education

Department:
Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

MATHEMATICAL LITERACY P2

FEBRUARY/MARCH 2009

MARKS: 150

TIME: 3 hours

This question paper consists of 11 pages and 2 annexures.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of SIX questions. Answer ALL the questions.

2. QUESTION 1.4 must be answered on ANNEXURE A. Write your centre number and examination number in the space provided and hand in the ANNEXURE with the 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. A non-programmable, non-graphical calculator may be used.

6. ALL the calculations must be clearly shown.

7. ALL the final answers must be rounded off to TWO decimal places, unless stated otherwise.

8. Write neatly and legibly.

QUESTION 1

The Hospitality Studies department of Ses'fikile High School bakes brown bread in order to raise funds for the shortfall incurred in their day-to-day expenses.

The school charges the Hospitality Studies department a fixed weekly cost of R400,00 for water and electricity.

The cost of producing one loaf of brown bread, including labour and ingredients, is R3,50. The brown bread is sold at R6,00 a loaf.

1.1   If one loaf of brown bread requires 450 g of flour, determine the maximum number of loaves of brown bread that can be baked from a 12,5 kg bag of flour.   (4)

1.2   The table below shows the weekly cost of making the bread.

   TABLE 1: Weekly cost of making brown bread

Number of loaves	0	40	80	120	160	**B**	300
Total cost (in rand)	400	540	680	**A**	960	1 240	1 450

   The formula used to calculate the total cost per week is:
   Total cost per week = Fixed weekly cost + (number of loaves of bread × cost per loaf)

   Use the given formula to determine the values of **A** and **B** in TABLE 1.   (4)

1.3   The table below shows the weekly income from selling the bread.

   TABLE 2: Weekly income received from selling bread

Number of loaves	0	40	120	150	**D**	250	300
Total income (in rand)	0	240	**C**	900	960	1 500	1 800

   Determine the values of **C** and **D** in TABLE 2.   (4)

1.4   Use the values from TABLE 1 and TABLE 2 to draw TWO straight line graphs on the same grid using ANNEXURE A, showing the total **COST** per week of making bread and the **INCOME** per week from selling bread.

   Clearly label the graphs **'COSTS'** and **'INCOME'**.   (8)

1.5   Use the tables or the graph drawn on ANNEXURE A to answer the following questions.

    1.5.1   How many loaves of bread must they sell to break even and describe what is happening at the break-even point?   (3)

    1.5.2   What income would they receive if 230 loaves were sold?   (2)

    1.5.3   Estimate the number of loaves baked if the total cost is R840.   (2)

    1.5.4   Determine, by calculation, whether Ses'fikile High School will make a profit or a loss if they bake 300 loaves of bread during the week, but only sell 250 of these loaves of bread.   (3)

1.6   The bread is baked in batches of 20 loaves. Each batch requires 90 minutes for mixing and proofing and one hour for baking. (Proofing is the stage when the dough 'rises' to its full size.)

The bakery employees work an 8-hour day. This includes two 30-minute rest breaks and one hour for cleaning everything and preparing for the next day.

TIME SCHEDULE FOR MAKING BREAD

BATCH		08:00	08:30	09:00	09:30	10:00	10:30	11:00	11:30	12:00	12:30	13:00	13:30	14:00	14:30	15:00	15:30	16:00
	1	M	P	P	B	B												
	2		M	P	P	B	B											
	3			R	M	P	P	B	B									
	4					M	P	P	B	B								
	5					R	M	P	P	B	B							
	6							M	P	P	B	B	C	C				

M = Mixing
P = Proofing
B = Baking
R = Rest break
C = Cleaning

The bakery received an order to supply 110 loaves on a particular day.

Use the time schedule above to determine whether or not the Hospitality Studies Department should accept this order. Justify your answer by means of a calculation.   (5)

[35]

QUESTION 2

Annabel started working for a construction company on 3 July 2007. She earned a net income of R144 000 per annum without any bonus.

She set aside R8 400 per month for her monthly expenses, and each month set aside 90% of the balance towards a deposit for a car.

TABLE 3: Annabel's monthly expenditure before buying a car

ITEMS	MONTHLY EXPENDITURE
Rent and electricity	R2 850
Groceries	R1 500
Student loan repayment	R900
Public transport to work	R700
Clothing	R350
Household insurance	R420
Entertainment	R350
Life insurance	R300
Other	R1 030
TOTAL	**R8 400**

2.1   2.1.1   Calculate Annabel's net monthly salary.   (2)

          2.1.2   How much did Annabel save towards the deposit for a car each month?   (3)

2.2   Annabel was advised to invest some of her monthly savings in a special monthly savings account that pays more interest. She thus invested R3 000 of her monthly savings each month in this account. This special savings account paid an interest rate of 10,8% per annum, compounded monthly.

Use the formula $F = \dfrac{x\left[(1+i)^n - 1\right]}{i}$ to calculate the total amount she will have for her deposit if she saves monthly for 11 months, where:

F = total amount received; x = monthly amount invested; i = monthly interest rate;
n = number of months for which the money was invested   (5)

2.3   On 1 July 2008, Annabel receives a 10% salary increase. Calculate Annabel's new monthly net salary.   (4)

2.4   On 1 July 2008 Annabel buys a car. She finds that she has to budget R3 900 per month for the car to cover the cost of petrol, repayments, insurance and maintenance. However, she no longer has to pay for public transport.

Determine her new total monthly expenditure.   (3)

2.5   In her new car Annabel travels a distance of 18 km to her workplace in approximately 15 minutes. Determine her average speed in km/h (kilometres per hour).
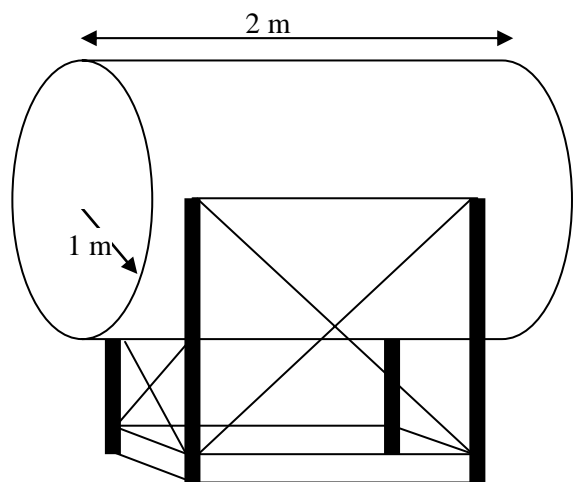   Use the formula: **Distance = speed × time**   (4)

                                                                                                            [21]

QUESTION 3

As a result of load shedding, Wayne, a chicken farmer, goes back to using a generator to provide dependable power for his chicken sheds and his farmhouse.

He buys a second-hand diesel tank with a radius of 1 m and a length of 2 m to store the fuel for the generator.

2 m

1 m

3.1   He decides to paint both the outside surface area of the tank and the stand on which it rests. The surface area of the stand is 1 m². It takes 1 ℓ paint to paint 3 m² of the surface area.

3.1.1   Calculate the surface area (SA) of the tank in m².
Use the formula: $SA = 2\,\pi\,r^2 + 2\,\pi\,r\,h$, where r = radius, h = height and use $\pi = 3{,}14$ (3)

3.1.2   Calculate the quantity of paint (in litres) needed to paint both the outside of the tank and the stand. Round off your answer to the nearest litre.   (5)

3.1.3   If a 1 ℓ tin of paint costs R23,63 and a 5 ℓ tin of paint costs R113,15, calculate the most economical way to purchase the amount of paint needed in QUESTION 3.1.2.   (3)

3.2   3.2.1   Calculate the capacity (volume) of the diesel tank in litres where 1 m³ = 1 000 ℓ.
Use the formula: $V = \pi r^2 h$, where r = radius, h = height and use $\pi = 3{,}14$ (4)

3.2.2   Farmer Wayne fills the diesel tank to 80% of its capacity. The generator used 72 ℓ of diesel in 36 hours.

Calculate the amount of diesel in litres remaining in the tank after 7 days of the generator running continuously.   (8)

[23]

QUESTION 4

One of the aims of the Arrive Alive Campaign is to increase safety on South African roads. The Arrive Alive team decide that one of the ways of alerting the public to the dangers of road travel is to publish the data on fatalities on South African roads.

TABLE 4: Number of fatalities per province

YEAR	PROVINCE									
	GAU	KZN	WC	EC	FS	MPU	NW	LIM	NC	RSA
2005	2 959	2 906	1 589	1 366	1 012	1 473	1 156	1 320	354	14 135
2006	3 412	2 967	1 637	1 779	1 175	1 530	1 241	1 262	389	15 392

[Source: www.statssa.gov.za]

The Arrive Alive team also decide to compare the estimated million vehicle kilometres (mvk) travelled in a province to the number of fatalities in that province.

TABLE 5: Million vehicle kilometres (mvk) travelled per province

YEAR	PROVINCE									
	GAU	KZN	WC	EC	FS	MPU	NW	LIM	NC	RSA
2005	43 408	20 227	19 514	9 192	7 226	9 767	7 225	6 186	2 731	125 476
2006	44 042	20 750	19 884	9 226	7 517	10 397	7 320	6 056	2 894	128 086

[Source: www.statssa.gov.za]

NOTE: This means that a total of 43 408 000 000 km were travelled by all the vehicles on Gauteng roads in 2005.

Use the data in TABLE 4 and TABLE 5 to answer the following questions.

4.1   Which province had a decrease in both the number of fatalities from 2005 to 2006 and the million vehicle kilometres (mvk) travelled? (1)

4.2   4.2.1   Which TWO provinces had the highest number of fatalities in 2005 and 2006? (2)

       4.2.2   In which TWO provinces were the highest million vehicle kilometres (mvk) travelled? (2)

       4.2.3   Describe the possible relationship between the number of fatalities and the number of million vehicle kilometres (mvk) travelled per province in the two provinces indicated in QUESTION 4.2.2. (2)

4.3   4.3.1   What percentage of the total number of fatalities in South Africa in 2006 occurred in Gauteng (GP)? (3)

       4.3.2   Calculate the number of fatalities per million vehicle kilometres travelled in 2006 in:

            (a)   Gauteng (rounded off to THREE decimal places) (4)

            (b)   The province with the lowest number of fatalities (rounded off to THREE decimal places) (4)

       4.3.3   Which of these two provinces do you think is the safest in terms of kilometres travelled and fatalities suffered? Give ONE valid reason for your answer. (3)

[21]

QUESTION 5

Gerrie van Niekerk is a primary school learner who lives in Krugersdorp. He lives on the corner of Wishart Street and 5th Street.

5.1   Detach the map of part of Krugersdorp, Gauteng, on ANNEXURE B and use it to answer the following questions.

      5.1.1   Give a grid reference for the Jays Shopping Centre where Gerrie and his mother do their weekly grocery shopping.   (1)

      5.1.2   Gerrie's grandmother lives with them and goes to the hospital for her medication once a month.

               What is the relative position of Krugersdorp Central Hospital with respect to Gerrie's home?   (1)

      5.1.3   Gerrie's father drives from Jays Shopping Centre to the petrol station to buy petrol for his car. Describe his route if the exit from Jays Shopping Centre is in 4th Street.   (3)

      5.1.4   Gerrie walks from home to Paardekraal Primary School by:

- Crossing 5th Street and walking in an easterly direction along Wishart Street
- Turning right and walking in a southerly direction along 4th Street
- Turning left and walking in an easterly direction along Onderste Street
- Turning right, and walking in a southerly direction along 3rd Street

               The school's entrance is on the corner of 3rd Street and Pretoria Street.

         (a)   Measure the total walking distance on the map between Gerrie's house and the Paardekraal Primary School in centimetres.   (3)

         (b)   Use the scale 1:11 000 to calculate the actual distance Gerrie walks to school. Give your answer in kilometres.   (4)

5.2 | There were complaints from parents of Paardekraal Primary School that motorists were speeding in 3rd Street near the school. As a result of this they felt that stop signs should be installed at the intersection of 3rd Street and Pretoria Street.

The speed limit is 60 km/h.

A parent, who is a traffic officer, recorded the speed of the 17 cars that passed the school between 14:15 and 15:00 on a particular Monday. The speeds in kilometres per hour (km/h) are:

62;	57;	55,5;	64;	70;	60;
62;	60;	50;	97;	56;	71;
61;	48;	59,5;	60;	61	

5.2.1   Determine the mean speed of the cars rounded off to the nearest whole number. (3)

5.2.2   What is the modal speed? (1)

5.2.3   Determine the median speed of the cars. (3)

5.2.4   Do you think that the parents' request for stop signs to be installed at the intersection of 3rd Street and Pretoria Street is valid? Give reasons for your answer. (4)

5.2.5   Could you suggest TWO other ways that would reduce the speed at which cars travel past the school? (2)

[25]

QUESTION 6

6.1   Bathwizz is a company that installs and renovates bathrooms. The general manager had to present the company's earnings for the first three quarters of the year to the company directors. He drew the two graphs below.

GRAPH 1   **GRAPH 2**
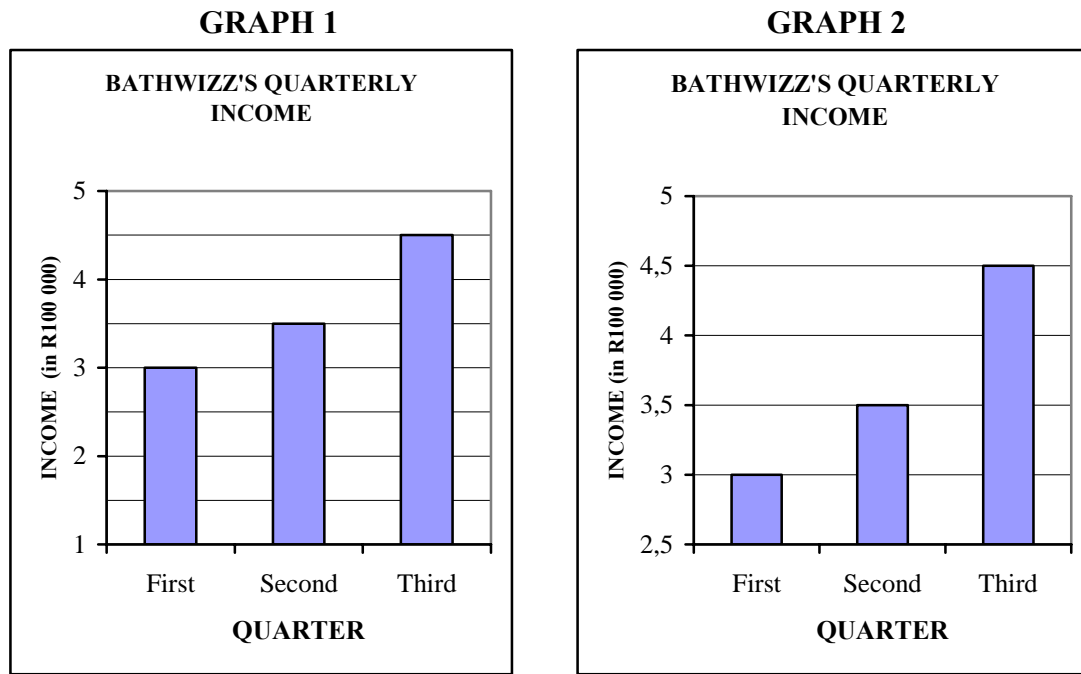
Use the graphs to answer the following questions.

6.1.1   What possible trend do you notice with regard to Bathwizz's quarterly income? (2)

6.1.2   Calculate the average (mean) monthly income for Bathwizz for the first nine months of the financial year. (4)

6.1.3   The general manager wanted to prove to the company directors that Bathwizz's income was increasing and that the company was doing well.

Which graph would be the better one to show to the company directors? Give a reason for your answer. (3)

6.2   Mrs Naude decides to hire Bathwizz to re-tile her bathroom floor.

The scale drawing of the bathroom is illustrated alongside.

Scale drawing of bathroom
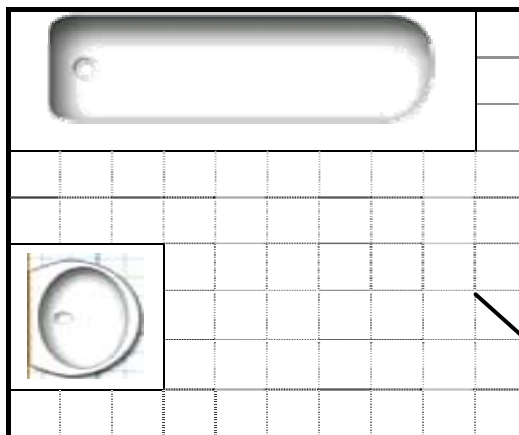
Scale: The length of one small square is 20 cm.

The fitted washbasin and fitted bath are illustrated in the photographs below.
The area under the washbasin and the area under the bath will NOT be tiled.

6.2.1   (a)   What area (in m^2) of the bathroom floor does the bath cover?   (6)

          (b)   Calculate the area (in m^2) of bathroom floor that needs to be tiled.   (5)

6.2.2   Determine how many full boxes of tiles Mrs Naude must buy to tile her bathroom.

          The following information will help you with your calculations:

          • One box of tiles covers $1,5\ m^2$.
          • Mrs Naude is advised to buy 10% more tiles than she needs in order to allow for the cutting of the tiles and for breakages.   (5)

                                                                                              [25]
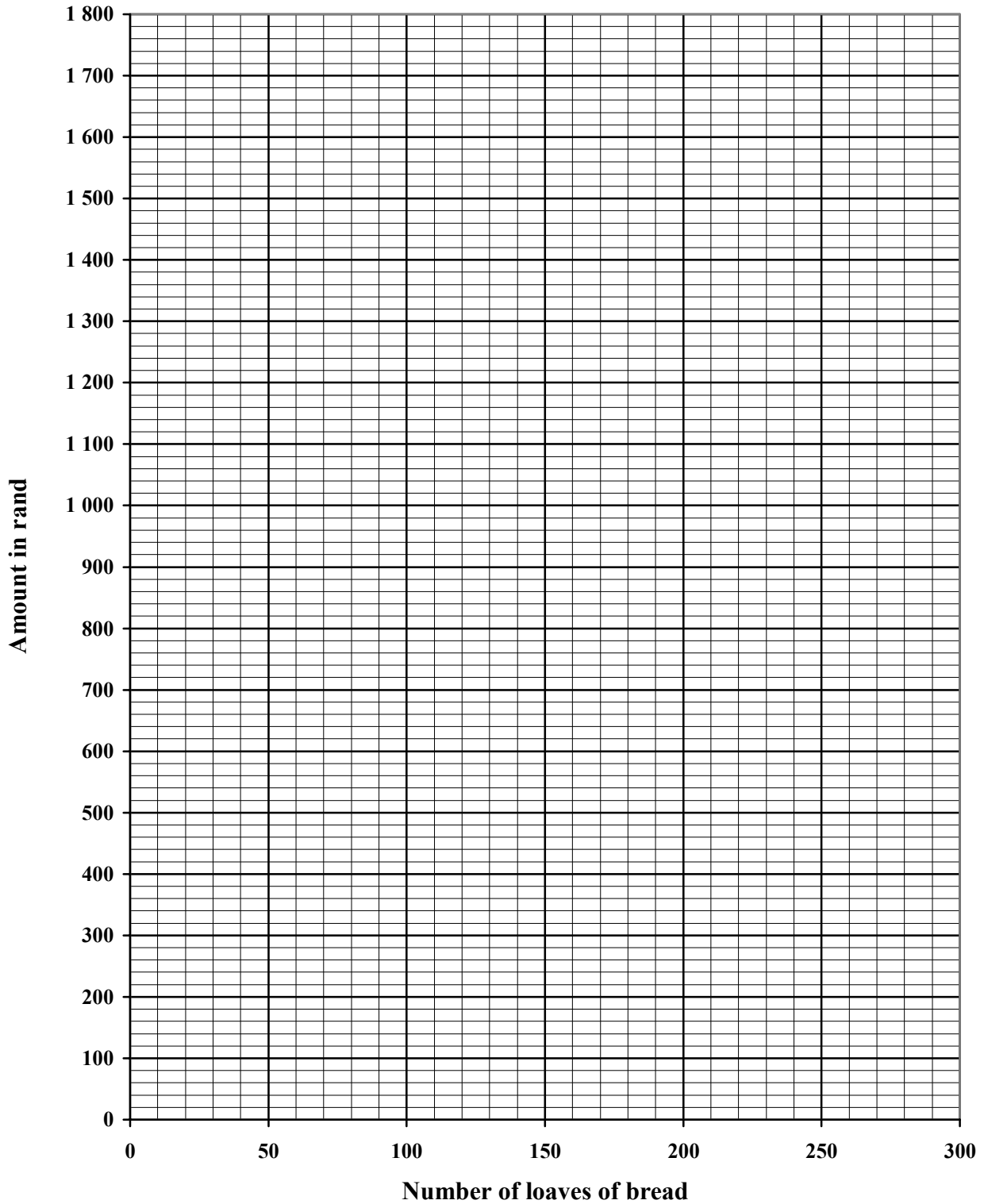
                                                                           TOTAL: 150

ANNEXURE A

QUESTION 1.4

INCOME AND COSTS

Amount in rand

Number of loaves of bread

ANNEXURE B

QUESTION 5.1

N

| Petrol station | | Jays Shopping Centre |

Pienaarville

Barnard St

Klopper

Hugo St

Douglas de Villiers St

Bodenstein St

Bodenstein St

Hinks St

Freda St

7th St

Roodt St

6th St

P.W. Marais St

5th St

Rhodes St

4th St

Snyman St

Connaught St

De Wet St

Remainder

1

view H

S

The Avenue

Krugersdorp

C.C. van Dyk St

Warder St

Watt St

Krugersdorp-Noord

S

Becker

2nd St

Convent St

Viljoen St

Buiten St

S

2

Quellerie St

Krugersdorp Town P.

North

5th St

Victoria St

Premier St

3rd St

May St

St Ursula's Convent

edaris St

Maria St

Gerrie Visser St

6th St

Wishart St

Blommestein St

Union St

H Monument

S

Culemborg St

Kompanjie St

VAN RIEBEECK ST

Blommestein St

Jays Centre

Kingdon St

Otto St

4th St

3

Kingdon St

Oranje St

Herbert Dent St

Onderste St

Roode St

Buston St

Botha St

Spruit St

Church St

Paardekraal P

S

Pretoria St

Monument St

Job St

H Jan de Klerk

S

Krugersdorp

Van Breda St

Eloff St

efstroom St

g St

36

Van der Merwe

Krugersdorp Central

Fountain St

Church St

President St

4

Marico St

Lagois St

dorp St

ga St

| A | B | C | D |

| Gerrie's house | | Krugersdorp Central Hospital | | Entrance to Paarde-kraal Primary School |