

Grade11 Mathematical Literacy: Question Paper 2

MARKS: 100

TIME: $2\frac{1}{2}$ hours

World Vision (www.worldvision.org) tells the story of Liber, a six year old Bolivian boy, who was forced together with his family to flee his home as a result of flooding. He and his family have taken up temporary accommodation in a camp with some 300 other people. Liber and his family lost everything as a result of the flood. To help his family make ends meet, Liber and his father Esteban get up at 6 a.m. each morning to purchase bulk ice cream supplies, which they bring back to the camp in a white cart. They spend the rest of the day pushing the cart around selling ice cream.



QUESTION 1

Thabo lives in Johannesburg and is exploring selling ice cream in order to pay for his college fees. He has established the following information:

EXPENSES:

- **R3 000,00** monthly payment for the first 12 months to pay for the bicycle and franchise fee.
- **R3,50** per ice cream to the company
- **R0,50** for a serviette and spoon that he supplies with each ice cream
- **R0,50** franchise fee per ice cream to the company
- **R25,00** per day for the block of ice that he uses to keep the container cold

INCOME:

- **R10,00** per ice cream that he sells.

1.1 Identify Thabo's fixed monthly costs. (1)

1.2 Identify Thabo's variable costs. (2)

1.3 Identify Thabo’s source(s) of income and classify it as fixed or variable (2)
 The company has told Thabo that salesmen typically sell a minimum of 30 ice creams and a maximum of 60 ice creams per day.

1.4 Show that Thabo’s variable expenses for a day on which he sells 30 ice creams is: R160,00 (3)

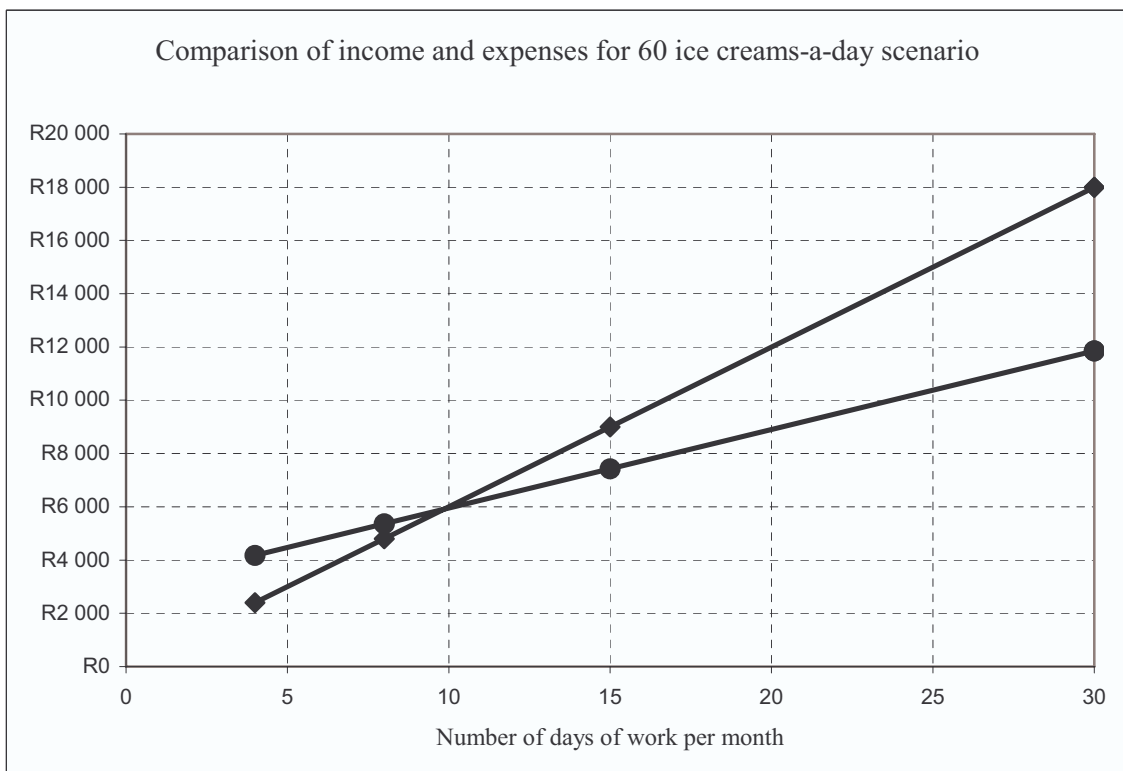
1.5 Hence, or otherwise, complete the table below (only write down the values of a, b and c and your working for each value in your answer book) (6)

Monthly expenses				
No of days worked in the month	4	8	15	30
30 ice creams sold per day	R3 640,00	a	b	c
60 ice creams sold per day	R4 180,00	R5 360,00	R7 425,00	R11 850,00

1.6 Complete the following table (only write down the values of a, b and c and your working for each value in your answer book) (6)

Monthly income				
No of days worked in the month	4	8	15	30
30 ice creams sold per day	R1 200,00	a	b	c
60 ice creams sold per day	R2 400,00	R4 800,00	R9 000,00	R18 000,00

1.7 Thabo has used the values form the tables above to draw the graph below to compare the monthly income and expenses for the 60 ice creams-a-day scenario. Draw a similar graph for the 30 ice creams-a-day scenario on the graph paper provided. (6)



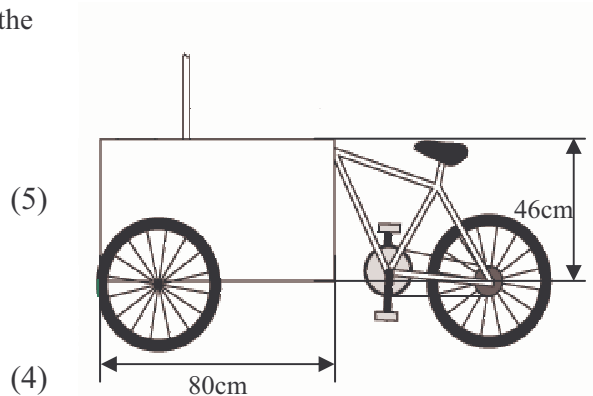
- 1.8 Use your graph and Thabo’s graph above to answer the following questions:
- 1.8.1 Roughly how many days should Thabo work in order to cover his expenses in each scenario? (2)
 - 1.8.2 Roughly how many days should Thabo work for each scenario in order to make a profit of at least R2 000,00 per month? (2)

[30]

QUESTION 2

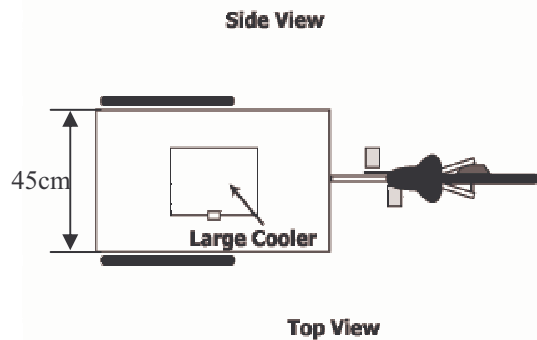
A drawing of the bicycle appears alongside with the dimensions of the cooler box marked.

- 2.1 If the cooler box is drawn to scale determine the dimensions of the lid of the cooler box (show all working) (5)
- 2.2 If the walls of the cooler box are 8cm. thick to ensure good insulation, what are the internal dimensions of the cooler box? (4)



The ice creams that are sold by the company come in tubs with a diameter of 7cm and a height of 5,4cm.

- 2.3 Use the formula for the volume of a cylinder ($Volume = \pi \times r^2 \times h$) to show that the tubs can hold the 200ml of ice cream marked on the side of the tub. Use $\pi = 3,14$. (4)



- 2.4 If Thabo places a single ice block with dimensions 20cm × 20cm × 20cm in the cooler box at the start of each day, estimate (showing detailed calculations and/or diagrams) how many ice cream tubs will be able to fit inside the cooler box (6)

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QUESTION 3

The time table for the Metrobus (www.mbus.co.za) and the fare table are supplied below. Use these tables to answer the questions that follow.

521 NATURENA TO SANDTON VIA OXFORD ROAD			
MONDAY TO FRIDAY ONLY			
FROM NATURENA			
NATURENA	0550	0605	0625
SOUTHGATE CENTRE	0610	0630	0645
NASREC	0618	0638	0653
RIVERLEA	0623	0643	0658
LANGLAAGTE STATION	0628	0648	0703
HIGH / RIPLEY (BRIXTON)	0636	0656	0711
UNIV. OF JHB	0641	0701	0716
MILPARK BUSINESS PARK (EMPIRE ROAD)	0644	0704	0719
PARKTOWN (VICTORIA / OXFORD)	0649	0709	0724
KILLARNEY	0656	0716	0731
ROSEBANK	0701	0721	0736
ILLOVO	0706	0726	0741
SANDTON CITY	0715	0735	0750
MALBORO / KATHERINE DRIVE	0725	0750	0800

FROM SANDTON			
MALBORO / KATHERINE DRIVE	1615	1635	1700
SANDTON SQUARE	1630	1650	1710
ILLOVO	1640	1700	1720
ROSEBANK	1645	1705	1725
KILLARNEY	1651	1711	1731
PARKTOWN	1656	1716	1736
MILPARK BUSINESS PARK	1701	1721	1741
UNIV. OF JHB	1706	1726	1746
RIPLEY / HIGH (BRIXTON)	1711	1731	1751
LANGLAAGTE STATION	1721	1741	1801
RIVERLEA	1726	1746	1806
NASREC	1736	1756	1816
SOUTHGATE CENTRE	1745	1805	1825
NATURENA	1805	1825	1845

ZONE	NATURENA						
1	R3.80	DAPHNE / MIDAS					
2	R5.40	R3.80	NASREC / RIFLE RANGE				
3	R8.80	R5.40	R3.80	LANGLAAGTE STATION			
4	R8.30	R6.80	R5.40	R3.80	OXFORD / VICTORIA		
5	R9.90	R8.30	R6.80	R5.40	R3.80	JELlicoe / OXFORD	
6	R11.40	R9.90	R8.30	R6.80	R5.40	R3.80	SANDTON SQUARE

Thabo stores his bicycle in a garage in Parktown and lives near to the Southgate Centre and travels by bus to get from home to where he stores his bicycle.

It takes Thabo approximately 10 minutes to walk from home to the bus stop.

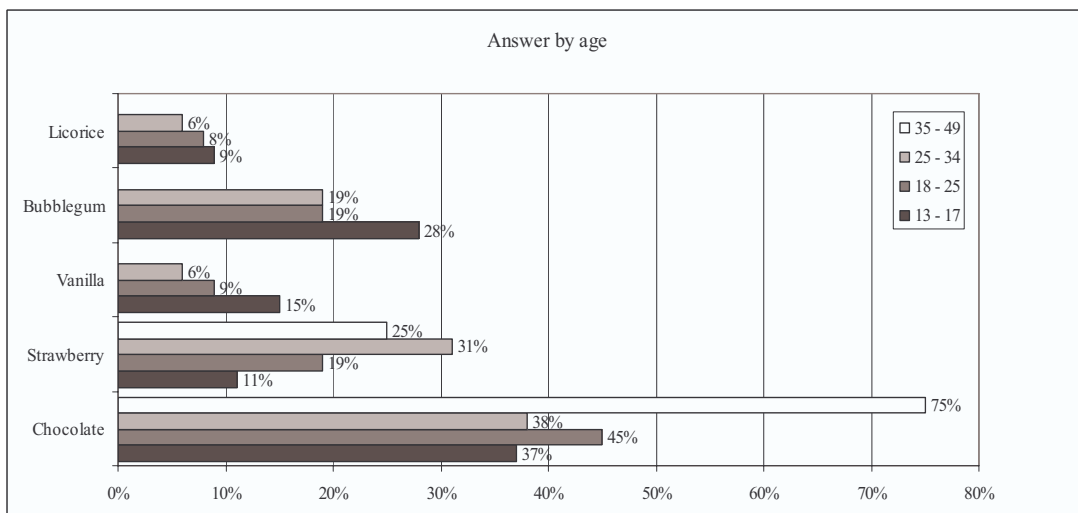
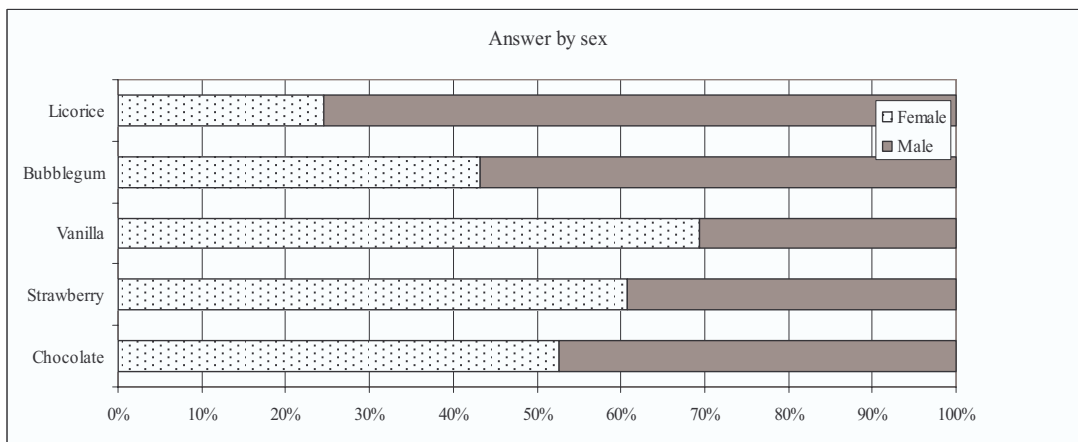
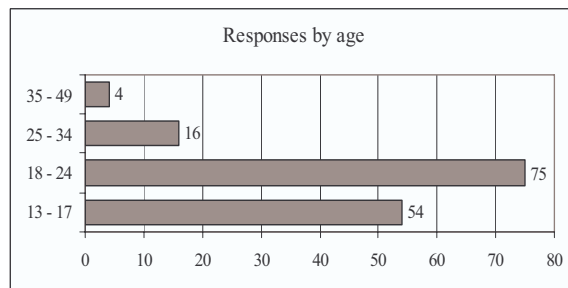
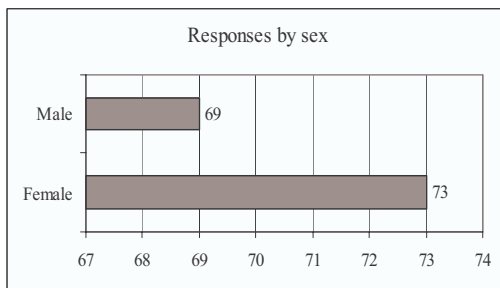
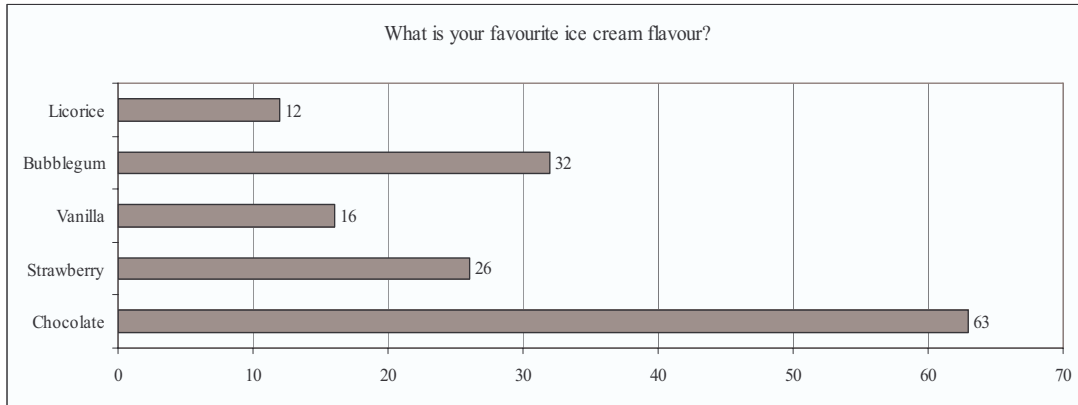
It takes Thabo approximately 15 minutes to walk from the bus stop to his bicycle.

- 3.1 At what time should Thabo leave home to reach his bicycle as early as possible and at what time can he expect to get there? Describe his journey in detail to substantiate your answer. (5)
- 3.2 How much will the appropriate one-way ticket on the bus cost Thabo? Explain how you have come to your answer (3)
- 3.3 By what time should Thabo have packed away his bicycle if he is to get home by bus? What time will he get home? (4)

[12]

QUESTION 4

In order to assist him in planning which flavours of ice cream to buy, Thabo conducted a survey the results of which are shown below. The questions that follow are based on the information contained in these graphs



- 4.1 How many people participated in the survey according to the following graphs above:
- 4.1.1 “What is your favourite ice cream”
- 4.1.2 “Responses by sex”
- 4.1.3 “Responses by age” (3)
- 4.2 Suggest a possible reason for the discrepancy between the number of participants in these graphs. (1)
- 4.3 Why is the “Response by sex” graph misleading? What impression does it create and what is this the result of? (4)
- 4.4 From the survey it would appear that 35+ year olds do not like bubble gum flavoured ice cream. By referring to the sample size comment on how reliable you think this observation is? (2)
- 4.5 Thabo has used a compound bar graph to represent the “Answer by sex” data. What has he gained and what has he lost by doing this instead of using a bar graph as he has in the other graphs? (2)
- 4.6 Use the information provided to determine the actual number of respondents by age for chocolate and strawberry ice cream and hence draw a bar graph of “Answer by age” based on actual numbers. (8)
- 4.7 Compare the two representations of “Answer by age” and identify an advantage or disadvantage of each representation. (4)
- 4.8 Thabo buys the ice creams in boxes of 24 ice creams. He has enough money to buy 20 boxes which he keeps in a freezer at his home. Use the data collected in the survey to help him decide on how many boxes of each flavour he should buy. (6)

[29]**QUESTION 5**

Dry-ice is sold in half-kilogram blocks. The people who sell the ice cream have developed the following rule of thumb to guide them when deciding how many half-kilogram blocks to buy:

To keep the food frozen for 4 hours:

$$\text{Kilogram of dry-ice needed} = \frac{\text{kilograms of food}}{5} + \frac{1}{2}$$

To keep the food frozen for 12 hours:

$$\text{Kilogram of dry-ice needed} = \frac{\text{kilograms of food}}{4} + 1\frac{1}{2}$$

- 5.1 If Thabo wants to keep 45 ice-creams (200g each) frozen for 12 hours, how many half-kilogram blocks should he buy? (6)
- 5.2 How many ice creams can Thabo keep frozen for 4 hours if he brought 7 half-kilogram blocks of dry-ice? (4)

[10]

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