basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

MATHEMATICAL LITERACY P1

FEBRUARY/MARCH 2012

MARKS: 150

TIME: 3 hours

This question paper consists of 14 pages and 3 annexures.

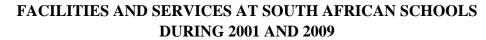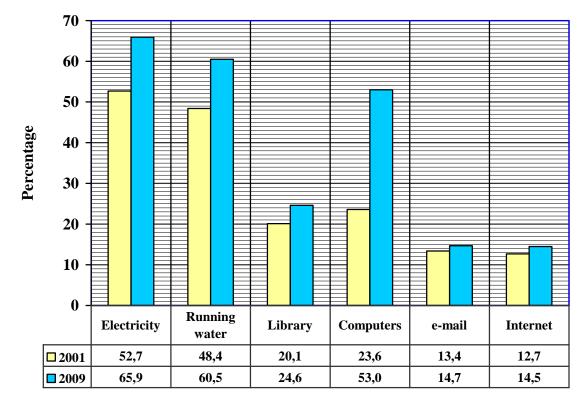**INSTRUCTIONS AND INFORMATION**

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

2.   Answer QUESTION 3.3.2 on ANNEXURE A, QUESTION 4.1.3 on ANNEXURE B and QUESTION 4.3.1 on ANNEXURE C. Write your examination number and centre number in the spaces provided on each ANNEXURE and hand in the ANNEXURES 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 ALL the final answers off to TWO decimal places, unless stated otherwise.

8.   Indicate units of measurement, where applicable.

9.   Write neatly and legibly.

QUESTION 1

1.1   1.1.1   Simplify: $\frac{3}{4}$ of $\sqrt{9\ 673}$ − 0,5 (5,9352 + 2,16937)   (2)

        1.1.2   Calculate 22,25 % of R136,00.   (2)

        1.1.3   Convert 450 metres to kilometres.   (1)

        1.1.4   Write 5,34 million as an ordinary number.   (1)

        1.1.5   Calculate the price per egg if half a dozen eggs cost R7,92.   (2)

        1.1.6   In which month of the year 2011 will the 200th day fall?   (2)

1.2 | A local supermarket pays their casual packers R18,00 per hour. Mike works a daily shift of $2\frac{1}{2}$ hours as a casual packer, starting at 16:30. |

        1.2.1   At what time does Mike's daily shift end?   (2)

        1.2.2   Determine Mike's wage if he worked 12 shifts per month. Use the
                  formula:

                  Wage = R18,00 × number of shifts × number of hours per shift   (2)

1.3 | Jakoba and Sihle's business made a profit of R135 400 during 2010. Their total expenses in the same year were R235 656. |

        1.3.1   Calculate the total income of the business during 2010.

                  Use the formula: **Total income = profit + total expenses**   (2)

        1.3.2   Jakoba and Sihle shared their profit such that Jakoba received R54 160.

                  Determine the ratio of Jakoba's profit to Sihle's profit in simplified form.   (3)

        1.3.3   They predict that in 2011 the business's profit will be 8% greater than the
                  profit made in 2010. Calculate the profit the business will make in 2011.   (3)

1.4 | Mark Botha is a cricket player. In his last nine innings he scored the following runs:

                  52   86   24   38   56   42   0   50   38 |

        1.4.1   Arrange the runs scored in ascending order.   (1)

        1.4.2   Write down the modal runs scored.   (1)

        1.4.3   Calculate the average (mean) number of runs scored.   (3)

1.5 In 2001 and 2009 Statistics South Africa ran the **Census@School** project using a sample of South African schools. The purpose of this project was to make schools aware of what a census was and also to obtain information about the schools. The schools could then use this information for teaching data handling.

The bar graph below gives the percentage of the schools in the 2001 and 2009 **Census@School** project that had the listed facilities and services.

FACILITIES AND SERVICES AT SOUTH AFRICAN SCHOOLS DURING 2001 AND 2009

	Electricity	Running water	Library	Computers	e-mail	Internet
☐ 2001	52,7	48,4	20,1	23,6	13,4	12,7
☐ 2009	65,9	60,5	24,6	53,0	14,7	14,5

Type of facility or service available at the school

1.5.1 Which facility or service showed the smallest percentage use during 2001? (1)

1.5.2 Calculate the difference in the percentage of the schools that had access to running water during the two years. (2)

1.5.3 Which facility or service showed the greatest increase in percentage over the two years? (1)

1.5.4 If 2 500 schools were surveyed in 2009, calculate the number of schools which had library facilities. (2)

[33]

QUESTION 2

2.1 | Mrs King inherited an amount of R150 000. She decided to invest the money at a bank and to use some of the interest to pay for an overseas holiday in China.

       2.1.1   She chooses ABC Bank which offers 6,6% compound interest per annum. Calculate the value of her investment after 3 years.

Use the formula: $A = P(1 + i)^n$
where A = final amount
          P = amount invested
          i = annual interest rate
          n = investment period in years   (3)

       2.1.2   She intends having R15 000 available to spend in China. How much will this amount be in Chinese yaun (CNY)?

Use the exchange rate: R1,00 (ZAR) = ¥ 0,89 (CNY)   (2)

2.2   TABLE 1 below shows the South African population (in thousands) during 2009 and 2010 according to race and gender.

TABLE 1:   **The South African population (in thousands) during 2009 and 2010 according to race and gender**

RACE	MALES		FEMALES		TOTAL	
	2009	**2010**	**2009**	**2010**	**2009**	**2010**
Black	18 901,0	19 314,5	20 235,2	20 368,1	39 136,2	39 682,6
Coloured	2 137,3	**A**	2 295,8	2 299,2	4 433,1	4 424,1
Asian	635,7	646,6	643,4	653,3	**B**	1 299,9
White	2 194,7	2 243,0	2 277,4	2 341,7	4 472,1	4 584,7
TOTAL	**23 868,7**	**24 329,0**	**25 451,8**	**25 662,3**	**49 320,5**	**C**

[*SA YEAR BOOK 2009/2010, 2010/2011*]

       2.2.1   Write down the population of the:

              (a)   Coloureds in 2010   (2)

              (b)   White females in 2009   (2)

       2.2.2   Determine the missing values **A**, **B** and **C**.   (6)

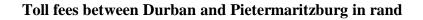   2.2.3   Calculate the difference in the number of black males between 2009 and 2010.   (2)
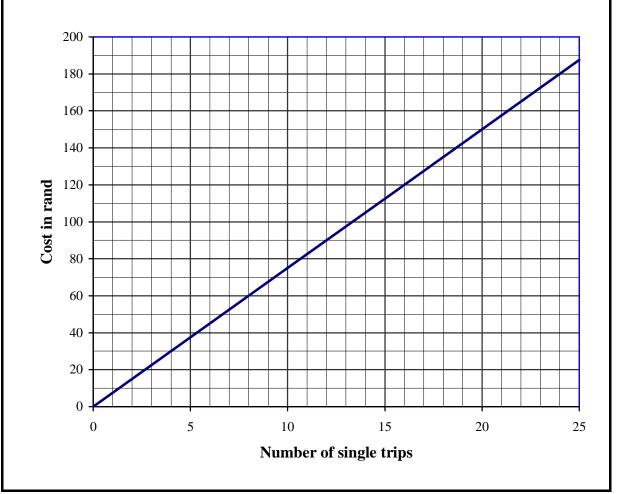
       2.2.4   Calculate the number of Asian females as a percentage of the total number of females in 2010.   (2)

       2.2.5   Which gender had a higher increase between 2009 and 2010? Show ALL calculations.   (3)

2.3 | Mrs King stays in Pietermaritzburg but works in Durban. She uses the N3 toll road daily to travel from home to work and back. She pays a toll fee (an amount paid for using the road) twice daily. The graph below shows the toll fees for single trips.

Toll fees between Durban and Pietermaritzburg in rand

Use the graph to answer the following questions.

2.3.1   Approximately how much will Mrs King pay for TEN single trips? (2)

2.3.2   How many single trips can Mrs King make for R180,00? (2)

2.3.3   Calculate the approximate cost of THREE return trips. (3)

2.3.4   Mrs King works for an average of 22 days per month. Calculate the approximate amount to be budgeted per month for toll fees. (3)

[32]

QUESTION 3

3.1 | Wandile Zwane is the cook at a boarding school. He is responsible for buying fresh vegetables for cooking. He normally uses three cabbages and five carrots to make salad.

    3.1.1   How much will he pay for the cabbages and carrots if the cost is calculated using the formula:

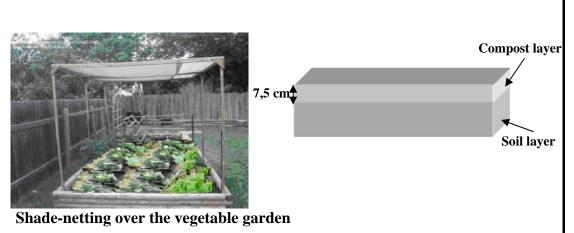   **Cost = number of cabbages $\times$ R5,75 + number of carrots $\times$ R1,25**   (2)

    3.1.2   If Wandile paid a total amount of R31,75 for the cabbages and the carrots, and he bought 4 cabbages, calculate how many carrots he bought that day.

               The following formula may be used:

$$\textbf{Number of carrots} = \frac{\textbf{cost} - (\textbf{number of cabbages} \times \textbf{R5,75})}{\textbf{R1,25}}$$

                                                                  (2)

3.2 | Wandile decides to grow his own vegetables. He makes a rectangular vegetable garden with length = 2,5 m and breadth = 1,5 m.

Compost layer

7,5 cm

Soil layer

Shade-netting over the vegetable garden

    3.2.1   Wandile wants to cover only the vegetable garden with shade-netting. Calculate the area that the shade-netting will cover.

               Use the formula: **Area of a rectangle = length $\times$ breadth**   (2)

    3.2.2   Wandile adds a 7,5 cm layer of compost to his vegetable garden. Calculate the volume of the compost added.

               Use the formula:

               Volume of a rectangular prism = length $\times$ breadth $\times$ height   (3)

3.3   The shop from which Wandile buys packets of seeds for his garden keeps records of the most popular vegetable seeds sold per year.

TABLE 2: Packets of seeds sold per year

COOL SEASON		WARM SEASON	
SEEDS	**PERCENTAGE SOLD**	**SEEDS**	**PERCENTAGE SOLD**
Cabbage	48,0	Pumpkin	50,0
Onions	10,6	Beans	30,0
Radish	2,7	Tomatoes	10,0
Carrots	31,5	Cucumbers	10,0
Lettuce	**A**		

3.3.1   (a)   What percentage of the seeds sold, was lettuce seeds?   (2)

(b)   Suppose 525 packets of cool season seeds were sold, how many of these packets were cabbage seeds?   (2)

3.3.2   Draw a pie chart on ANNEXURE A, representing the most popular warm-season seeds sold per year. Clearly label the sectors showing the name of the seed and the percentage sold.   (5)

[18]

QUESTION 4

4.1 AA High School is considering renting a photocopier. They approach two companies (Company A and Company B) and obtain the following quotations:

Company A:
Rental of R800,00 per month, which includes 3 000 free copies per month.
Thereafter a charge of 5 cents per copy applies.

Company B:
Rental of R600,00 per month, which includes 2 500 free copies per month.
Thereafter a charge of 10 cents per copy applies.

TABLE 3: Monthly cost (in rand) of renting a photocopier

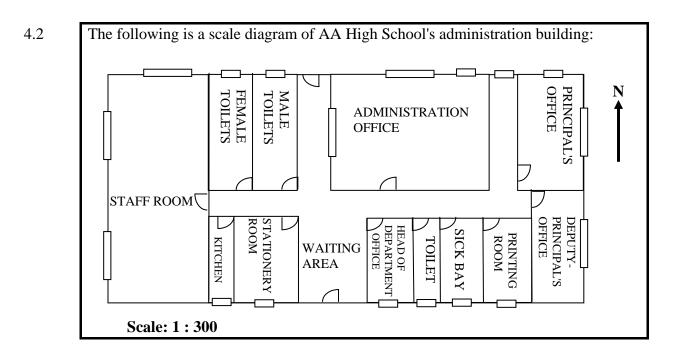| Number of copies made	0	2 000	2 500	3 000	4 000	6 000	7 000	8 000
Company A	800	800	800	800	**Q**	950	1 000	1 050
Company B	600	600	**P**	650	750	950	1 050	1 150

4.1.1 Determine the missing values **P** and **Q**. (4)

4.1.2 Write down a formula that can be used to calculate the total cost per month of renting a photocopier from Company B. (3)

4.1.3 The line graph illustrating the total rental cost for Company B has been drawn on ANNEXURE B.

On the same system of axes, draw a line graph to illustrate the total rental cost for Company A. (4)

4.1.4 Determine the number of photocopies made if the total rental cost for both companies is the same. (2)

4.1.5 AA High School makes an average of 7 000 photocopies per month.

Calculate how much the school will save by choosing the cheaper rental option and identify the company that charges the lower total rental cost. (3)

4.2   The following is a scale diagram of AA High School's administration building:

Scale: 1 : 300

4.2.1   Which room(s) lie south west of the administration office?   (2)

4.2.2   The width of the printing room on the scale diagram is 1,33 cm. Use the given scale to calculate the actual width of the printing room in metres.   (3)

4.3   The school secretary kept a weekly record of the number of copies made daily per week.

TABLE 4: Record showing the number of copies made daily

	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**
NUMBER OF COPIES	350	575	280	315	300

4.3.1   Use TABLE 4 above to draw a bar graph on ANNEXURE C representing the number of copies made daily per week.   (6)

4.3.2   On which day of the week is the least number of copies made?   (1)

[28]

QUESTION 5

5.1   Jabu Ndou requires a cylindrical water tank to collect rainwater from his roof. This water will be used for irrigating his garden.

Outer height

Cylindrical rainwater tank

5.1.1   Jabu wants to know how much rainwater the tank can hold. The inner radius of the tank is 0,998 m and the inner height of the tank is 2,498 m.

(a)   Calculate the total volume, rounded off to THREE decimal places, of the water tank.

Use the formula:
Volume of a cylinder $= \pi \times$ **(radius)**$^2 \times$ **height**,
and using $\pi = 3,14$ (3)

(b)   Determine the height, rounded off to THREE decimal places, of the water in the tank when it is 80% full.   (2)

5.1.2   The outside walls and roof of the rainwater tank need to be painted. The outer radius of the tank is 1 m and the outer height of the tank is 2,5 m. Calculate the surface area of the tank that will be painted using the formula:

Surface area of the tank $= \pi \times$ **radius** $\times$ **($2\times$ height + radius),** and
using $\pi = 3,14$ (5)

5.1.3   Suppose the tank filled up at an average rate of 5 mm per minute. Calculate how long it took (in hours) for the water in the tank to reach a height of 1 200 mm, if the tank was initially empty.

Use the formula:

$$\textbf{Time (in hours)} = \frac{\textbf{height (in mm)}}{\textbf{average rate (in mm per hour)}}$$ (3)

5.2 | The company supplying the rain water tank indicated that the time that it takes to install a water tank, depends on the number of workers.

TABLE 5: Number of workers needed to install Jabu's rainwater tank

NUMBER OF WORKERS	2	3	**A**	8
NUMBER OF HOURS	15	10	7,5	**B**

5.2.1   Determine the missing values **A** and **B.**   (4)

5.2.2   State the type of proportion that is represented by the data in **TABLE 5.**   (1)

[18]

QUESTION 6

6.1

Mr Coetzee owns a small aeroplane. He uses it to transport visitors to different national parks in South Africa.

His small aeroplane has two fuel tanks because it has two engines.

FUEL GAUGE OF A TWIN-ENGINE AEROPLANE

The left side of the gauge shows the fuel reading of the left engine. The right side of the gauge shows the fuel reading of the right engine.

6.1.1   Determine the total number of gallons of fuel that are in the two fuel tanks if both of them are full. (1)

6.1.2   Estimate how many gallons of fuel are still in the LEFT TANK of the aeroplane. (2)
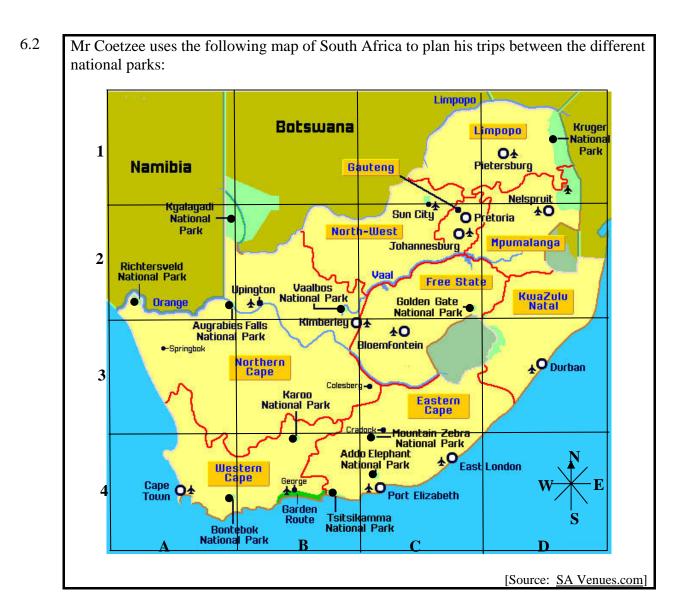
6.1.3   Estimate how many gallons of fuel will be needed to fill the RIGHT TANK of the aeroplane. (2)

6.1.4   Convert 18 gallons to litres where **1 gallon = 4,546 litres**. (2)

6.1.5   Determine the cost of 15,76 litres of fuel if fuel costs R9,92 per litre. (2)

6.1.6   The fuel price which was R9,92 per litre, decreased by 86 cents per litre. Calculate the percentage decrease. (3)

6.2   Mr Coetzee uses the following map of South Africa to plan his trips between the different national parks:

[Source: SA Venues.com]

Use the map to answer the following questions.

6.2.1   Write down the grid reference for the Vaalbos National Park.   (2)

6.2.2   Which national parks are situated in the Western Cape?   (2)

6.2.3   In which general direction is Kimberley from East London?   (2)

6.2.4   It took Mr Coetzee 30 minutes to fly the distance of 153 kilometres between Kimberley and Bloemfontein.

Calculate the average speed in kilometres per hour.

Use the formula: **Average speed** = $\dfrac{\textbf{distance travelled}}{\textbf{time taken}}$ (3)
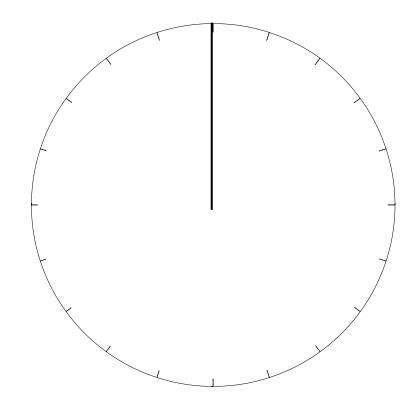
[21]

TOTAL: 150

ANNEXURE A

CENTRE NUMBER:

EXAMINATION NUMBER:

QUESTION 3.3.2

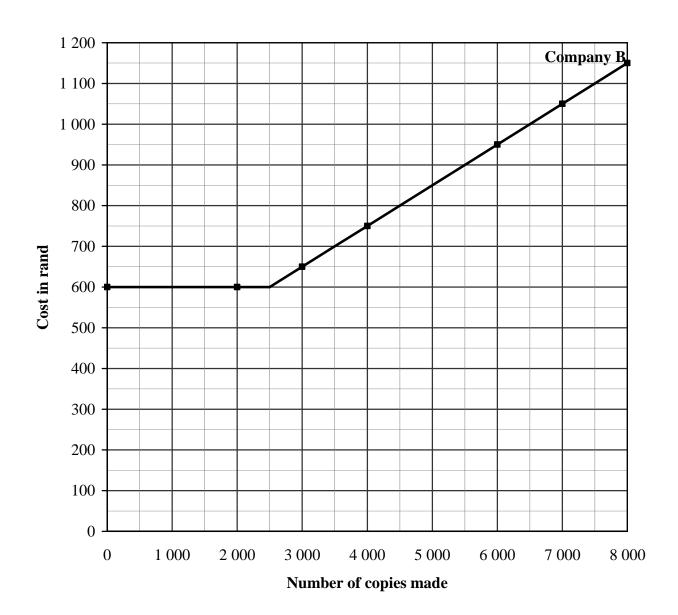**THE MOST POPULAR WARM-SEASON VEGETABLE SEEDS SOLD IN 2011**

ANNEXURE B

CENTRE NUMBER:

EXAMINATION NUMBER:

QUESTION 4.1.3

COST OF RENTING A PHOTOCOPIER

ANNEXURE C

CENTRE NUMBER:

EXAMINATION NUMBER:

QUESTION 4.3.1

NUMBER OF COPIES MADE

Number of copies (y-axis: 0, 100, 200, 300, 400, 500, 600)

Day of the week (x-axis: Mon, Tue, Wed, Thu, Fri)