education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL
SENIOR CERTIFICATE

GRADE 10

MATHEMATICAL LITERACY

NOVEMBER 2006

MARKS: 150

TIME: 3 hours

This question paper consists of 14 pages.

INSTRUCTIONS AND INFORMATION

1.   Answer ALL the questions.

2.   Number the answers correctly according to the numbering system used in this
        question paper.

3.   Non-programmable calculators may be used, unless otherwise stated.

4.   ALL working details must be shown clearly.

5.   ALL final answers must be rounded off to TWO decimal places, unless other-
        wise stated.

6.   Start each question on a NEW page.

7.   Write neatly and legibly.

8.   Neatly cross out ALL rough work before handing in the ANSWER BOOK.

9.   Re-read your work to check for errors before you hand in the ANSWER
        BOOK.

QUESTION 1

TABLE 1 below shows a summary of the water accounts for Mr DG Moletsane for a period of eight months. The first 5,6 kilolitres (kℓ) used for each month, is free. (Remember that 1 000 litres = 1 kℓ.)

TABLE 1: Mr DG Moletsane's water account for a period of eight months

Month	Total kilolitres used	Kilolitres free	Kilolitres to be paid for	Cost of each kilolitre (RANDS)	Amount due (RANDS)
August	22,0	5,6	16,4	4,57	75,95
September	28,0	5,6	22,4	4,57	102,37
October	23,5	5,6	17,9	4,57	81,80
November	20,6	5,6	15	4,57	68,5
December	27,9	5,6	22.3	4,57	101,91
January	25,10	5,6	(QUESTION 1.4.1)	4,57	89,12
February	24,6	5,6	19	4,57	(QUESTION 1.4.2)
March	(QUESTION 1.4.4)	5,6	(QUESTION 1,4.3)	4,57	98,70

1.1   How many litres of water were consumed in September?   (1)

1.2   What is the highest amount that Mr Moletsane had paid for water used?   (1)

1.3   In which month did Mr Moletsane pay the least for water used?   (1)

1.4   Now complete the outstanding values for the table above. Write down the question numbers (1.4.1 to 1.4.4) and show ALL calculations next to it.   (7)

1.5   The water usage for August was 22 kℓ and for September it was 28 kℓ.

        Calculate the percentage increase for the total number of kilolitres (kℓ) of water used for August and September.   (3)

1.6   Calculate the total amount paid by Mr Moletsane for water from August to January.

        The interest rate for value added tax (VAT) is currently 14%.   (2)

        Calculate the VAT payable on the amount calculated in QUESTION 1.6.   (3)

1.7   Assume that Mr Moletsane did not pay his account for September. (Municipal accounts are to be paid on the last day of every month.)

If Mr Moletsane only pays this amount at the end of five months, calculate the interest that is payable on this amount (excluding VAT) IF:

1.7.1   The municipal charges 12% per annum interest compounded monthly   (4)

1.7.2   The municipal charges 12% per annum simple interest   (3)

1.7.3   Explain which of compound interest or simple interest you expect to be higher and give a reason for your answer.   (2)

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QUESTION 2

2.1   Study the graphs below and match each graph to one of the descriptions that follow:
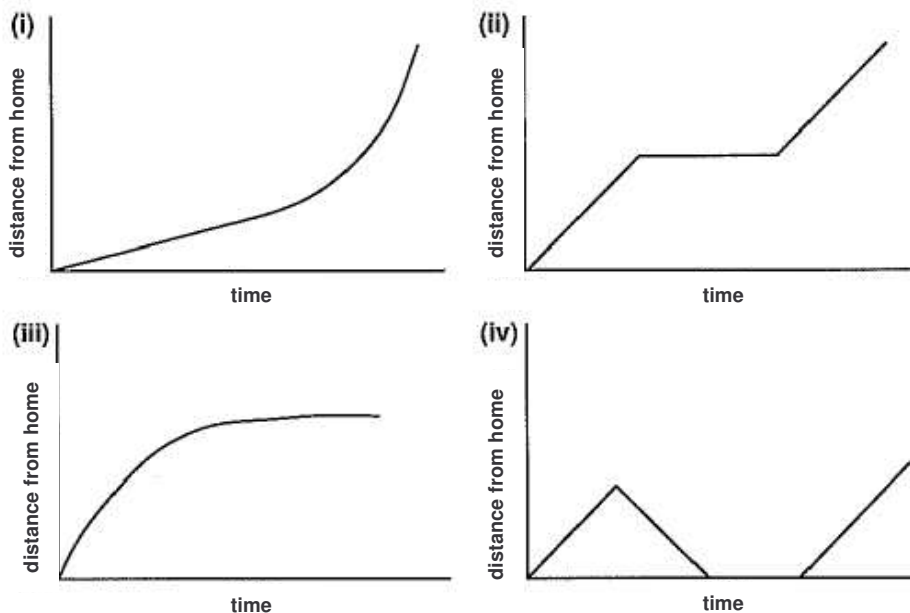
2.1.1   Pulane was driving her car from home to work and everything went fine until the engine of the care started cutting out and the car eventually came to a standstill.   (2)

2.1.2   Kelly was walking from home to school as usual, when she realised that she had forgotten her Mathematical Literacy exercise books and lunch at home, so she went back home to fetch them and she returned to school.   (2)

2.1.3   Initially Mr Martin walked slowly from his home to the office. However, when he realised that he was going to be late for a meeting, he started walking faster and faster.   (2)

2.1.4   Whilst on my way from home to town, I stopped to help a friend
          who had a flat tyre before I continued my journey.   (2)

2.2   Kelly and Denzil can each walk approximately 6 km in one hour. It takes each
        one of them one hour to cycle 18 km.

2.2.1   If Kelly lives a quarter of an hour's walk from school, approximately
          how many kilometres away from school does she live?   (3)

2.2.2   How long will it take Kelly to cycle to school?   (3)

2.2.3   Denzil always cycles to school and it usually takes him
          approximately 20 minutes. Yesterday when he was half way to
          school, his bicycle tyre got a puncture and he had to walk the rest
          of the way to school.

          Calculate how long it took Denzil to get to school yesterday.   (5)
                                                                              [19]

QUESTION 3

3.1   Jane and Tom are redesigning their garden. They plan to use the wheel-barrows below.

Drawings A and B are the isometric drawings of two wheelbarrows.
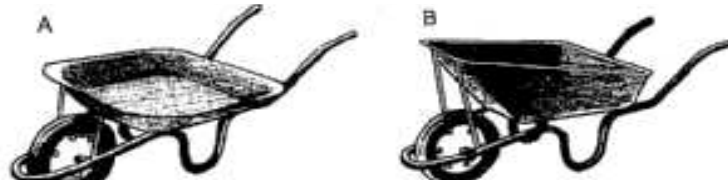
3.1.1 Which of the following plan views is of wheelbarrow B? Give a reason for your answer.

3.1.2 Which of the following front views is of wheelbarrow A? Give a reason for your answer.

These are the side views of the wheelbarrows.

3.1.3 Which difference between the wheelbarrows will enable you to tell which side view belongs to which wheelbarrow?   (6)

3.2   Jane and Tom are considering redesigning their front garden. The length of the garden is 8 metres and the width is 4 metres. They plan to plant several trees in the garden and to cover the remainder of the garden with grass. The illustration below provides a view from above of their front garden. Each hole shown below, has a radius of 0,5 m.

8 m

4 m
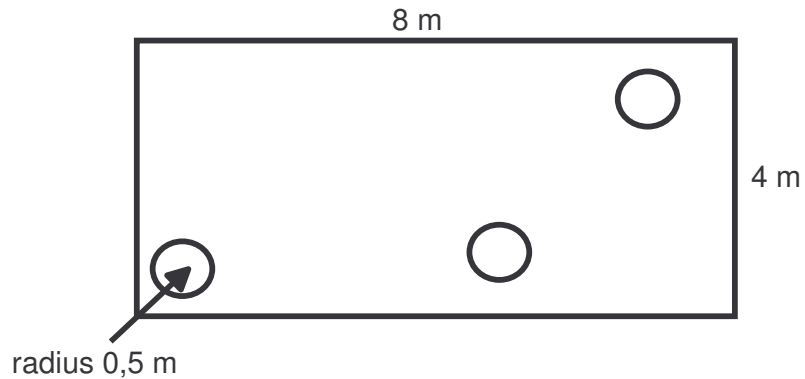
radius 0,5 m

3.2.1   Determine the total area of the garden.   (3)

3.2.2   Determine the area of ONE of the holes that has been dug out for the trees if the radius of the hole is 0,5 m.   (3)

3.2.3   Determine the area to be covered by grass (that is excluding the holes made for the trees).   (3)

3.3   Jane and Tom want to use a portion of their plot, on the side of their house, to plant vegetables. A rough sketch of this portion is shown below.

205 cm

80 cm
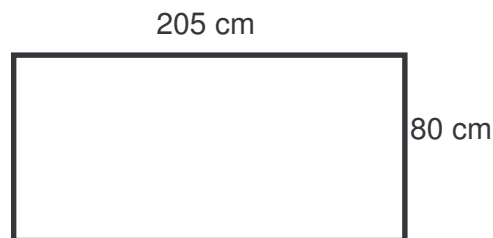
If cabbages need a circular area with a diameter of 25 cm to grow, what is the maximum number of cabbages that Jane and Tom can plant along the length of the garden?   (2)

3.4   They have hired workers to help in their garden. The graph below shows payments received against hours worked.

PAYMENT FOR HOURS WORKED
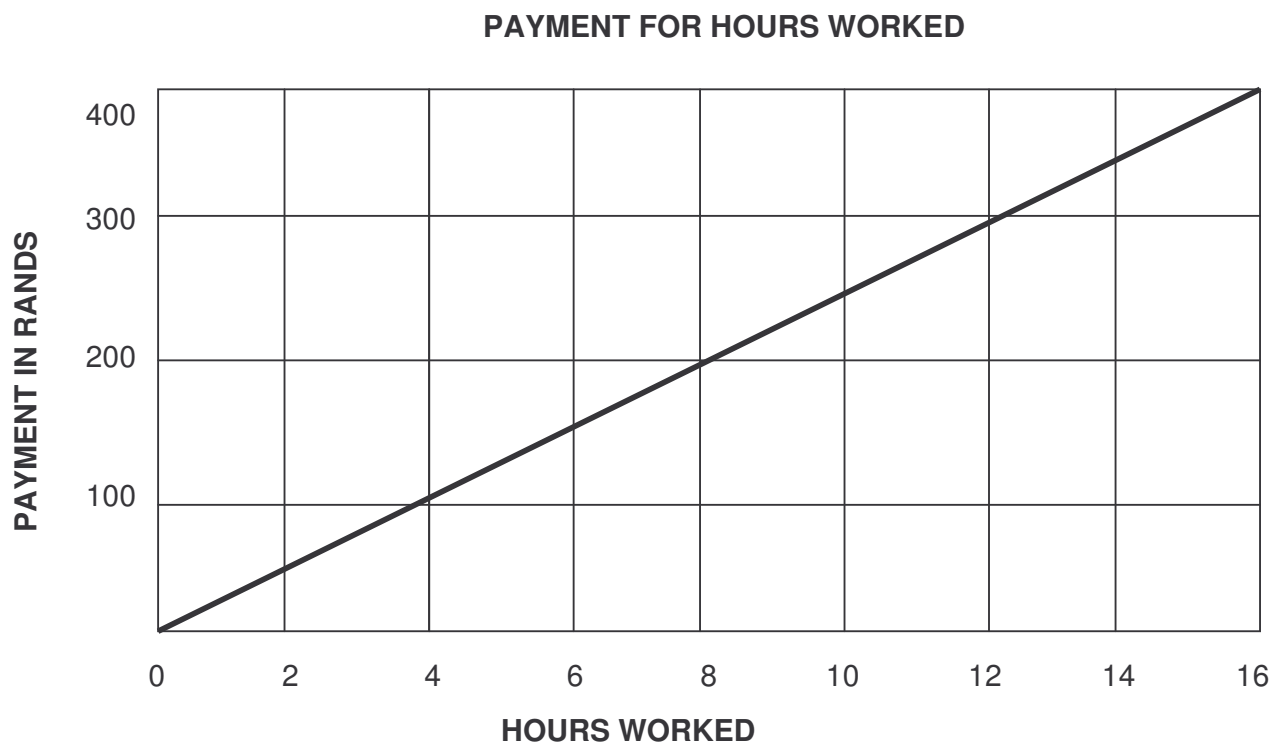
Use the graph above to answer the following questions:

3.4.1   How much would a worker receive for 12 hours of work?   (1)

3.4.2   How many hours would someone have to work to earn a payment of R200?   (1)

3.4.3   Determine the hourly rate used in the graph.   (2)

3.4.4   Find an equation that could be used to calculate the payment due for hours worked.   (2)

3.4.5   The workers requested that a transport allowance of R35 be added to their payment. Show how the equation obtained in QUESTION 3.4.4 should be adapted to include this allowance in their payment.   (1)
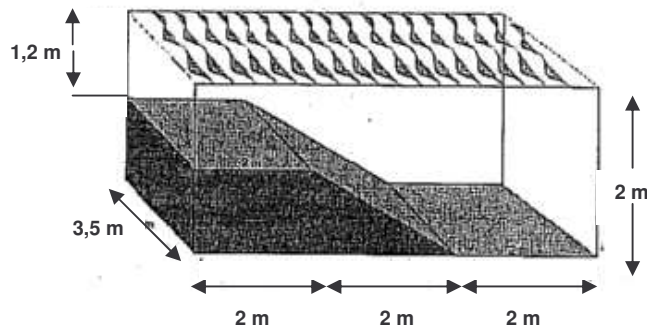
[24]

QUESTION 4

Jane and Tom plan to install a sloping pool in their back garden. A sketch of the pool is shown below.

The length of the pool is 6 m and its width is 3,5 m. The depth of the water in the shallow end is 1,2 m and 2 m deep in the deep end.

4.1   Calculate the volume of the rectangular hole in the ground in which the pool will be built.   (3)

4.2   Calculate the volume of the raised cemented portion at the swallow end of the pool.   (6)

4.3   4.3.1   Hence, determine the volume of water, in litres, required to fill the pool to the top.
                  (NOTE: 1 000 litres = 1 m^3.)   (3)

        4.3.2   Express your answer in QUESTION 4.3.1 in scientific notation.   (1)

4.4   Jane and Tom are planning to put up a security fence, one metre away from the edges of the pool. The fence will be right around the pool.

        Determine how many metres of fencing Jane and Tom would need to buy.   (4)

4.5 Below is the sketch of the metal gate that will be installed at the entrance to the pool.

0,5 m

1,2 m
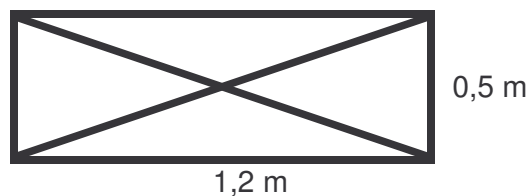
4.5.1 The length of the gate is 1,2 m and the width is 0,5 m. The two crosspieces are equal in length.

Calculate the length of ONE crosspiece that will be used to strengthen the gate. (3)

4.5.2 Below are the exact measurements of the gate that will be in the fence around the pool.

Using a scale of 1:50, determine the length of the gate (in cm) that should appear on a scale drawing of a plan of the gate. (3)

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QUESTION 5

5.1 The table below shows the number of workers that will be needed to build Jane and Tom's swimming pool and the minimum of number of working days it will take to build the swimming pool. A working day is given as eight hours.

Number of workers	1	2	3	4	5	QUESTION 5.1.1(b)
Days to build the pool	QUESTION 5.1.1(a)	24	16	12	9,6	4,8

5.1.1 Use the information given above to complete the TWO outstanding values, that is:

(a) The number of days it will take ONE worker to build the pool (2)

(b) The number of workers that are required to complete the pool in 4,8 days (2)

5.1.2 Write down an equation showing the relationship between the number of workers and the number of days it takes to build the pool.

Use the following form:

Number of days = ... (2)

5.1.3   Use the equation in QUESTION 5.1.2 to determine how long it will take SEVEN workers to build the pool. (Show ALL the workings and express your answer as days and hours, rounded off to the NEAREST hour.)   (4)

5.1.4   Draw a graph to represent the relationship between the number of workers and the number of days it takes to build the pool.

          Use the following scale:

          X-axis: 1 cm represents 1 unit (number of workers)
          Y-axis: 1 cm represents 5 units (number of days)   (5)

5.1.5   Use the graph to determine how many workers will be needed to complete the pool in 6½ days.   (1)

5.1.6   Consider your graph in QUESTION 5.1.5 and explain whether you should join the points to form a continuous (line) graph or not.   (2)

5.1.7   Estimate how many days it will take 96 workers to complete the pool. Substantiate your answer.   (2)

5.2   Mr Khumalo brings home a roll of wine gums for his seven-year-old son. In the roll of 12 wine gums, three are yellow, three are red, three are green and three are black. His son is delighted and offers him one of the sweets.

        What is the probability that Mr Khumalo will get the following:

5.2.1   A red wine gum   (2)

5.2.2   Any colour except black   (2)
                                                                                                                  [24]

QUESTION 6

Watching soccer is one of the most important South African pastimes. The table below reflects the statistics of the National Soccer League (NSL) games played at home.

NOTE: 1. All teams have played the SAME number of games.
2. Points are earned for games WON and games DRAWN.

TEAMS	GOALS SCORED	POINTS
Kaizer Chiefs	22	36
Ajax Cape Town	23	31
SuperSport Utd	30	26
Wits University	29	29
Orlando Pirates	20	22
Santos	24	33
Swallows	28	31
Black Leopards	16	20
Golden Arrows	17	25
Sundowns	18	23
Flyer stars	18	21
Rangers	22	21
Jomo Cosmos	13	17
Dynamos	10	13
Hellenic	12	12
Zulu Royals	21	15

The following is a frequency table of the goals scored by each team:

Class intervals (goals scored)	Tally	Frequency
10 – 15		
16 – 21		
22 – 27		
28 – 33		

6.1   Complete the frequency table.   (4)

6.2   Determine the range of the goals scored.   (2)

6.3   Calculate the mean for the goals scored.   (3)

6.4   What is the median of the goals scored?   (3)

6.5   Determine the mode for the number of goals scored.   (2)

6.6   Consider the information given and describe how Rangers performed at their home games as compared to Kaizer Chiefs.   (2)

[16]

QUESTION 7

7.1   The mortality rate for infants is defined as the number of infants per 1 000 infants that die before they reach the age of five. The 2004 mortality rate for infants in South Africa is 59. This means that for every 1000 children that are born in South Africa, 59 are expected to die before the age of five.

The two tables below show the infant mortality rate for South Africa over the period 1990 – 2010.

YEAR	INFANT MORTALITY RATE	YEAR	INFANT MORTALITY RATE
1990	52	2001	58
1991	51	2002	59
1992	50	2003	59
1993	50	2004	59
1994	50	2005	58
1995	51	2006	58
1996	52	2007	57
1997	53	2008	56
1998	55	2009	56
1999	56	2010	55
2000	58		

7.1.1   Draw a bar graph to illustrate the trends in infant mortality rates in South Africa for the period 1990 to 2000.   (5)

7.1.2   What trends have you noticed in the infant mortality rates in South Africa since 1990?   (2)

7.2   The line graph below shows the infant mortality rate for the United States of America for the period 1990 to 2003.

INFANT MORTALITY RATES
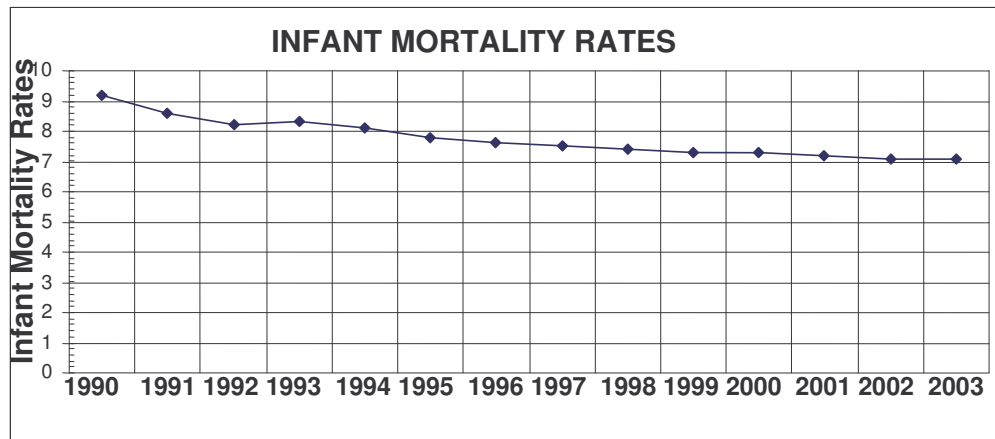
Use the line graph given above, showing the infant mortality rate for the United States of America for the period 1990 to 2003, to answer the following questions:

7.2.1   In which year was the infant mortality rate the HIGHEST for the USA?   (1)

7.2.2   Use the graph to give an approximate value for the LOWEST infant mortality rate for the USA.   (2)

7.2.3   The graph shows that the infant mortality rate for 1990 was 9,2. (This means that an average of 9,2 infant deaths were recorded for every 1 000 babies.)

          If in 1990, 29 395 babies were younger than five years, calculate how many of these children would have died in that year.   (4)

7.2.4   Study the line graph above, what trend do you notice in the infant mortality rate for the USA over the period 1990 to 2003?   (1)

7.2.5   How does the infant mortality rate in South Africa for the period 1990 to 2000 compare with the infant mortality rate in the USA for the same period?   (2)

[17]

TOTAL: 150