



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P1

FEBRUARY/MARCH 2015

MARKS: 150

TIME: 3 hours

This question paper consists of 15 pages, 1 answer sheet and 2 annexures.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of FIVE questions. Answer ALL the questions.
2. Use ANNEXURE 1 to answer QUESTION 1.1 and ANNEXURE 2 for QUESTION 3. Answer QUESTION 1.2.4 on the ANSWER SHEET. Write your centre number and examination number in the spaces on the ANSWER SHEET. Hand in the ANSWER SHEET with your ANSWER BOOK.
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 the calculations clearly.
7. Round off ALL final answers appropriately according to the context, unless stated otherwise.
8. Indicate units of measurement, where applicable.
9. Maps and diagrams are NOT necessarily drawn to scale, unless stated otherwise.
10. Write neatly and legibly.

QUESTION 1

- 1.1 Eunice is an employee at Emoya High School. Her daily working hours are from 07:30 to 15:00 from Monday to Friday. Her total daily hours worked includes a 20-minute tea break and a 45-minute lunch break.

The following deductions are made from her gross monthly salary:

- 7,5% of her gross monthly salary for pension fund contributions
- UIF (Unemployment Insurance Fund) of 1% of her gross monthly salary
- PAYE (pay-as-you-earn) tax as per tax bracket

ANNEXURE 1 shows a copy of her salary advice that she received at the end of October 2013. Use the above information as well as ANNEXURE 1 to answer the following questions:

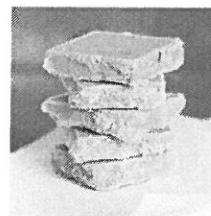
- 1.1.1 The new tax year, to which this salary advice is applicable, started on 1 March 2013.
Explain why the period on the salary advice is indicated as 08. (2)
- 1.1.2 Define the concept of *gross salary*. (2)
- 1.1.3 Calculate her housing allowance as a percentage of her gross salary. (2)
- 1.1.4 Show how the pension fund contribution of R596,40 was calculated. (2)
- 1.1.5 Write down the total pension fund contribution she has made thus far for the current tax year. (2)
- 1.1.6 Calculate the missing value A. (2)
- 1.1.7 Determine the difference between the overtime hourly rate paid for working during the week (Monday–Friday) and for working on Saturdays. (2)

1.2

Shanté makes fudge and sells it for pocket money. She uses the following recipe that was given to her by her grandmother. She sells the fudge for R2,50 a block.

Recipe for 1 batch of fudge (54 blocks)

1 tin of condensed milk
1 kg of sugar
250 g of butter
5 mL vanilla essence
250 mL milk



- 1.2.1 Write down a formula that Shanté can use to calculate her total income from the sale of blocks of fudge, in the form:

$$\text{Total income (in rand)} = \dots \quad (2)$$

- 1.2.2 TABLE 1 shows her total income from the sale of blocks of fudge:

TABLE 1: Total income from the sale of fudge

Number of blocks	0	4	10	B	20	24	36	50	54
Total income (in rand)	0	10	25	30	50	60	90	125	135

Calculate the missing value B. (2)

- 1.2.3 Shanté wants to determine the cost of making one batch of fudge. TABLE 2 below shows how the cost of the ingredients required per batch of fudge has been determined.

TABLE 2: Cost of ingredients required per batch of fudge

Ingredients	Quantity purchased	Cost of item	Actual quantity of ingredients used	Actual cost of ingredients used
Condensed milk	1 tin	R12,89	1 tin	R12,89
Sugar	2,5 kg	R24,99	1 kg	R10,00
Butter	500 g	R30,55	250 g	R15,28
Vanilla essence	100 mL	C	5 mL	R0,59
Milk	1 litre	R6,95	250 mL	R1,74
TOTAL COST				R40,50

Answer the following questions:

- (a) Show how Shanté calculated the actual cost of the sugar required for ONE batch of fudge. (2)
- (b) Calculate the number of batches of fudge she will be able to make with the quantity of milk she purchased. (2)
- (c) Determine the missing value C. (2)
- (d) Calculate the actual cost of the ingredients to make ONE block of fudge. (2)

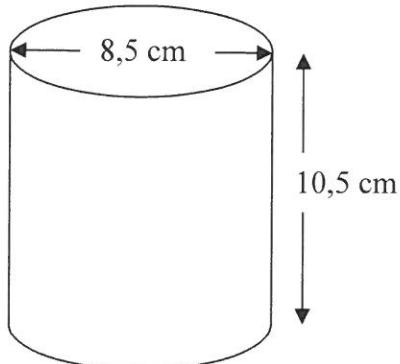
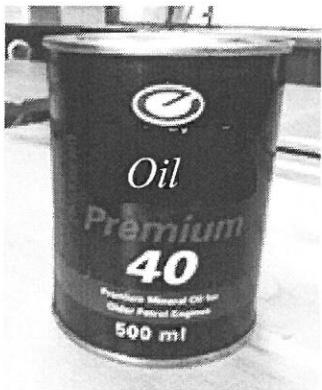
- 1.2.4 The ANSWER SHEET shows the line graph of Shanté's expenses to make one batch of fudge.

Whenever Shanté makes fudge she has to pay her mother a fixed amount for the use of the kitchen, electricity and water.

- (a) Determine the fixed amount she pays her mother. (2)
- (b) Draw another line graph on the ANSWER SHEET that shows her total income from the sale of different quantities of blocks of fudge. (5)
- 1.2.5 Explain the meaning of the point of intersection of the two straight lines representing expenses and income. (2)
[35]

QUESTION 2

- 2.1 Mrs De Klerk bought a 500 mL can of motor oil. She is aware that the can of oil is not filled to its fullest capacity. Below is a photograph of the can of motor oil and a diagram showing the external dimensions of the cylindrical can.

Photograph of the can of motor oil Diagram of the cylindrical can of motor oil

NOTE: $1 \text{ cm}^3 = 1 \text{ mL}$

Calculate:

- 2.1.1 The actual capacity (volume) of the can

You may use the following formula:

$$\text{Volume of a cylinder} = \pi \times (\text{radius})^2 \times \text{height} \text{ where } \pi = 3,142 \quad (4)$$

- 2.1.2 The volume of the empty space in the can when it is filled with 500 mL of motor oil

(2)

- 2.1.3 The height of the motor oil in the can

You may use the following formula:

$$\text{Height of motor oil in can} = \frac{\text{volume of motor oil}}{\pi \times (\text{radius})^2} \text{ where } \pi = 3,142 \quad (3)$$

2.2

Mr Neymar owns a refuse removal company that removes refuse from building sites. His refuse containers are rusted and Mr Neymar wants to repaint the exterior sides of the containers.

Each container is an open-top right prism with two sides that are trapezium-shaped and two slanted sides that are rectangular.

The photograph below is of one of his refuse containers that he delivers to building sites. The dimensions of a container are shown on the diagram below.

Photograph of the side view of the container

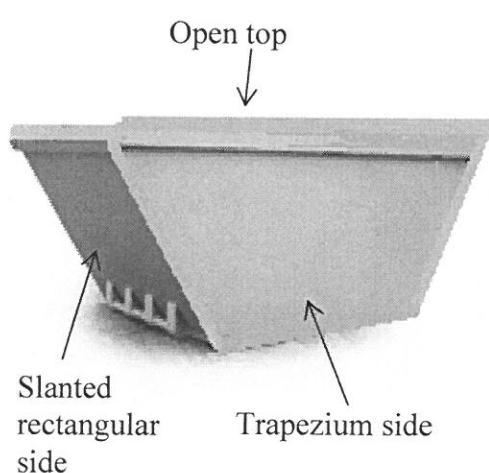
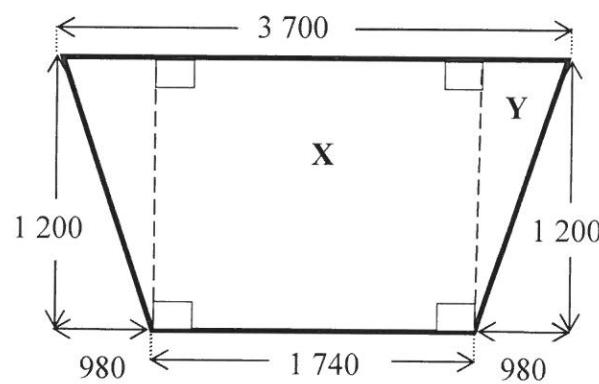


Diagram of the side view of the trapezium-shaped container (all dimensions are in mm)



Use the above diagram to answer the following questions:

- 2.2.1 Calculate the area (in mm^2) of the triangular part marked Y on the diagram.

You may use the following formula:

$$\text{Area of a triangle} = \frac{1}{2} \times \text{base} \times \text{height}$$

(2)

- 2.2.2 Use the formula below to calculate the total exterior area (in m^2) of the trapezium side of the container if the area of the rectangular part X is equal to $2\ 088\ 000 \text{ mm}^2$.

You may use the following formula:

$$\begin{aligned} &\text{Area of a trapezium side of the container} \\ &= 2 \times (\text{area of part Y}) + (\text{area of part X}) \end{aligned}$$

$$\text{NOTE: } 1 \text{ m}^2 = 1\ 000\ 000 \text{ mm}^2$$

(5)

- 2.2.3 The total exterior surface area of the container, excluding the top and the base, is $11,676 \text{ m}^2$.

Hence, calculate the area of ONE of the slanted rectangular sides of the container if they are identical in size.

(3)

- 2.3 To paint the exterior sides of the container it must first be rustproofed with a coat of Optirustbusta. It is then painted with Optimetalcoat.

The technical consultant recommends that two layers of Optimetalcoat must be applied.

Mr Neymar has 25 identical containers, each having an exterior area of $11,676 \text{ m}^2$, that need to be repainted as described above.

Optimetalcoat is sold in 5 litre tins. One tin of Optimetalcoat will cover 25 m^2 .

- 2.3.1 Calculate the total area of all the containers that will be coated with Optirustbusta. (2)
- 2.3.2 Determine the total number of coats of Optimetalcoat that will be needed for all the containers. (2)
- 2.3.3 Mr Neymar estimates that he needs to paint a total area of 585 m^2 .
Calculate the minimum number of tins of Optimetalcoat that he will need to order, based on his estimation. (3)
[26]

QUESTION 3

Mamusi and her family live in Barkly West. She decided to take her family on a road trip to the Free State. In order to plan her trip she obtained a strip map at the tourist information centre in Barkly West. Part of this strip map has been reproduced on ANNEXURE 2.

Use ANNEXURE 2 to answer the following questions:

- 3.1 Mamusi travelled from Barkly West to Bloemfontein via Kimberley.

Name the towns or cities that they would pass through if they travelled on the N8 to Bloemfontein. (2)

- 3.2 Give the compass direction from Kimberley to Bloemfontein. (2)

- 3.3 According to the map the distance from Kimberley to Bloemfontein, using the N8, is 165 km.

Calculate the time (in hours and minutes) Mamusi would take to travel to Bloemfontein if she was driving at an average speed of 97,3 km/h.

You may use the following formula:

$$\text{Time} = \frac{\text{distance}}{\text{average speed}}$$

(5)

- 3.4 Mamusi decided to rather take the route via Boshof to Bloemfontein from Barkly West. Name the provincial or regional roads that they needed to take to get to Bloemfontein. (2)

- 3.5 After Mamusi and her family visited Bloemfontein they wanted to visit a family friend who lives in another town in the Free State. Below is a description of the routes they used from Bloemfontein.

- Travelled along route N8 to Petrusburg.
- At Petrusburg they turned onto route R48 and drove to Koffiefontein.
- At Koffiefontein they took route R704 and drove through Fauresmith and Jagersfontein.
- At Trompsburg they took route R717 in a southwesterly direction.
- They stopped at the next town where they visited their family friend.

Use the above description to determine the town where they would have visited their family friend. (3)

- 3.6 Calculate the distance between Koffiefontein and Luckhoff. (4)

- 3.7 Determine the scale used on the map if 5,4 cm on the map represents 2,7 km.

Write the scale in the form 1 : ...

(3)

[21]

QUESTION 4

- 4.1 The IPL-T20 (Indian Premier League) is a cricket tournament in which each team gets to bat for 20 overs per match. Each team must get as many runs as possible from their 20 overs.

TABLE 3 shows statistics of the 2014 tournament that was played in Abu Dhabi.
(Some of the details have been omitted.)

TABLE 3: IPL-T20 cricket statistics during the 2014 Abu Dhabi Tournament

Name of player	Number of matches played	Number of balls faced	Number of runs scored	Strike rate
Ajinkya Rahane	5	151	182	120,52
David Warner	5	145	163	112,41
Dwayne Smith	6	178	256	143,82
JP Duminy	5	128	173	135,15
Glenn Maxwell	5	125	300	201,34
Robin Uthappa	6	127	144	113,38
Brendon McCullum	6	191	249	130,36
Manish Pandey	6	121	145	R
Jacques Kallis	6	123	141	114,63
Aaron Finch	5	133	169	127,06
David Miller	5	96	155	161,45

[Source: www.iplt20.com]

- 4.1.1 Arrange the number of runs scored in descending order. (2)
- 4.1.2 Determine which player scored the lowest number of runs. (2)
- 4.1.3 Calculate the mean number of runs scored by these players. (3)
- 4.1.4 The strike rate in cricket is determined using the following formula:

$$\text{Strike rate} = \frac{\text{number of runs scored}}{\text{number of balls faced}} \times 100$$

Use this formula to determine the missing value R. (2)

- 4.1.5 Determine the probability (as a percentage) of randomly selecting a player who has already played six matches. (2)

4.2 Consider the following statements:

- A:** The value that shows the mid-value for a set of given data.
- B:** The sum of the data divided by the number of data items.
- C:** The difference between Quartile 3 and Quartile 1.
- D:** The difference between the highest and lowest value in a set of data.
- E:** The item that occurs the most in a set of data.

State which ONE of the above statements BEST describes each of the following:

- 4.2.1 Interquartile range (2)
- 4.2.2 Mode (2)
- 4.2.3 Median (2)

4.3

TABLE 4 shows the number of births and deaths in South Africa from 2002 to 2013, as provided by Statistics South Africa.

TABLE 4: Number of births and deaths in South Africa from 2002 to 2013

Year	Number of births	Number of deaths	Number of Aids-related deaths	Percentage of Aids-related deaths
2002	1 117 731	636 416	257 394	40,4
2003	1 119 820	674 281	295 237	43,8
2004	1 105 534	703 651	325 405	46,2
2005	1 095 999	722 075	344 657	47,7
2006	1 092 768	701 001	324 192	46,2
2007	1 098 959	657 051	280 098	42,6
2008	1 107 603	618 324	240 309	38,9
2009	1 114 301	591 135	211 903	35,8
2010	1 123 409	580 673	201 174	34,6
2011	1 109 926	579 371	200 259	34,6
2012	1 095 669	572 600	P	33,5
2013	1 084 397	559 631	178 373	Q

[Adapted from www.statssa.gov.za]

- 4.3.1 Identify the year during which the number of births was closest to 1,1 million. (3)
- 4.3.2 During which year was the total number of deaths the highest? (2)
- 4.3.3 Calculate the missing value:
- (a) P (2)
- (b) Q, rounded off to ONE decimal place (3)
- 4.3.4 Determine the number of deaths during 2013 that were NOT Aids-related. (3)
- 4.3.5 During which years, before 2012, was the percentage of Aids-related deaths exactly the same, but more than 40%? (2)
- 4.3.6 Name the years during which the number of births was greater than one million one hundred and eighteen thousand. (2)
- 4.3.7 Determine the ratio of the number of deaths to the number of births during 2011. (2)
- [36]

QUESTION 5

- 5.1 Shaun needs to buy a new laptop for his daughter. The laptop costs R9 247,95 (VAT inclusive). He is considering taking out a personal loan.

He obtained the following personal loan payment table from Easy Loans:

TABLE 5: Personal loan repayment table (21% interest per annum)

Loan amount	MONTHLY PAYMENT FOR DIFFERENT PERIODS				
	12 months	24 months	36 months	48 months	60 months
R4 000	R936,43	R519,28	R384,42	R315,60	R276,76
R10 000	R1 872,85	R1 038,55	R764,84	R613,21	R553,52
R20 000	R2 809,28	R1 557,83	R1 147,27	R946,81	R830,27
R30 000	R3 745,70	R2 077,10	R1 529,69	R1 262,42	R1 107,03

The amounts shown above are approximate and will vary according to interest rate fluctuations.

NOTE:

- The monthly payment excludes the monthly service fee of R75,00 and a monthly balance-protection insurance fee of R20,50.
- A once-off initiation fee of R350 is payable for new loans.

[Source: www.wfs.co.za]

- 5.1.1 Determine how much of his own funds he will have to use in order to buy the laptop if he takes a personal loan of only R4 000. (2)
- 5.1.2 Shaun eventually decides to take a personal loan of R10 000, repayable over three years.

Determine:

- (a) The initiation fee as a percentage of the loan amount (3)
- (b) The total monthly amount he will have to pay for this loan (2)
- (c) The total interest he will pay for this loan (4)

5.2

Shaun intends buying a new car. He investigates his possible monthly payments by using the online calculator for Absolute Bank's Vehicle Finance as shown in the two examples below.

On-line Banking Calculators for Absolute Bank's Vehicle Finance:

All Calculators

Car finance calculator

Cost of car	149 995,00	Deposit/Trade-in value	25 000,00
Car finance required		Interest rate	9,00
Residual amount (R)	0	Residual amount (%)	0
Term of loan (months)	24		
Initiation fee (once off)	1 140,00	Monthly service fee	57,00
Monthly repayment	5 819,44	Calculate	

All Calculators

Car finance calculator

Cost of car	149 995,00	Deposit/Trade-in value	25 000,00
Car finance required		Interest rate	9,00
Residual amount (R)	0	Residual amount (%)	0
Term of loan (months)	36		
Initiation fee (once off)	1 140,00	Monthly service fee	57,00
Monthly repayment	4 068,06	Calculate	

[Adapted from www.absa.co.za]

Use the on-line calculator examples above to answer the following:

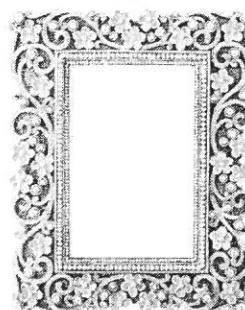
- 5.2.1 Calculate the amount Shaun needs to borrow to buy the new car. (3)
- 5.2.2 The total monthly repayments for the loan over 36 months are R146 450,16. Show how this total was determined. (2)
- 5.2.3 Calculate the difference in the monthly repayments if he takes a loan over 36 months instead of 24 months. (3)

5.3

Marissa has a rectangular photo with dimensions of 5 inches \times 7 inches.

She would like to frame the photo.

The inside dimensions of the rectangular frame as shown alongside is 10 cm \times 15 cm.

Picture of photo frame

5.3.1

Convert the dimensions of the photo to centimetres if
1 cm = 0,394 inches.

(3)

5.3.2

The photo does not fit exactly into the frame. Determine the minimum measure she will have to cut off from both the length and width of the photo so it can fit exactly into the frame.

(3)

5.4

TABLE 6 below shows the age and gender groups of registered voters for the 2014 South African national election.

TABLE 6: Total registered voters according to age and gender for the 2014 national election

Age Group	Female	Male	TOTAL
18 to 19	351 555	297 686	649 241
20 to 29	3 099 266	2 661 566	3 102 493
30 to 39	3 220 425	2 953 490	6 173 915
40 to 49	2 690 374	2 309 110	4 999 484
50 to 59	2 107 405	1 680 275	3 787 680
60 to 69	1 297 809	959 228	2 257 037
70 to 79	738 443	416 302	1 154 745
80 +	419 257	160 003	579 260
TOTAL	13 924 534	11 437 660	25 362 194

[Source: www.elections.gov.za]

5.4.1

Write down the modal age group for the registered female voters.

(2)

5.4.2

Determine the following:

(a) The age group that had the least chance of having a voter from the group randomly selected for an interview on the day of voting

(2)

(b) The probability of randomly selecting a male voter in the 30 to 39 age group from all the registered voters. Give your answer as a decimal fraction.

(3)

[32]

TOTAL: 150

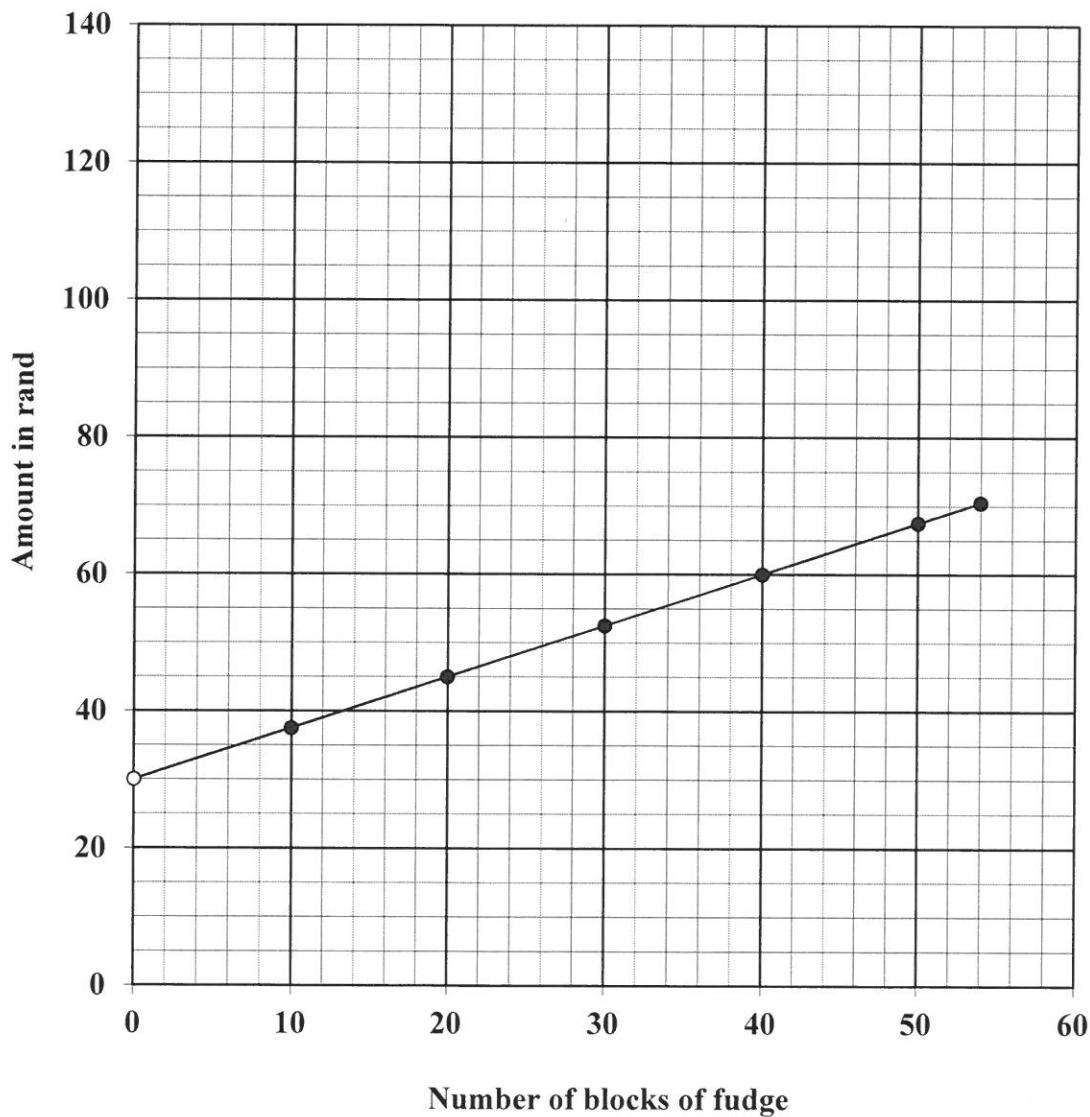
ANSWER SHEET

CENTRE NUMBER:

EXAMINATION NUMBER:

QUESTION 1.2.4**TABLE 1: Total income from the sale of fudge**

Number of blocks	0	4	10	B	20	24	36	50	54
Total income (in rand)	0	10	25	30	50	60	90	125	135

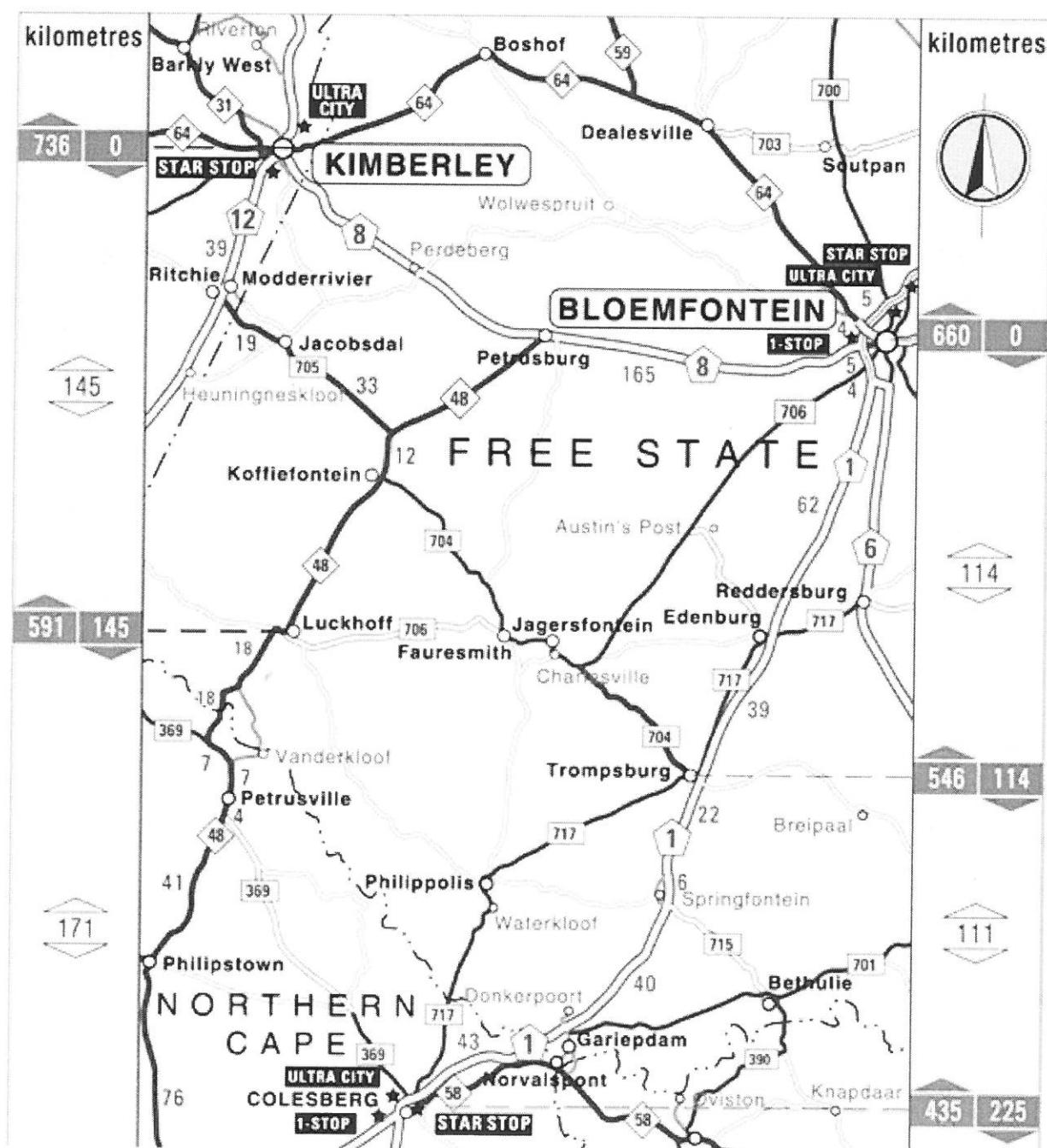
Income and expenses for making one batch of fudge

ANNEXURE 1**QUESTION 1.1****SALARY ADVICE**

COMPANY NAME		PERIOD	DATE		
EMOYA HIGH SCHOOL PO Box 0111 Willows 9320		08	31/10/2013		
Name of Employee: Mrs Eunice Mentoor		Identity Number: 641028 0124 111	Employee number: 51111110		
INCOME					
Description	Hours	Hourly rate	Amount		
Basic salary	172,5	A	R 7 452,00		
Overtime worked Mon.–Fri.	0	75,80	R 0,00		
Overtime worked Saturdays	0	120,45	R 0,00		
Housing allowance			R 500,00		
GROSS SALARY		R7 952,00			
DEDUCTIONS					
Description	Amount				
PAYE tax	R 393,00				
UIF contributions	R 79,52				
Pension fund contributions	R 596,40				
TOTAL DEDUCTIONS		R1 068,92			
TAXABLE SALARY		R7 276,08			
LEAVE DAYS DUE	18	NETT SALARY	R6 883,08		
TOTAL GROSS REMUNERATION	TOTAL PAYE TAX	TOTAL MEDICAL AID CONTRIBUTIONS	TOTAL PENSION FUND CONTRIBUTIONS		
R63 616,00	R4 982,00	R0,00	R5 981,67		

ANNEXURE 2**QUESTION 3**

= N6 The symbol for a national road	= R48 The symbol for a provincial road	= R701 The symbol for a regional road

[Source: www.aa.co.za]