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Western Cape
Government

Western Cape Education Department

Directorate: Curriculum FET

TERM 1 TUTORING PROGRAMME

GRADE 12

SUBJECT: MATHEMATICAL LITERACY

LEARNER MATERIAL

Tutor Material March 2024

FINANCE

1.1

Dr. Kyle Brooks lives in Johannesburg. He has to pay rates to the Johannesburg Municipality for the water and electricity that he uses monthly. Below is the electricity bill that he received from the municipality for the month of August.

CITY OF JOHANNESBURG MUNICIPALITY					
158 Civic Boulevard Street Metropolitan Centre, 8th Floor, A-Block, Braamfontein					
Street Address		Client Name		Invoice Number	
47 Tenth Street Linden 2196		Dr. K. Brooks		NORTH – ELEC453723	
Date	Consumption details	Tariff	Sub-Total	VAT	Sub-Total Due
29/08	Previous reading: 114628 kWh Current reading: 115353 kWh → Consumption for August: _____ (A)	R0,219 per kWh	R158,78	_____ (B)	R181,01
29/08	30 AMP Circuit Breaker	R2,80 per AMP	R84,00	R11,76	R95,76
TOTAL AMOUNT DUE					_____ (C)

- 1.1.1 Define the term *tariff*. (2)
- 1.1.2 What is the current strength of the circuit breaker attached to his flat? (2)
- 1.1.3 Calculate the consumption for August. (A) (2)
- 1.1.4 Show how the sub-total value of R158, 78 was calculated. (2)
- 1.1.5 Calculate the VAT amount on R158, 78. (B) (2)
- 1.1.6 Determine the total amount due. (C) (2)

2.1

Khumu is planning an event to raise funds for needy learners.

Part of her plan is to find a suitable venue for about 200 to 300 people. She obtains quotations from three different service providers. Each venue had a fixed rental cost as well as a variable cost per person.

TABLE 1 below shows the costing structure of these three venues.

TABLE 1: VENUE COSTING STRUCTURE

VENUE	FIXED RENTAL COST	VARIABLE COST PER PERSON
Avon	R3 000	R75
Beach Hotel	R6 000	R45
Castle	R11 000	R25

The graphs representing the total cost of the three venues are given on ANSWER SHEET 1.

Use the information in the table above and the graphs on ANSWER SHEET 1 to answer the questions that follow.

2.1.1 Explain the term *variable cost* in this context. (2)

2.1.2 Calculate the exact total cost of renting the Beach Hotel venue for 230 people.

You may use the following formula:

$$\text{Total cost (in rand)} = \text{fixed cost} + 230 \times \text{variable cost} \quad (3)$$

2.1.3 Determine:

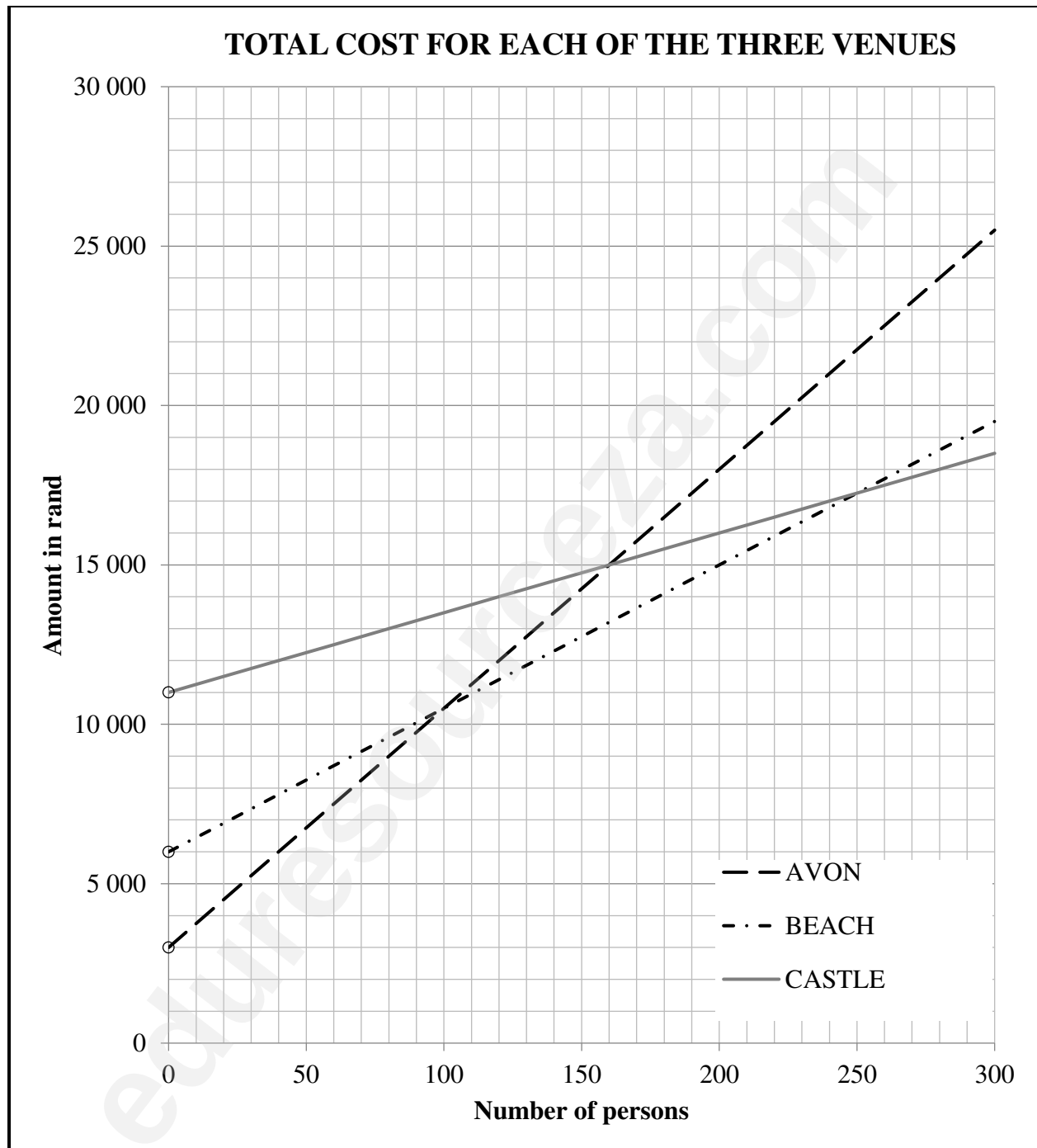
(a) The cheapest venue if only 90 persons attend the event (2)

(b) The maximum number of people that can attend the event if the total cost of the venue is R15 000 (2)

2.1.4 Khumu sells the tickets for R150 each.

(a) Draw the income graph from the sale of up to 200 tickets on the same grid as the total cost graphs on ANSWER SHEET 1. (4)

(b) Calculate the total profit to be made if she rents the Castle venue and pays for 250 people, but sells only 194 tickets. (5)



- 2.2 At the end of August 2017, Dr. Brooks received a water bill for 50 kilolitres of water used at his home. Use the water tariff structure below and complete . 2.2.1 to 2.2.8.

Table 1: Johannesburg municipality domestic water tariffs* for 2016/17

Johannesburg municipality domestic water tariffs* for 2016/17	
WATER	
Volume	Charge (per kl)
Up to 6 kl	R0, 00
6, 1 kl – 15 kl	R7, 85
15, 1 kl – 30 kl	R11, 29
30, 1 kl – 45 kl	R13, 05
> 45 kl	R14, 00
<i>*All tariffs exclude VAT, which is charged at 15%</i>	

Number of kilolitres used	Cost per kilolitre	Total cost
6 kl	Free	R0, 00
9 kl	R7, 85	R70, 65
2.2.1	R11, 29	2.2.3
15 kl	R13, 05	2.2.4
2.2.2	R14, 00	2.2.5
Total (VAT exclusive)		2.2.6
VAT		2.2.7
Total (VAT inclusive)		2.2.8

- 2.3 Mr and Mrs Bush will use their new Tucson 1.6 litre to travel from Johannesburg to Richards Bay and back home. A full tank of petrol for the car is 62 litres. The price of unleaded 95 petrol is R12,60 per litre in June. They intend travelling along the N3 via Durban and then take the N2 to Richards Bay. The distance they will travel is 886 km.



Class 1 Vehicle

- 2.3.1 The specification of the car indicates that a full tank covers 560 000 m at an average speed of 120 km/h.

Use calculations to determine whether they will need more than THREE full tanks of petrol for a return trip. (4)

- 2.3.2 ANNEXURE E shows the toll fees that they will pay on their trip from Johannesburg to Richards Bay. They will pass all the **mainline toll gates** along the N3 and N2.

Calculate the total cost for FOUR full tanks of petrol and the toll fees for a return trip. (6)

- 2.3.3 Analysts have predicted that the CPI (Consumer Price Index) for 2017 will be similar to the one of 2013, as shown in TABLE 3 below.

TABLE 3: Consumer Price Index (CPI) for 2013

Month	Jan	Feb	Mar	Apr	May	Jun	Jul
Growth rate	2,15%	2,26%	1,96%	1,74%	1,50%	1,41%	1,39%

In June, Mr Bush claimed that if they decided to travel in July, they would need R2 500,00 for fuel cost.

Verify his claim by showing all necessary calculations. (4)

ANNEXURE E

QUESTION 2.3.2

N3 JOHANNESBURG TO DURBAN			VEHICLE CLASS			
			Class I	Class II	Class III	Class IV
De Hoek	Main line	Heidelberg – Villiers	R42,00	R65,00	R99,00	R142,00
Wilge	Main line	Villiers – Warden	R58,00	R100,00	R133,00	R189,00
Tugela	Main line	Warden – Frere	R62,00	R102,00	R161,00	R223,00
Tugela East	Ramp	Harrismith – Ladysmith	R38,00	R64,00	R94,00	R131,00
Bergville	Ramp	Ladysmith – Estcourt	R19,00	R22,00	R40,00	R62,00
Treverton	Ramp		R13,00	R32,00	R45,00	R60,00
Mooi	Main line	Frere – Cedara	R44,00	R106,00	R149,00	R201,00
	N ramp	Mooi River – Frere	R12,00	R30,00	R43,00	R58,00
	S ramp	Mooi River – Cedara	R30,00	R74,00	R104,00	R141,00
Marianhill	Mainline	Key Ridge – Paradise Valley	R10,00	R18,00	R23,00	R35,00

N2 DURBAN TO RICHARDS BAY			VEHICLE CLASS			
			Class I	Class II	Class III	Class IV
oThongathi	Main line	Umdloti – Ballito	R10,00	R21,00	R28,00	R40,00
	S ramp	Tongaas – Umdloti	R5,00	R11,00	R14,00	R20,00
	N Ramp	Tongaas – Ballito	R5,00	R11,00	R14,00	R20,00
Mvoti	Main line	Ballito – Stanger	R12,00	R34,00	R46,00	R66,00
Mandini	S ramp	Mandini – Stanger	R6,50	R12,00	R15,00	R20,00
Dokodweni	S ramp	Gingindlovu – Stanger	R17,50	R35,00	R40,00	R55,00
Mtunzini	Main line	Stanger – Empangeni	R41,50	R80,00	R95,00	R142,00
	N ramp	Mtunzini – Empangeni	R7,50	R15,00	R18,00	R30,00
	S ramp	Mtunzini – Stanger	R34,50	R65,00	R78,00	R1126,00

3.1

Monde wants to sell prepaid airtime at 52 schools during a normal school week by placing portable airtime vending machines at school offices. TABLE 3, on ANNEXURE D, shows the prepaid airtime price structure for the different South African cellular network providers.	Portable vending machines for prepaid airtime  [Source: www.topupsprepaid.com]
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Use ANNEXURE D to answer the following questions.

- 3.1.1 Determine the probability that Monde sold a Neotel prepaid airtime voucher at one of the schools. (2)
- 3.1.2 Which cellular network provider offers the second largest percentage discount? (2)
- 3.1.3 Explain the term *profit* in this context. (2)
- 3.1.4 One of the vending machines only sells R15 airtime vouchers. On a particular day MTN airtime worth R270 and Virgin Mobile airtime worth R120 were sold. Calculate the total profit for that day. (4)
- 3.1.5 Calculate how many school weeks it would take Monde to make a profit of R5 122,50 if his average daily profit is R341,50. (3)
- 3.1.6 Each vending machine costs R1 539,00, including 14% VAT. Monde bought 52 machines. Determine how many R10 Virgin Mobile airtime vouchers he must sell to cover the total cost of his machines. (4)
- 3.1.7 If Cell C airtime worth R14 760 is sold, determine the total discount received by Monde. (3)

TABLE 3: PREPAID AIRTIME PRICE STRUCTURE FOR DIFFERENT SOUTH AFRICAN CELLULAR NETWORK PROVIDERS

Cellular network	Selling price (R)	Profit (R)	Cost price (R)	Discount %
Vodacom	2	0,07	1,93	3,37
	5	0,17	4,83	
	10	0,34	9,66	
	29	0,98	28,02	
	49	1,65	47,35	
Telkom Mobile	5	0,29	4,71	5,87
	10	0,59	9,41	
	20	1,17	18,83	
	30	1,76	28,24	
MTN	2	0,07	1,93	3,37
	5	0,17	4,83	
	10	0,34	9,66	
	15	0,51	14,49	
	30	1,01	28,99	
Cell C	5	0,16	4,84	3,25
	10	0,33	9,67	
	25	0,81	24,19	
	35	1,14	33,86	
	39	1,27	37,73	
Virgin Mobile	10	0,54	9,46	5,37
	15	0,81	14,19	
	20	1,07	18,93	
	35	1,88	33,12	
	50	2,69	47,31	

[Adapted from www.topupsprepaid.com]

4.1

A courier company that operates from Mbombela uses maps and pricing schedules, as indicated in ANNEXURE D, to show the cost of their services.

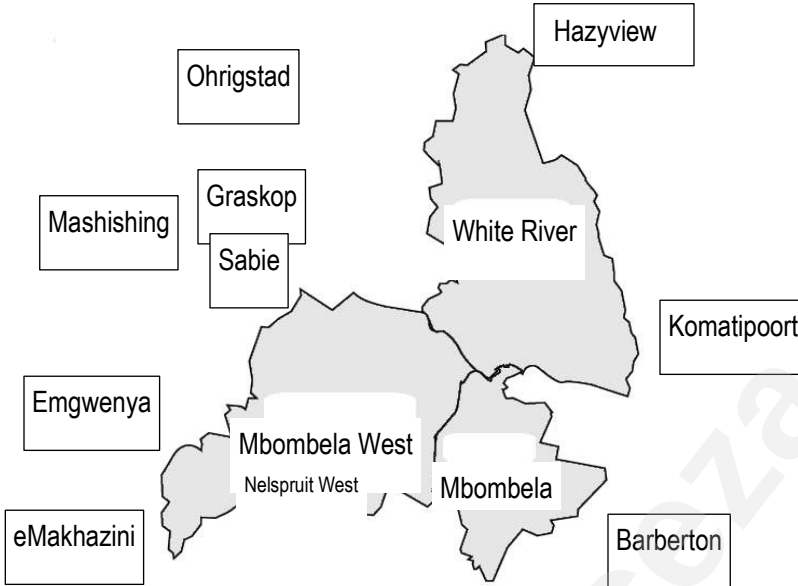
Use the information in ANNEXURE D to answer the questions that follow.

- 4.1.1 Give a possible reason why certain places on the map are marked for a 48-hour delivery service. (2)
- 4.1.2 A shop in Mbombela sends three identical 18 kg parcels to be delivered in Graskop, Klerksdorp and Port Alfred.
- NOTE:** Port Alfred is in the shaded (grey) area.
- (a) Determine the total delivery cost, including 14% VAT, for the three packages. (10)
- (b) The courier picked up the parcels at 14:50 on 30 April and delivered one parcel in Port Alfred at 08:15 on 2 May.
- Verify whether this delivery was done within the specified service delivery time. (4)
- 4.1.3 A factory in Mbombela needs to send 650 parts with mass of 2 kg each to George.
- They can pack the parts in the following two box sizes:
- Box size A (to pack 7 parts)
 - Box size B (to pack 15 parts)
- (a) Determine the total delivery cost, excluding VAT, for using only box size A to send all the parts. (4)
- (b) Hence, showing further calculations, advise the management on which ONE of the two options is more economical for the factory. (7)

LOCAL AND SHORThAUL DELIVERY

Mbombela, White River and Mbombela West: a.m. pickup – p.m. delivery
p.m. pickup – a.m. delivery

All other areas in this zone will have a service of 1 to 2 days.



Price: R70,00*

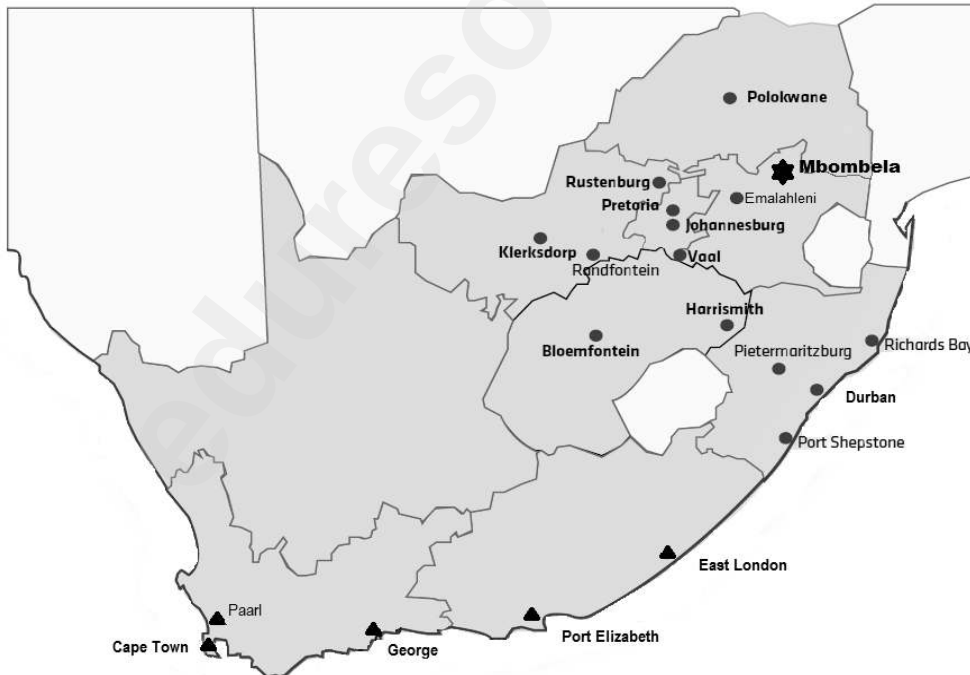
Parcel up to 30 kg

*All prices exclude VAT.

NATIONAL DELIVERY

Areas marked with a ● : 24-hour service

Areas marked with a ▲ : 48-hour service



PRICING

Area	Price	Parcels up to
●	R106,00*	15 kg
▲	R117,00*	15 kg
	R160,00*	10 kg

5 kg excess: R15,00*

Add 5 kg excess for each additional 5 kg (or part thereof) to a maximum of 30 kg per parcel.

* All prices exclude VAT.

[Source: fastway.com]

DATA

- 5.1 TABLE 8 shows the number of passenger vehicles sales for each province up to November 2017.

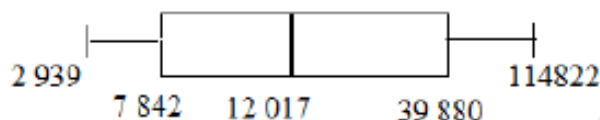
TABLE 8: PASSENGER VEHICLES SALES FOR EACH PROVINCE UP TO NOVEMBER 2017

SALES			
Province	October 2017	November (Nov) 2017	Total sales up to Nov 2017
Eastern Cape	1 129	Y	12 017
Free State	657	640	7 002
Gauteng	10 412	10 983	114 822
KwaZulu Natal	3 795	3 985	41 912
Limpopo	963	971	9 447
Mpumalanga	1 228	1 267	13 071
North West	742	753	8 681
Northern Cape	281	256	2 939
Western Cape	3 577	3 334	37 848
TOTAL	22 784	23 415	247 739

[Source: Lightstone.created with datawrapper]

- 5.1.1 Calculate the total number of passenger vehicles sold in the North West Province during October 2017 and November 2017. (2)
- 5.1.2 Name the province that sold the second most passenger cars up to November 2017. (2)
- 5.1.3 Determine the number of cars sold nationally from January to September 2017. (3)
- 5.1.4 For the national total sales up to November 2017, determine the probability (as a percentage) that a vehicle selected randomly was sold in the Western Cape. (4)
- 5.1.5 Determine the value of Y, the number of cars sold in November 2017 in the Eastern Cape. (3)
- 5.1.6 Explain the meaning of the term 'range'. (2)
- 5.1.7 Determine the range for provincial passenger vehicles sales in October. (3)
- 5.1.8 Calculate the mean of the passenger vehicles sold nationally up to November 2017. (3)

- 5.1.9 Calculate the Interquartile Range (IQR) for the total passenger vehicle sales up to November 2017 for the provinces using the box and whisker scale given below.



(3)

- 5.2 TABLE 9 shows the population and net migrants of India for the period 2013-2019.

The net migrant value is negative when the number of people leaving a country is more than the number of people coming into the country.

TABLE 9: POPULATION AND NET MIGRANTS OF INDIA FOR THE PERIOD 2013-2019

Period	Population (in billions)	Migrants (net) (in millions)	Urban population (in millions)
2019	1,37	-4,9	4,6
2018	1,35	-4,9	4,4
2017	1,34	-4,9	4,3
2016	1,32	-4,9	4,2
2015	1,30	-5,5	4,1
2014	1,23	-3,9	3,29
2013	1,14	-1,43	2,88

[Adapted from worldometers.info]

Use TABLE 9 to answer the questions that follow.

- 5.2.1 In which year did India have the least number of people leaving the country as compared to the number of people coming to the country? (2)
- 5.2.2 Express the 2015 population value in number format. (2)
- 5.2.3 Determine the mode for the net migrants. (2)
- 5.2.4 Write down the year in which the urban population grew the most. (2)
- 5.2.5 Determine the probability (as a common fraction), of randomly selecting a year from 2013 to 2019 with an urban population of less than 4, 2 million. (2)
- 5.2.6 Calculate the difference between the 2013 population and 2013 urban population. (3)

6.1 Study the following five descriptions:

- A The sum of the data set values divided by the number of data items
- B The middle value in the top half of the ordered data set
- C Data values that are arranged in ascending or descending order
- D The middle value in the bottom half of the ordered data set
- E The middle value of the ordered data set

State which ONE of the descriptions above BEST describes each of the following.
Write down only the letter (A–E) next to the question number (4.1.1–4.1.2).

6.1.1 Median (2)

6.1.2 Upper quartile (2)

6.2

The school-based assessment (SBA) marks and percentages of the ten lowest performing learners in Mathematical Literacy of a particular school in 2016 are represented in TABLE 5 below.

TABLE 5: SBA MARKS IN MATHEMATICAL LITERACY FOR 2016 OF THE TEN LOWEST PERFORMING LEARNERS

LEARNER	NUMBER OF ASSESSMENT TASKS WRITTEN	TOTAL MARKS ATTAINED	ACTUAL SBA PERCENTAGE MARK (ROUNDED)
A	7	162	46
B	7	168	48
C	5	118	34
D	5	109	31
E	7	137	39
F	6	146	42
G	3	72	21
H	6	144	41
I	6	144	41
J	6	137	39

Information about SBA marks:

- The total mark for each task is 50.
- The actual SBA percentage mark is calculated out of a maximum of 350 marks.
- The SBA percentage marks of candidates submitting valid reasons for not writing a task will be adjusted. The recalculation of the SBA percentage mark will be based only on the actual tasks written.

Use TABLE 5 and the information above to answer the questions that follow.

- 6.2.1 Determine the probability (as a percentage) of randomly selecting a learner in the table who wrote all the assessment tasks. (3)
- 6.2.2 Determine the median total mark. (3)
- 6.2.3 Write down the modal actual SBA percentage mark. (2)
- 6.2.4 Which learner scored the lowest actual SBA percentage mark? (2)
- 6.2.5 Calculate the mean actual SBA percentage mark. (3)
- 6.2.6 Learner J submitted a valid medical certificate for the day he missed his one task and qualifies for an adjusted SBA percentage mark.
Determine this learner's adjusted SBA percentage mark. (3)

6.3

A part of the 2015 midyear population estimates by race, gender and age of the Republic of South Africa (RSA) is represented in TABLE 6 below. The midyear estimated total population of South Africa for 2015 was 54 957 764.

TABLE 6: 2015 MIDYEAR POPULATION ESTIMATES BY RACE, GENDER AND AGE OF RSA

AGE	COLOURED			INDIANS/ASIANS		
	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL
0–4	214 854	211 302	426 156	50 222	48 486	98 708
5–9	216 858	213 809	430 667	49 265	47 800	97 065
10–14	217 286	214 494	431 779	47 267	46 245	93 512
15–19	219 989	217 423	437 412	49 926	49 926	99 852
20–39	768 179	790 707	1 558 886	246 359	220 927	467 286
40–59	540 749	610 026	1 150 775	176 079	168 398	344 477
60–79	148 759	216 786	365 544	65 156	83 582	148 738
80+	8 145	23 553	31 698	3 847	9 363	13 210
TOTAL	2 334 819	2 498 098	Y	688 118	674 730	1 362 848

[Source: Adapted from *STATS SA Report*, p. 302]

Use TABLE 6 and the information above to answer the questions that follow.

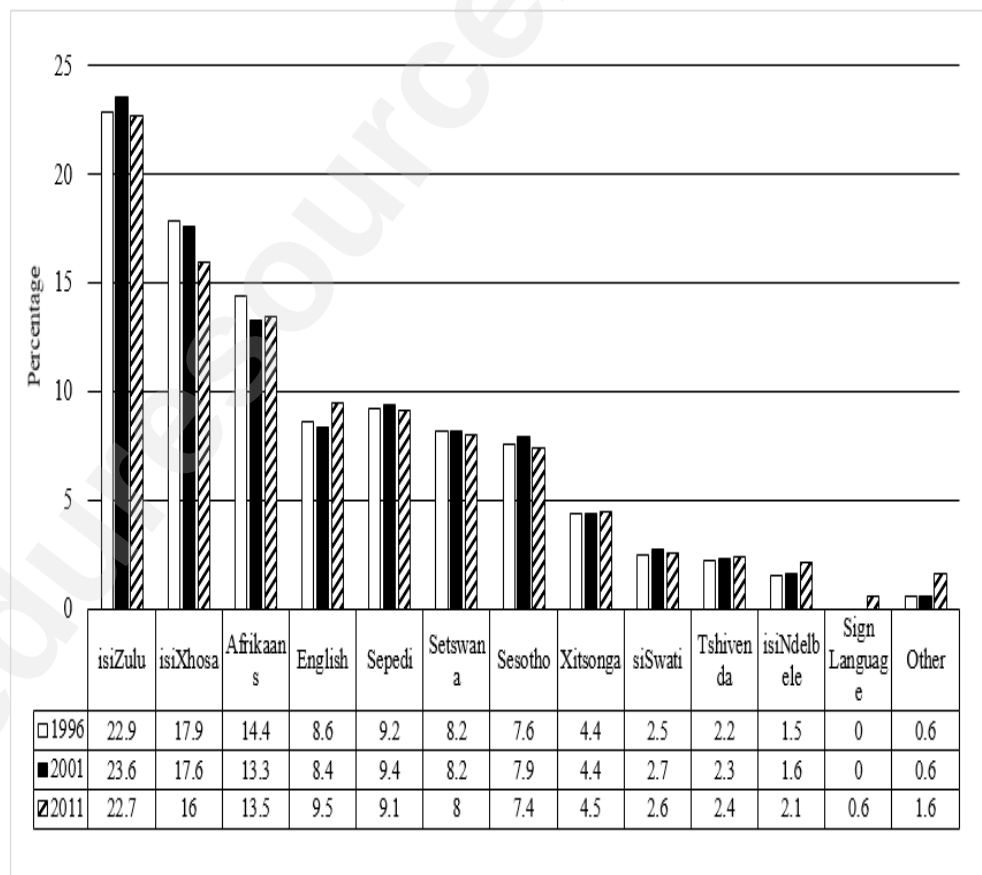
- 6.3.1 Which ONE of the following represents the estimated 2015 midyear total population?
- A Fifty-four million, nine hundred and seventy-five thousand, seven hundred and sixty-four
 - B Fifty-four million, nine hundred and fifty-seven thousand, seven hundred and sixty-four
 - C Fifty-four million, nine hundred and fifty-seven thousand, seven hundred and forty-six
- (2)
- 6.3.2 Identify the race and age group which both have the same number of males and females.
- (2)
- 6.3.3 Calculate the missing value **Y**.
- (2)
- 6.3.4 Determine the probability (as a percentage) of randomly selecting a coloured male from the total population.
- (3)
- 6.3.5 Express the ratio (in simplest form) of the number of Asian females to the number of Asian males.
- (3)
- 6.3.6 Calculate the number of coloured females as a percentage of the total population by the middle of 2015.
- (3)
- 6.3.7 Which age group has the largest number of people?
- (2)
- 6.3.8 State which ONE of the following graphical representations will be best suited to represent the data in TABLE 6:
- A Pie chart
 - B Bar graph
 - C Scatter plot
 - D Box and whisker plot
- (2)

- 7.1 South Africa has 11 official languages. ANNEXURE B shows the break down (in percentages) of the home languages of the South African population.

Use ANNEXURE B to answer the questions that follow.

- 7.1.1 Which language had the third lowest percentage in 2001? (2)
- 7.1.2 Which language showed the biggest percentage increase from 1996 to 2001? (2)
- 7.1.3 Arrange the 1996 language percentages in ascending order. (2)
- 7.1.4 Determine the median language percentage for 1996. (2)

ANNEXURE B
QUESTION 7.1
HOME LANGUAGES OF SOUTH AFRICA



- 7.2 Three census surveys have been done in South Africa since 1994. TABLE 5 indicates the total population of South Africa's nine provinces according to these census surveys.

TABLE 5: TOTAL POPULATION OF SOUTH AFRICA PER PROVINCE

	1996		2001		2011	
	Population	%	Population	%	Population	%
Gauteng	7 348 423	18,1	8 837 178	19,7	12 272 263	23,7
KwaZulu Natal	8 417 021	20,7	9 426 017	21,0	10 267 300	19,8
Eastern Cape	6 302 525	15,5	6 436 763	14,4	6 562 053	12,7
Western Cape	3 956 875	9,7	4 524 335	10,1	5 822 734	11,2
Limpopo	4 929 368	12,1	5 273 642	11,8	5 404 868	10,4
Mpumalanga	2 800 711	6,9	3 122 990	7,0	4 039 939	6,8
North West	3 354 825	8,3	3 669 349	8,2	3 509 953	6,8
Free State	2 633 504	6,5	2 706 775	6,0	2 745 590	5,3
Northern Cape	840 321	2,1	822 727	1,8	1 145 861	2,2
SOUTH AFRICA	40 583 573	100	B	100	51 770 561	100

[Adapted from

www.statssa.co.za]

Use TABLE 5 to answer the questions that follow.

- 7.2.1 Write the population in Gauteng for 2011 in words. (2)
- 7.2.2 Determine the range of South Africa's population per province in 1996. (3)
- 7.2.3 Calculate the total population (**B**) of South Africa in 2001. (3)
- 7.2.4 Determine the mode of the provinces' population percentages for 2011. (2)

- 7.3 During the census surveys, numerous census forms were completed. TABLE 6 shows part of the table on a page from a census form, pertaining to Educational Levels.

TABLE 6: EDUCATIONAL LEVELS

Code	Name of Qualification	Code	Name of Qualification
99	No education	08	Certificate without Grade 12
01	Grade 1 to 4	09	Certificate with Grade 12
02	Grade 5 and 6	10	Diploma without Grade 12
03	Grade 7 to 9	11	Diploma with Grade 12
04	Grade 10 to 12	12	Higher Diploma
05	N3	13	Post Diploma
06	N4 and N5	14	Baccalaureus degree
07	N6	15	Honours degree

[Adapted from www.statssa.co.za]

NOTE:

A diploma or certificate must comprise at least 6 months full time studies (or the equivalent thereof).

Use TABLE 6 to answer the questions that follow.

- 7.3.1 What qualification does the code 99 represent? (2)

- 7.3.2 Which code would be used on your census form, if you have completed a THREE month course after Grade 10 and received a certificate? (2)

- 8.1 Mrs Geere a 54-year-old Structural engineer earns a monthly salary of R78 264. She pays Medical Aid for her husband, herself and their 3 children. She receives 7,5% credit for pension fund.

Use the ANNEXURE below to answer the following questions.

- 8.1.1 Determine Mrs Geere's annual salary. (2)

- 8.1.2 Write down the tax bracket in which Mrs Geere's annual salary falls. (2)

- 8.1.3 What does the abbreviation SARS stand for? (2)

- 8.1.4 Determine the annual medical tax credit for Mrs Geere and her family for 2020. (4)

- 8.1.5 If Mrs Geere receives an increase of 8% on her monthly salary, then calculate how much will she have to pay towards monthly Pay as You Earn (PAYE) after the increase.

Show all calculations.

(8)

INCOME TAX: INDIVIDUALS AND TRUSTS FOR 1 MARCH 2019 – 29 FEBRUARY 2020

2020 ~ INDIVIDUALS

Tax Bracket	Taxable Income (in Rand)	Rate of Tax (in Rand)
1	0 – 195 850	18% of taxable income
2	195 851 – 305 850	35 253 + 26% of taxable income above 195 850
3	305 851 – 423 300	63 853 + 31% of taxable income above 305 850
4	423 301 – 555 600	100 263 + 36% of taxable income above 423 300
5	555 601 – 708 310	147 891 + 39% of taxable income above 555 600
6	708 311 – 1 500 000	207 448 + 41% of taxable income above 708 310
7	1 500 001 and above	532 041 + 45% of taxable income above 1 500 000

Tax rebate type	2020
Primary	R14 220
Secondary (Age 65 to below 75)	R7 794
Tertiary (Age 75 and older)	R2 601

Tax thresholds	2020
Below age 65	R79 000
Age 65 to below 75	R122 300
Age 75 and older	R136 750

Medical Aid ~ monthly tax credits	2020
Main member	R310
First dependant	R310
Second dependant	R209
Third dependant	R209

[Source: Adapted from SARS pocket tax guide 2020]