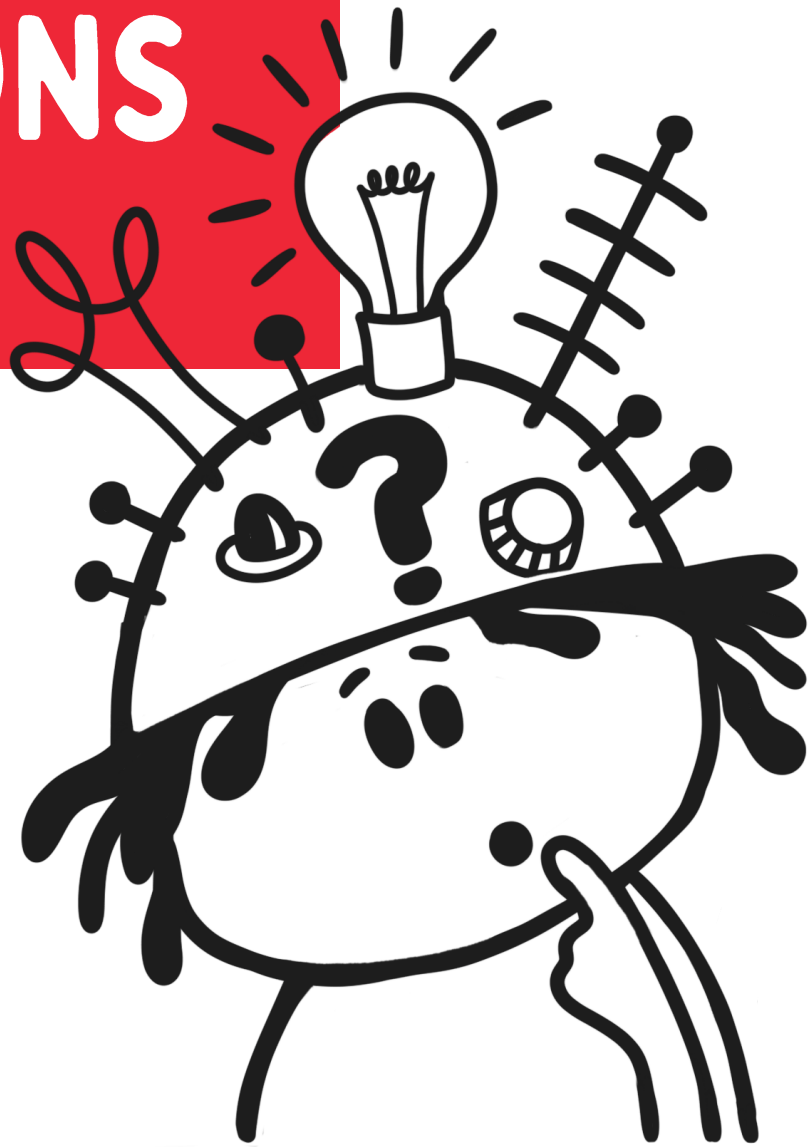
TABLE 7: CURRENCY CONVERSION FACTORS FOR FOUR COUNTRIES ON 19 MARCH 2023

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

- **The context of 'Mandatory Palestine' and 'New Israel' was perhaps insensitive and upsetting to learners. Perhaps learners may even leave this question out due to moral beliefs?**

CHALLENGING QUESTIONS

PAPER 2



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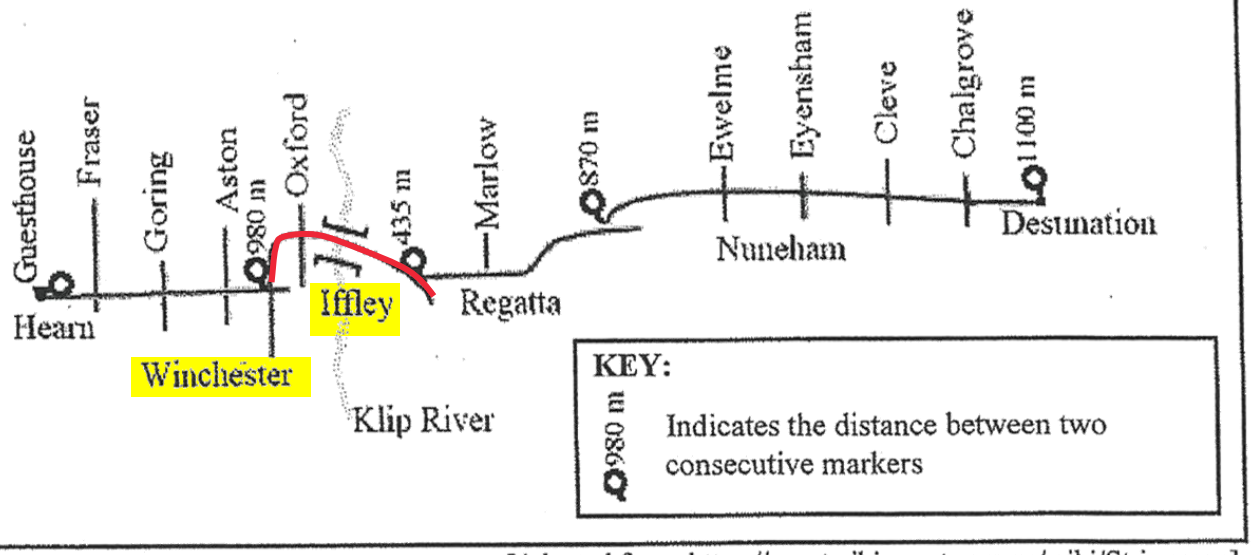
AMESA

QUESTION 1.2.2

THE ANSWER SERIES *Your Key to Exam Success*

Mr Masunte stays at a guesthouse in Hearn Street. Below is a strip chart showing the streets he will use to reach his destination.

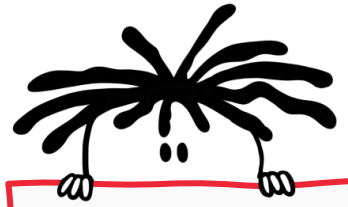


[Adapted from https://scoutwiki.scouts.org.za/wiki/Strip maps]

1.2.2 Name the street that goes over Klip River. (2)

Iffley Street

Winchester Street appears to curve into Iffley Street?



COMMENTS

- **It was not clear that the words represented streets – some thought it represented areas**
- **Strip chart was not clear nor large enough**
- **Iffley could be interpreted as the name of the bridge or the name of the street that crosses the bridge**
- **Learners are familiar with vertical strip charts been given, not horizontal ones – which may have thrown some learners**

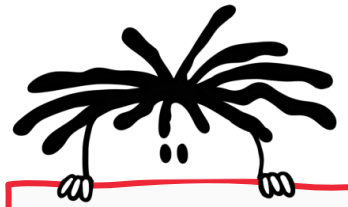
QUESTION 1.3.2 (b)

THE ANSWER SERIES *Your Key to Exam Success*

1.3.2 Use the steps to assemble a chair to identify the following:

(b) The number of screws used in step 4 (2)

4 screws (H)

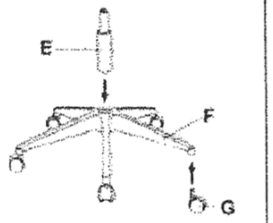
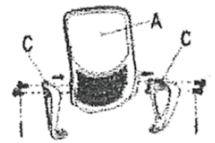
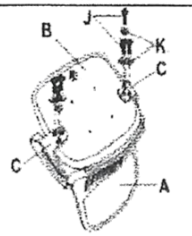
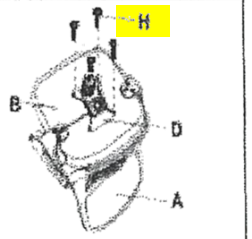


COMMENTS

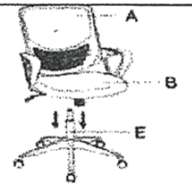
- **Assembly diagram was unclear and needed to be enlarged**
- **The 4th screw in the centre of the chair cannot be easily seen**
- **Some also thought that an additional 2 screws would be required to add on the chair arms, which are slightly visible in Step 4**
- **Last year was the assembly diagram of a garden chair and this year it is a work chair – perhaps we need more variability**

Illustrated below are the steps and components needed to assemble a chair. The components to assemble the chair are labelled alphabetically (A–K).

STEPS TO ASSEMBLE A CHAIR

STEP 1	STEP 2	STEP 3	STEP 4
			

STEP 5



COMPLETED CHAIR

COMPONENTS NEEDED TO ASSEMBLE THE CHAIR

A Chair back	B Chair seat	C Seat mechanism	D Gas lift	E Chair base	F Chair arms
					

G Casters	H Screws	I Screws	J Screws	K Washer	L Assembly tool: Allen key
					

[Source: http//www.bing.com]

REVIEW OF QUESTION 1

THE ANSWER SERIES *Your Key to Exam Success*

Q 1.1

TABLE 1 below contains a list of explanations and definitions of concepts used in Mathematical Literacy.

TABLE 1: EXPLANATIONS AND DEFINITIONS OF CONCEPTS

A	A drawing showing the streets for a person who drives a car
B	Visual indication of the real-life distance and its distance on the map
C	The boundary that surrounds a circular-shaped object
D	A position which roughly shows the location of an object
E	The sum of the areas of all the faces of a 3D object
F	The rate of covering a certain distance
G	The amount of space that is enclosed by the perimeter of an object

1.1.2 Use TABLE 1 above to write down the letter of the explanation or definition (A to G) of EACH of the following concepts: Surface area (2)

- **Translation discrepancy between the English and Afrikaans paper**

QUESTION 2.2

THE ANSWER SERIES Your Key to Exam Success

A single layer of the bottled water will be packed on a rectangular base. The packed bottled water will occupy half of the length of the rectangular refreshment table and will not overlap the edges of the table.

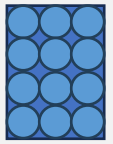
Shown below are the pictures and the dimensions of the top of the rectangular refreshment table and the packed bottled water.

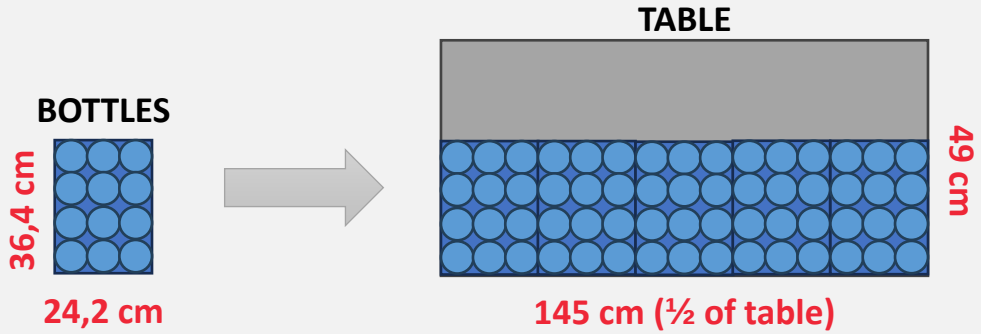
DIMENSIONS OF THE RECTANGULAR REFRESHMENT TABLE TOP	PACKED BOTTLED WATER (Rectangular base packaging)
Refreshment table Width = 49 cm Length = 290 cm	 Width = 24,2 cm Length = 36,4 cm

2.2 Calculate the maximum number of packed bottled water that can fit on this half of the table. (8)

Half of the length of refreshment table
= 290 cm ÷ 2
= 145 cm

Option 1

Bottle placed  **orientation on the table**



$\frac{145\text{ cm}}{24{,}2\text{ cm}} = 5{,}99 = 5$ packs ⟷ length of table (145 cm)
i.e. 24,2 x 5 = 121 cm

$\frac{49\text{ cm}}{36{,}4\text{ cm}} = 1{,}34 = 1$ pack ↕ breadth of table (49 cm)
i.e. 36,4 x 1 = 36,4 cm

∴ Total no. of packs = 1 x 5 = 5

QUESTION 2.2

THE ANSWER SERIES *Your Key to Exam Success*

A single layer of the bottled water will be packed on a rectangular base. The packed bottled water will occupy half of the length of the rectangular refreshment table and will not overlap the edges of the table.

Shown below are the pictures and the dimensions of the top of the rectangular refreshment table and the packed bottled water.

DIMENSIONS OF THE RECTANGULAR REFRESHMENT TABLE TOP	PACKED BOTTLED WATER (Rectangular base packaging)
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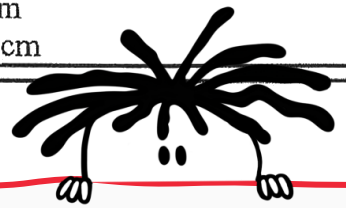
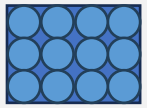
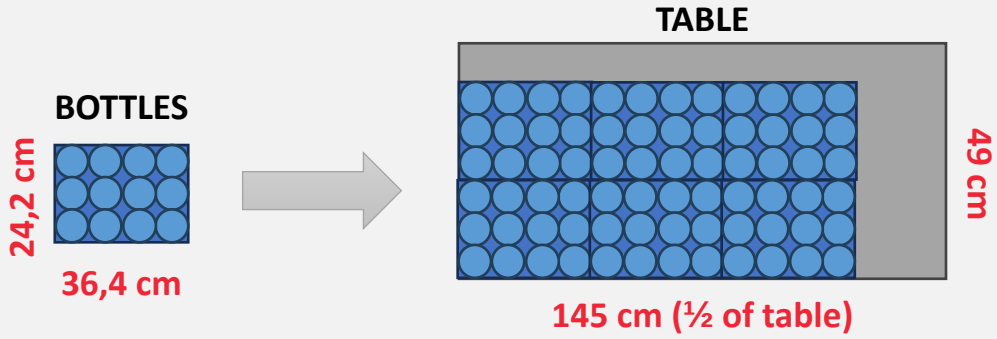


COMMENTS

- Learners would need to check both orientations of packages – they might not even realize that there might be a difference in their answers with different orientations
- Learners may have calculated the number of bottles of water – instead of the packages of water – and wasted a lot of time
- The wording of the question was misleading – it should have perhaps clarified by asking which orientation would have provided a maximum number of bottles and justify by means of calculations

Option 2

Bottle placed  orientation on the table



$\frac{145\text{ cm}}{36,4\text{ cm}} = 3,98 = 3$ packs ⟺ length of table (145 cm)
i.e. 36,4 x 3 = 109,2 cm

$\frac{49\text{ cm}}{24,2\text{ cm}} = 2,02 = 2$ packs ↕ breadth of table (49 cm)
i.e. 24,2 x 2 = 48,4 cm

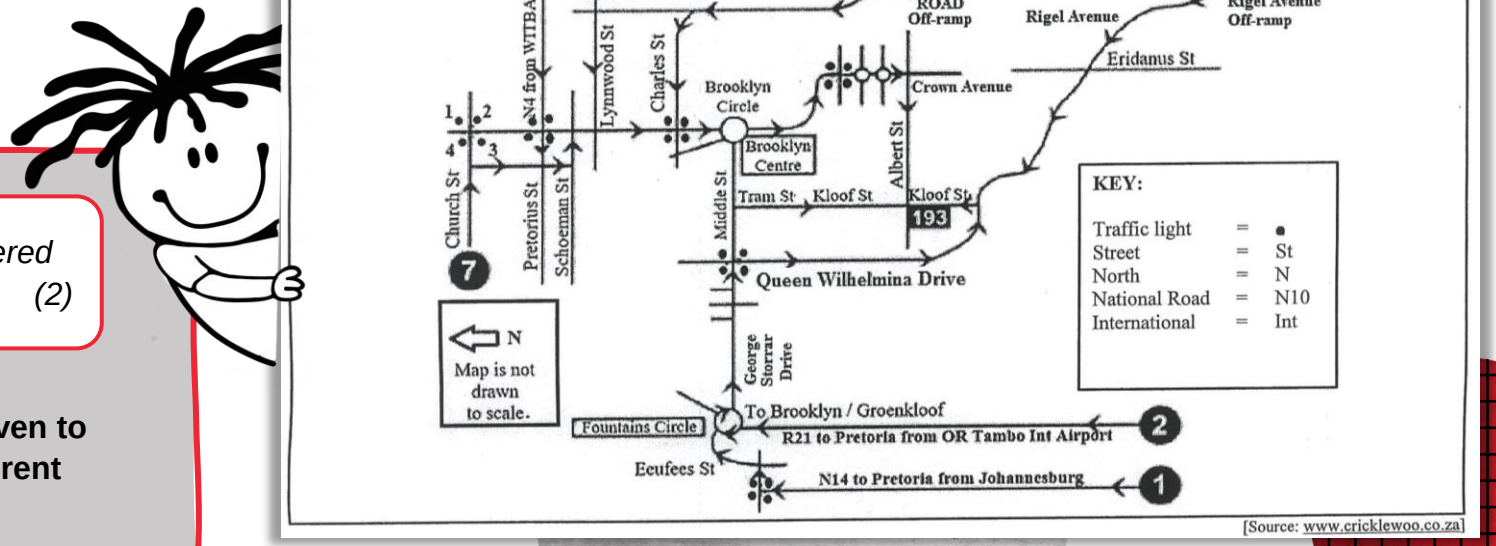
∴ Total no. of packs = 3 x 2 = 6

∴ Maximum no. of packed bottled water = 6

REVIEW OF QUESTION 2

THE ANSWER SERIES *Your Key to Exam Success*

Q 2.3



2.3.5 Give ONE reason why some streets are numbered from 1 to 7. *(2)*

- **It was not clear that this map would have been given to conference attendees who would come from different directions to the hotels**
- **Not sure learners would have had the wordly experience to formulate a reason**

QUESTION 3.2.3

THE ANSWER SERIES *Your Key to Exam Success*

Andrew wants to erect a Vibracrete wall on the boundary of his property.

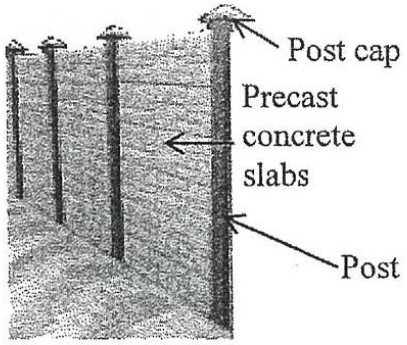
The wall will consist of concrete posts with precast concrete slabs between them.

The wall will have 12 posts planted into the ground using concrete.

On top of each post, he will place a post cap.

For each post, Andrew digs a square hole in the ground with a side length of 30 cm and a depth of 60 cm.

PICTURE OF A VIBRACRETE WALL



3.2.3 The concrete is made from a mixture of cement, river sand and stone in the ratio illustrated below.

Cement	River Sand	Stone
50 kg		
1 Bag	2 Wheelbarrows	2 Wheelbarrows

0,75 m^3 of concrete requires 5,5 bags of cement.
One level wheelbarrow full of river sand weighs 102 kg.

Calculate the mass of river sand needed to make 1 m^3 of concrete. (6)

Cement : River Sand

1 bag : 2 wheelbarrows

50 kg : 204 kg (= 2 x 102 kg)

For 0,75 m^3 of concrete, we need 5,5 bags of cement:

= 50 kg x 5,5 bags

= 275 kg

Concrete : Cement

0,75 m^3 : 275 kg

1 m^3 : ?

$\therefore$ Cement needed = 275 kg x $\frac{4}{3}$ = 366,67 kg

Cement : River Sand

50 kg : 204 kg

366,67 kg : ?

$\therefore$ River Sand needed = 204 kg x 7,33 = 1 496 kg

OR

QUESTION 3.2.3

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Andrew wants to erect a Vibracrete wall on the boundary of his property.

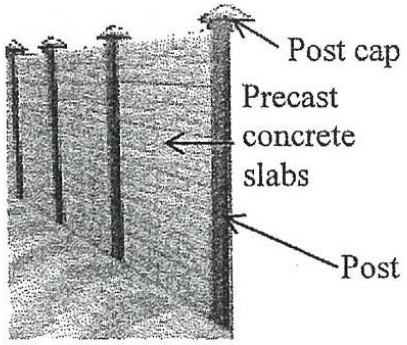
The wall will consist of concrete posts with precast concrete slabs between them.

The wall will have 12 posts planted into the ground using concrete.

On top of each post, he will place a post cap.

For each post, Andrew digs a square hole in the ground with a side length of 30 cm and a depth of 60 cm.

PICTURE OF A VIBRACRETE WALL



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Cement	River Sand	Stone
50 kg		
1 Bag	2 Wheelbarrows	2 Wheelbarrows

0,75 m^3 of concrete requires 5,5 bags of cement.
One level wheelbarrow full of river sand weighs 102 kg.

Calculate the mass of river sand needed to make 1 m^3 of concrete. (6)

OR

Cement : River Sand

1 bag : 2 wheelbarrows

5,5 bags : 11 bags (= 2 x 5,5 bags)

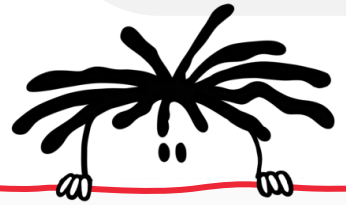
Weight of 11 bags of cement = 11 x 102 kg = 1 122 kg

Concrete : Cement

0,75 m^3 : 1 122 kg

1 m^3 : ?

$\therefore$ Cement needed = 1 122 kg x $\frac{4}{3}$ = 1 496 kg



COMMENTS

- **Many educators felt that it was unreasonable to ask such a complex ratio question**
- **A big challenge for many to work with two different ratios and then to relate them to each other**
- **'Stone' was an added element that was unnecessary as it was not used**

QUESTION 3.3.2

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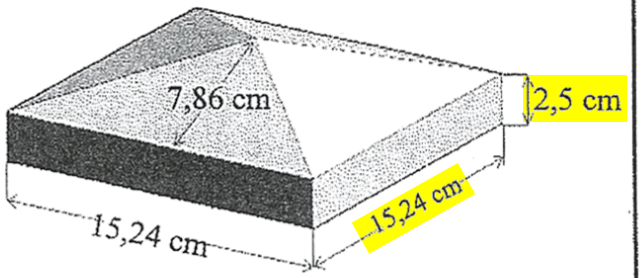
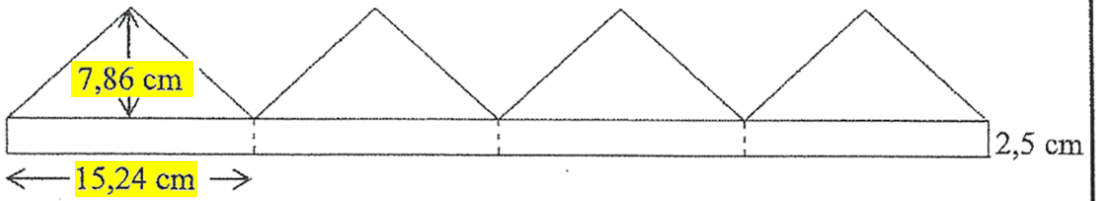
The square-based post cap has a side length of 15,24 cm and a constant height of 2,5 cm.

The perpendicular height of the triangular face is 7,86 cm, as shown in the diagram alongside.

DIMENSIONS OF THE POST CAP



NET OF THE FACES OF ONE OF THE POST CAPS TO BE PAINTED



Andrew will paint two sides of each of the concrete posts (each is 125 mm wide and 1,6 m long) and all the outside faces of the post caps.

The following formulae may be used:

Area of a rectangle = length × width

Area of a triangle = $\frac{1}{2}$ × base × perpendicular height

Area of 12 posts (**Q 3.3.1**)
= 12 x [2 x (12,5 cm x 160 cm)]
= 12 x [2 x 2 000 cm^2]
= 12 x 4 000 cm^2
= 48 000 cm^2

3.3.2 Duncan stated that the total area of all the posts and the post caps to be painted was 52 704 cm^2, rounded to the nearest whole number.

Verify, showing ALL calculations, whether his statement is VALID. (8)

Area of 1 square-base post cap to be painted
= 4 x (15,24 cm x 2,5 cm)
= 4 x 38,1 cm^2
= 152,4 cm^2

∴ Area of 12 post cap bases = 12 x 152,4 cm^2 = 1 828,8 cm^2

Area of 4 triangular faces to be painted
= 4 x (½ x 15,24 cm x 7,86 cm)
= 4 x 59,8932 cm^2
= 239,57 cm^2

∴ Area of 12 triangular faces = 12 x 239,57 cm^2 = 2 874,84 cm^2

Total area of all sides to be painted
= 48 000 cm^2 (Ans. Q 3.3.1) **+ 1 828,8 cm^2 + 2 874,84 cm^2**
= 52 703,64 cm^2
≈ 52 704 cm^2

∴ Duncan's claim is VALID

COMMENTS

- **Many learners would have lost track with this multi-step question**

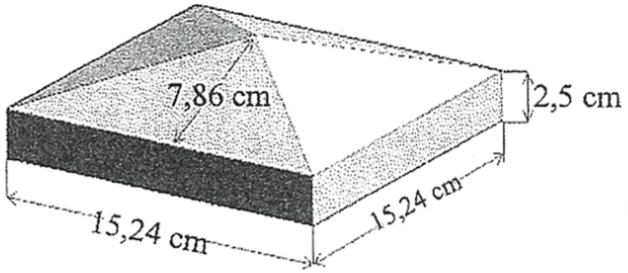
QUESTION 3.3.3

THE ANSWER SERIES *Your Key to Exam Success*

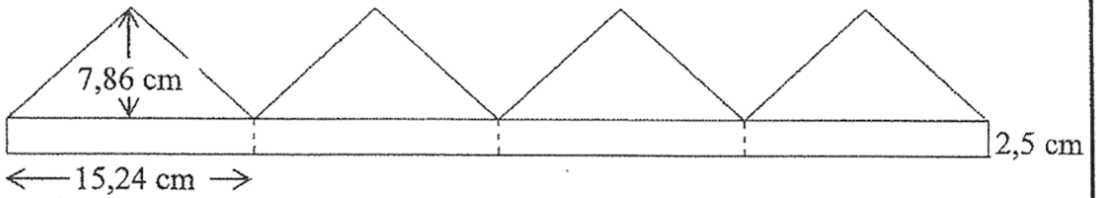
The square-based post cap has a side length of 15,24 cm and a constant height of 2,5 cm.

The perpendicular height of the triangular face is 7,86 cm, as shown in the diagram alongside.

DIMENSIONS OF THE POST CAP



NET OF THE FACES OF ONE OF THE POST CAPS TO BE PAINTED



Andrew will paint two sides of each of the concrete posts (each is 125 mm wide and 1,6 m long) and all the outside faces of the post caps.

The following formulae may be used:

Area of a rectangle = length × width

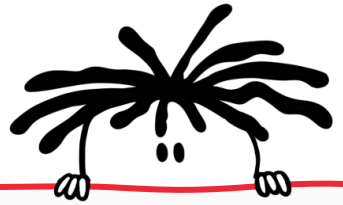
Area of a triangle = $\frac{1}{2}$ × base × perpendicular height

3.3.3 The spread of the pain is 12,46 litre/m^2.

Calculate how many litres of paint is needed to paint 52 704 cm^2. (3)

52 704 cm^2 = 52 704 cm^2 ÷ $(100)^2$
= 5,2704 m^2

∴ No. of litres of paint = 12,46 ℓ/m^2 x 5,2704 m^2
= 65,67 ℓ
≈ 66 ℓ



COMMENTS

- **Many learners would not have remembered to square the conversion factor when converting between cm^2 and m^2**

REVIEW OF QUESTION 3

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Q 3.1

Andrew and Duncan went fishing for carp on a friend's farm.

NOTE: Carp is a large freshwater fish that can be eaten by humans.

3.1.1 A female carp can lay 2,7 million eggs. Write 2,7 million in full, using numerals only. *(2)*

- **Translation discrepancy between the English and Afrikaans paper**

Q 3.2

…vants to erect a Vibracrete wall on the … of his property.

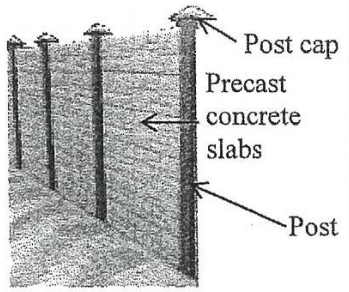
The wall will consist of concrete posts with precast concrete slabs between them.

The wall will have 12 posts planted into the ground using concrete.

On top of each post, he will place a post cap.

For each post, Andrew digs a square hole in the ground with a side length of 30 cm and a depth of 60 cm.

PICTURE OF A VIBRACRETE WALL



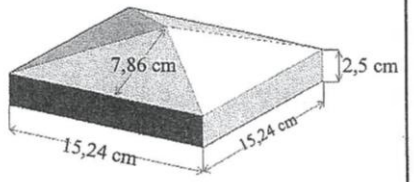
- **The terminology of using 'posts' vs 'poles' may have confused 2nd language users**
- **The fact that learners had to remember the '12 posts' from Question 3.2 to Question 3.3 could have been disadvantageous – as each sub-question should be a stand-alone question**

Q 3.3

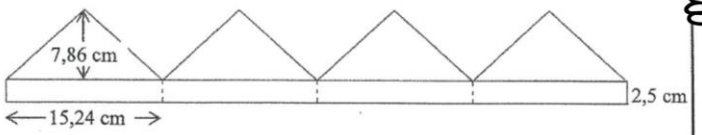
The square-based post cap has a side length of 15,24 cm and a constant height of 2,5 cm.

The perpendicular height of the triangular face is 7,86 cm, as shown in the diagram alongside.

DIMENSIONS OF THE POST CAP



NET OF THE FACES OF ONE OF THE POST CAPS TO BE PAINTED



Andrew will paint two sides of each of the concrete posts (each is 125 mm wide and 1,6 m long) and all the outside faces of the post caps.

The following formulae may be used:

Area of a rectangle = length × width

Area of a triangle = $\frac{1}{2}$ × base × perpendicular height

- **Learners would have struggled to interpret the diagrams, especially the square-base post cap**
- **Learners had to take information from Question 3.2 (i.e. '12 posts') and remember to multiply their answers by 12**
- **Question should have been scaffolded and broken down into multiple steps**

QUESTION 4.2.5

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The girls participating in the fashion show need dresses that fit well. The fashion show uses an **equal number** of girls for each size.

ANNEXURE C shows a body type chart used to select the correct dress size.

BODY TYPE CHART

Mass → / Height ↓	50 kg	55 kg	60 kg	65 kg	67 kg	70 kg	75 kg	80 kg	85 kg	90 kg	100 kg
1,50 m	XS	S	S	M	L	L	XL	XL	XL	XL	XXL
1,55 m	XS	XS	S	M	M	L	L	XL	XL	XL	XXL
1,60 m	XS	XS	S	S	M	L	L	L	XL	XL	XXL
1,65 m	XS	XS	S	S	M	L	L	L	XL	XL	XXL
1,70 m	XS	XS	S	S	M	M	L	L	XL	XL	XXL
1,75 m	XS	XS	XS	S	S	M	M	L	XL	XL	XXL
Dress size	0–2	2–4	4–6	6–8	8–10	10–12	12–14	14–16	16–18	18–20	20–22
Body size	XS	XS	S	S	M	M	M	L	L	XL	XXL

[Adapted from https://cmmodels.com/model-measurements-for-catwalks-and-fashion-shows/]

4.2.5 Bonolo stated that the probability of randomly selecting a girl wearing a dress with body size smaller than XXL is 0,833.

Verify, with calculations, whether her statement is VALID. (4)

P (smaller than XXL) = P (NOT XXL)

$= \frac{60}{66} = 0{,}9091$

∴ Statement is INVALID.

OR

P (smaller than XXL) $= \frac{5}{6} = 0{,}833$

∴ Statement is VALID.

COMMENTS

- Learners needed to apply another 'NOT' scenario to probability
- The equal number of girls was confusing – and not clear how to use it
- Many educators answered with Option 1 – until the logic of the equal number of girls was explained – and then Option 2 was understood and accepted
- Unnecessarily difficult probability question

REVIEW OF QUESTION 4

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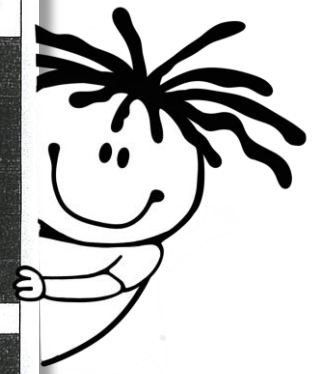
Q 4.2

BODY TYPE CHART

Mass → / Height ↓	50 kg	55 kg	60 kg	65 kg	67 kg	70 kg	75 kg	80 kg	85 kg	90 kg	100 kg
1,50 m	XS	S	S	M	L	L	XL	XL	XL	XL	XXL
1,55 m	XS	XS	S	M	M	L	L	XL	XL	XL	XXL
1,60 m	XS	XS	S	S	M	L	L	L	XL	XL	XXL
1,65 m	XS	XS	S	S	M	L	L	L	XL	XL	XXL
1,70 m	XS	XS	S	S	M	M	L	L	XL	XL	XXL
1,75 m	XS	XS	XS	S	S	M	M	L	XL	XL	XXL
Dress size	0–2	2–4	4–6	6–8	8–10	10–12	12–14	14–16	16–18	18–20	20–22
Body size	XS	XS	S	S	M	M	M	L	L	XL	XXL

[Adapted from https://cmmodels.com/model-measurements-for-catwalks-and-fashion-shows/]



- **The body type chart would have been unfamiliar and to then couple it with the dress size chart towards the end of the paper – would have been a challenge for many**

QUESTION 5.3.3

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Alaska is one of the states in the USA. Anchorage is the largest city in Alaska.

ANNEXURE D shows a part of the globe indicating the shortest distances, in nautical miles, between Anchorage and a few selected cities in the world.

NOTE: 1 nautical mile = 1,151 miles
1 km = 0,6215 miles

5.3.3 Cargo needs to be shipped to Los Angeles to Honolulu and then from Honolulu to Tokyo.

Phenyo searched the internet to determine how long it would take the cargo to reach its destination. Shown below are the search results. Some information has been omitted.

OCEAN ROUTE	TIME	DISTANCE
USLAX Los Angeles — USHNL Honolulu	10 days 4 hours	2 607 nautical miles
USHNL Honolulu — JPYOK Tokyo	...	3 350 nautical miles

NOTE: Ships sail 24 hours a day.

(b) Hence, determine the date and time of arrival in Tokyo if the ship leaves Honolulu on 24 September at 16:00 and sails at the same average speed. (6)

$$\text{Speed} = \frac{\text{2 607 nautical miles}}{(\text{10 days x 24h}) + \text{4 h}}$$

$$= \frac{\text{2 607 nautical miles}}{\text{244 h}}$$

= 10,68 nautical miles per hour

$$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$$

$$= \frac{\text{3 350 nautical miles}}{\text{10,68 nautical miles/h}}$$

= 313,670412 hours

Ans. Q 5.3.3(a)

∴ No. of days = 313,670412 hours ÷ 24 h
= 13,0696005 days

∴ No. of hours = 0,0696005 days x 24 h
= 1,670411985 hours

∴ No. of minutes = 0,670411985 x 60 min
= 40,22 minutes

∴ Total travel time = 13 days, 1 hour, 40 minutes

Left Honolulu on 24 September + 13 days = 7 October
Left at 16:00 + 1 hour 40 minutes = 17:40

Arrival date and time: 7 October at 17:40

COMMENTS

- Multi-step time conversions would have been challenging
- Many learners would have added in the '10 days 4 hours' if they had not read carefully
- There are variations in answers in the final arrival time – of up to 5 minutes – depending on the rounding off that is used when calculating the time

REVIEW OF QUESTION 5

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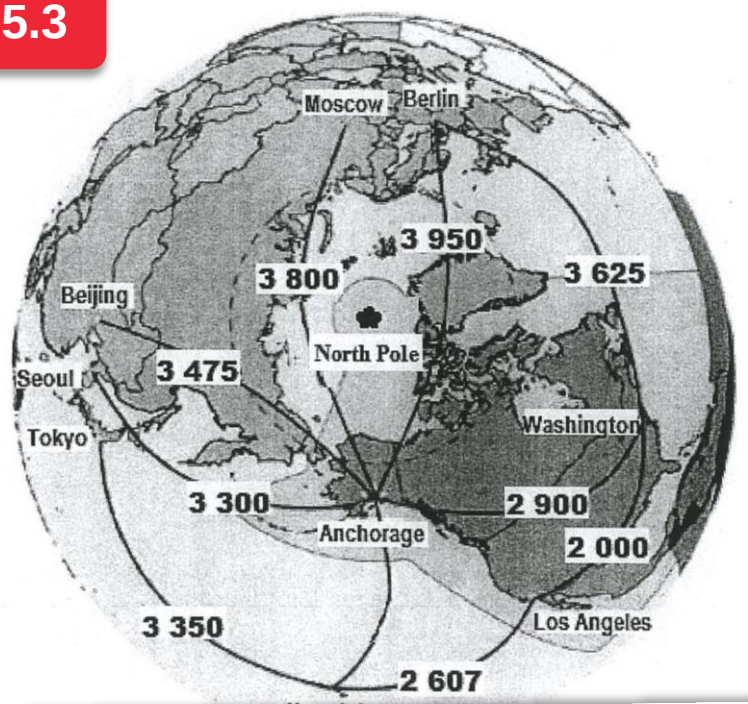
Q 5.3



OCEAN ROUTE	TIME	DISTANCE
USLAX Los Angeles — USHNL Honolulu	10 days 4 hours	2 607 nautical miles
USHNL Honolulu — JPYOK Tokyo	...	3 350 nautical miles

- **Learners struggle with conversions and elapsed time – so to put it at the end of the paper – could have resulted in many learners leaving out this question**

GENERAL OVERALL RECOMMENDATIONS

THE ANSWER SERIES *Your Key to Exam Success*

- There were too many tables, graphics or annexures per question (sometimes 3 per question) for learners to work through, which resulted in an ‘over-burdening’ amount of information. Learners would have taken a lot of time to understand, interpret and extract information before they have even begun to answer the questions. This is especially true for our 2nd language learners. This also made the question paper too long.
- Growth charts, assembly diagrams and strip charts should be far clearer and enlarged. They should be presented as an annexure.
- More scaffolding should be provided for the multi-layered, multi-step questions – to enable all learners to at least make a start with the question and progress from there onwards.
- The longer, more multi-layered and complex questions should not be given towards the end of the paper. Learners ‘zone-out’ and battle to concentrate and focus.

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