education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL
SENIOR CERTIFICATE

GRADE 12

MATHEMATICAL LITERACY P1

FEBRUARY/MARCH 2009

MARKS: 150

TIME: 3 hours

This question paper consists of 13 pages and 2 annexures.

INSTRUCTIONS AND INFORMATION

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

2. QUESTIONS 2.2.4 and 6.3.2 must be answered on the attached ANNEXURES. Write your centre number and examination number in the spaces provided on the ANNEXURES and hand in the annexures 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. An approved non-programmable, non-graphical calculator may be used, unless stated otherwise.

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

1.1 Do the following calculations: (Show ALL calculations in full.)

    1.1.1   Write 47% as a common fraction. (1)

    1.1.2   Write $\dfrac{78}{120}$ as a decimal fraction. (2)

    1.1.3   Simplify: $1,2$ m $+ (23,5$ m $\times 5) - 4,7$ m (2)

    1.1.4   Simplify: $\dfrac{1}{3} \times (3)^3 + \sqrt{64}$ (3)

    1.1.5   Calculate 14% VAT on R24 650,00. (2)

    1.1.6   Convert R1 500 into euros (€). Use the conversion R1 = €0,11. (2)

    1.1.7   Increase R1 250,00 by 24%. (3)

    1.1.8   Calculate the number of 30 g portions of jam that can be obtained from a 450 g tin. (2)

    1.1.9   Determine the cost of 6 bus tickets using the formula:

        Cost of bus ticket = number of bus tickets $\times$ R12,15 (2)

1.2 Jane participated in a sponsored 20 km walk to raise funds for Aids orphans. The organiser encouraged the walkers to have a fifteen minute rest during the walk. The graph showing the distance covered by Jane against the time taken by her, is given below.

TIME TAKEN FOR 20 km WALK
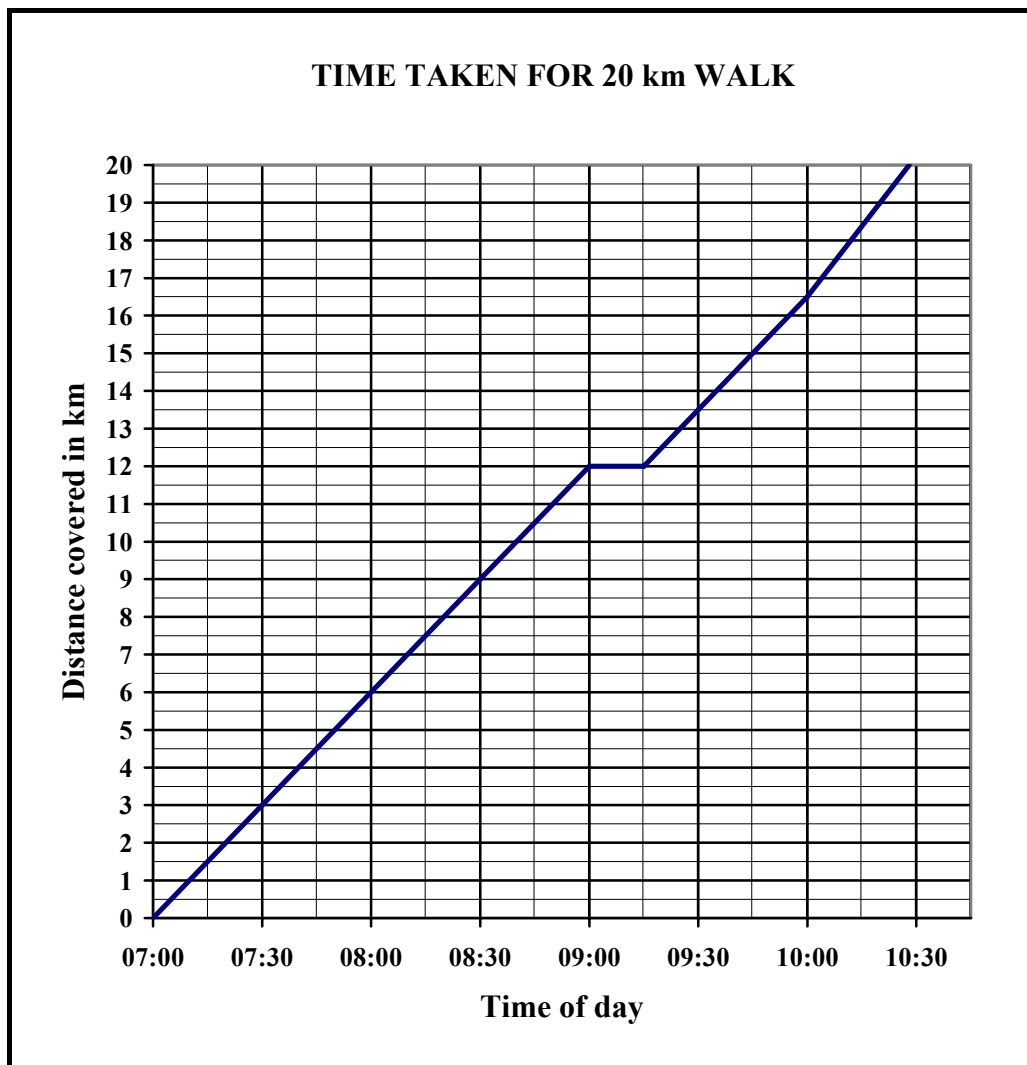
1.2.1   At what time did the walk start?   (1)

1.2.2   How many kilometres did Jane walk during the first hour?   (2)

1.2.3   How far had Jane walked by 10:00?   (2)

1.2.4   How long did Jane take to walk the first 9 km?   (2)

1.2.5   After how many hours of walking did Jane rest?   (2)

1.2.6   Give an estimate of the time at which Jane finished the walk.   (2)
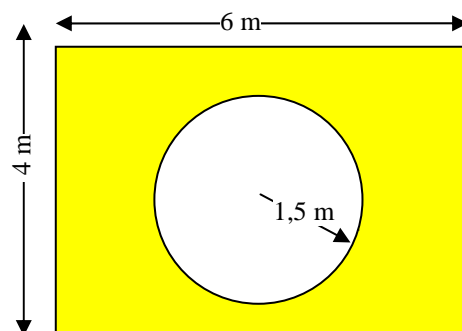
[30]

QUESTION 2

2.1   Mr Morai, the gardener at a school, created a circular flower-bed in a rectangular lawn, as shown in the diagram alongside.

The radius of the flower-bed is 1,5 m.

The length of the rectangular lawn is 6 m and the breadth is 4 m.

(Diagram: rectangular lawn 6 m by 4 m with a circular flower-bed of radius 1,5 m)

Calculate the following:

2.1.1   The area of the flower-bed.
Use the formula: **Area = πr^2**, where $\pi = 3,14$ and **r** = radius   (3)

2.1.2   The perimeter of the rectangular lawn.
Use the formula: **Perimeter = 2 (l + b)**, where **l** = length and **b** = breadth   (2)

2.1.3   The length of the lawn in feet if 1 m = 3,25 feet.   (2)

2.2   Learners were invited to enter a national essay-writing competition. The 70 winners attended a Youth Forum in Johannesburg.

A survey was done to find out how many winners came from each province. The results are given in the table alongside.

TABLE 1: Number of winners from each province

PROVINCE	NUMBER OF WINNERS
Eastern Cape	8
Free State	6
Gauteng	10
KwaZulu-Natal	11
Limpopo	8
Mpumalanga	7
Northern Cape	5
North West	6
Western Cape	9
	70

2.2.1   What percentage of the winners came from Mpumalanga?   (2)

2.2.2   Calculate the ratio of the number of winners from Gauteng to the number of winners from Northern Cape. Give your answer in simplified form.   (2)

2.2.3   Suppose one of the winners is chosen randomly.
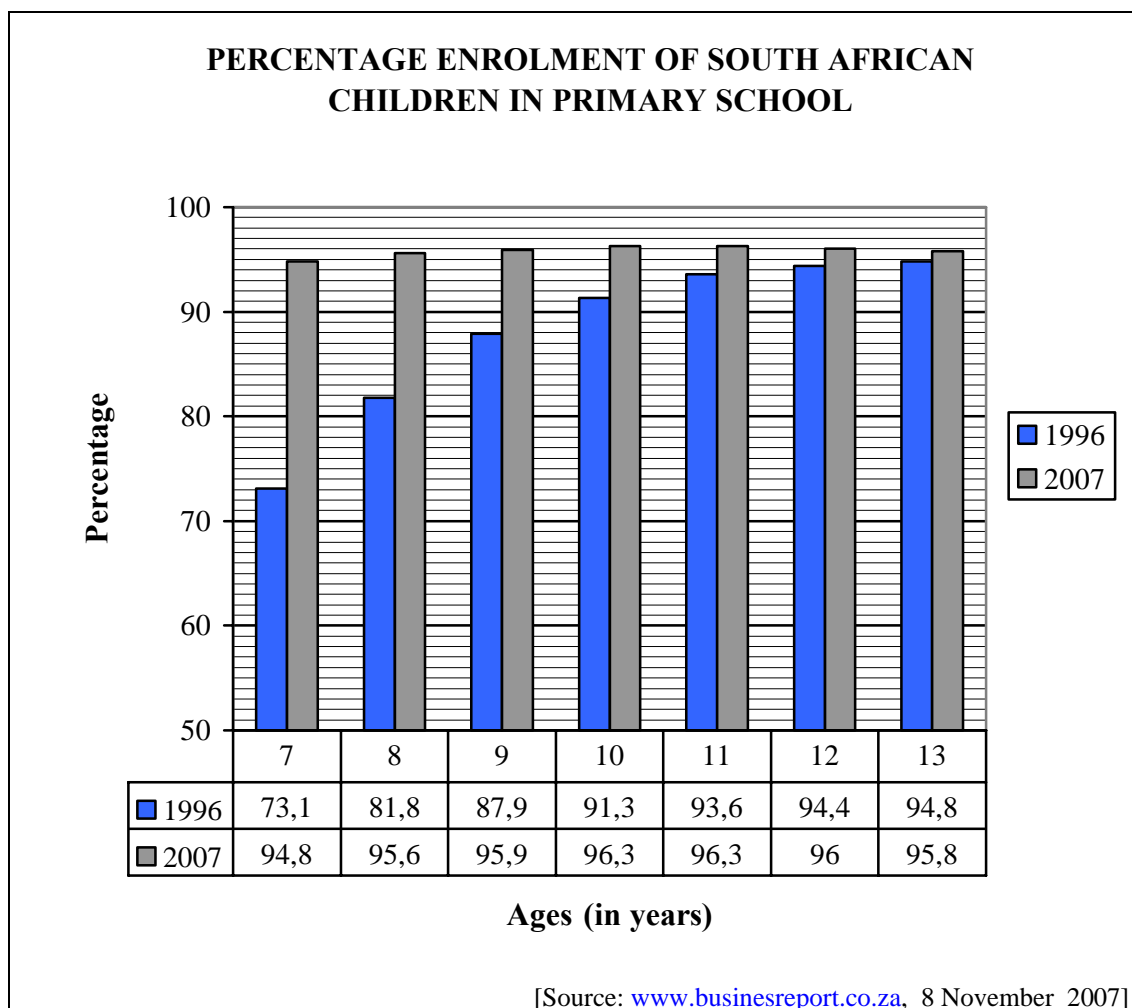
What is the probability that the learner is from:

(a)   The Eastern Cape   (2)

(b)   South Africa   (2)

2.2.4   Draw a vertical bar graph to represent the data in TABLE 1 on the grid provided in ANNEXURE A.   (5)

2.3   The compound bar graph below shows the percentage of South African children from age seven to thirteen, enrolled in primary schools during 1996 and 2007.

PERCENTAGE ENROLMENT OF SOUTH AFRICAN CHILDREN IN PRIMARY SCHOOL

Ages (in years)	7	8	9	10	11	12	13
1996	73,1	81,8	87,9	91,3	93,6	94,4	94,8
2007	94,8	95,6	95,9	96,3	96,3	96	95,8

[Source: www.businesreport.co.za, 8 November 2007]

Use the graph above to answer the following questions.

2.3.1   What percentage of the 10-year-olds was enrolled during 1996?   (1)

2.3.2   Calculate the percentage increase in enrolment of 11-year-olds from 1996 to 2007.   (3)

2.3.3   Which age group had:

(a) The largest percentage enrolment during 1996   (1)

(b) The smallest percentage enrolment during 2007   (1)

(c) The greatest increase in percentage enrolment between 1996 and 2007   (2)

2.3.4   If there were 240 000 10-year-old children in South Africa in 1996, calculate the number of 10-year-old children enrolled in primary school.   (2)
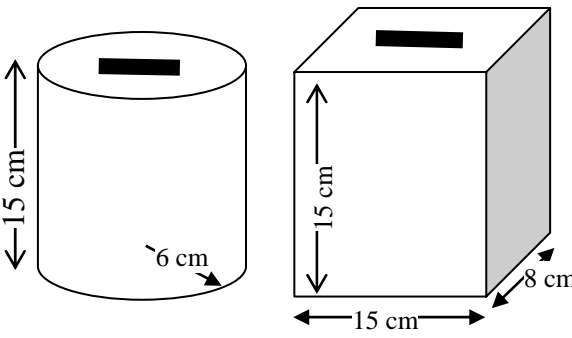
[30]

QUESTION 3

Jabulani is learning the skill of welding. He decides to make a money box out of a rectangular sheet of metal that is 40 cm by 30 cm.

3.1   Calculate the area of the thin sheet of metal.
        Use the formula: **Area of a rectangle = length $\times$ breadth**   (2)

3.2   Jabulani has a choice of a rectangular or cylindrical money box as shown alongside.

        The cylindrical money box has a radius of 6 cm and a height of 15 cm.

        The rectangular money box has a breadth of 8 cm, a length of 15 cm and a height of 15 cm.

        Calculate the following:

        3.2.1   The surface area of the circular money box.
                  Use the formula:
                  Surface area of a cylinder
                  $= (2\pi \times$ radius $\times$ height) $+ (2\pi \times$ (radius)^2)   using $\pi = 3{,}14$ (4)

        3.2.2   The surface area of the rectangular money box.
                  Use the formula:
                  Surface area of a rectangular prism
                  $= (2 \times$ length $\times$ breadth) $+ (2 \times$ length $\times$ height) $+ (2 \times$ breath $\times$ height)   (4)

        3.2.3   The volume of the circular money box.
                  Use the formula:
                  Volume of a cylinder $= \pi \times$ (radius)$^2 \times$ height   using $\pi = 3{,}14$ (3)

3.3   Jabulani decides that it is easier to make the rectangular money box and starts a small business making and selling money boxes. It costs him R25,50 to make ONE money box, including labour and overheads. He intends selling each money box for R30,00.

        3.3.1   Calculate the percentage profit Jabulani will make on each money box.   (4)

        3.3.2   How many money boxes will Jabulani need to sell in order to make a profit of at least R400,00?   (3)

                                                                                                      [20]

QUESTION 4

A train time-table is displayed for travelling from Durban to Bloemfontein and then to Kimberley.

TABLE 2: The train journey from Durban to Kimberley via Bloemfontein

Shosholoza Meyl
A pleasant experience

Durban – Bloemfontein – Kimberley

Frequency: From Durban on Wednesdays

Town	Arrival	Departure	Time in minutes stopped at station
Durban		18:30	
Pietermaritzburg	20:53	21:10	17
Ladysmith	00:33		27
Harrismith	03:23	03:53	30
Bethlehem	05:20	05:40	20
Kroonstad	07:49	08:19	30
Hennenman	08:57	08:59	2
Virginia	09:17	09:19	2
Theunissen	09:50	09:52	2
Brandfort	10:25	10:27	2
Bloemfontein	11:15	11:45	30
Kimberley	14:50		

4.1   On which day of the week does this train from Durban arrive in Kimberley?   (2)

4.2   How long did the total journey take? Write your answer in hours.   (3)

4.3   At what time did the train leave Ladysmith?   (2)

4.4   Calculate the total time taken for stops between Durban and Kimberley. Give the answer in hours and minutes.   (3)

4.5   Not counting stops, the actual travel time for the train journey is 17,6 hours and the distance between Durban and Kimberley is 842 km. Calculate the average speed at which the train is travelling. Use the formula: $\textbf{Speed} = \dfrac{\textbf{distance}}{\textbf{time}}$ (3)

4.6   James travels from Durban to Brandfort on the same train. He needs to board a bus in Brandfort that is leaving the bus station at 11:00. It takes 5 minutes to walk from the train station to the bus station. Determine whether or not James will be in time to board the bus. Show ALL the necessary calculations.   (3)

[16]

QUESTION 5

Mrs Lurie attended a conference in South Africa on the recycling of waste material. She presented a paper at the conference on the recycling of waste material in Australia and used the following table in her presentation:

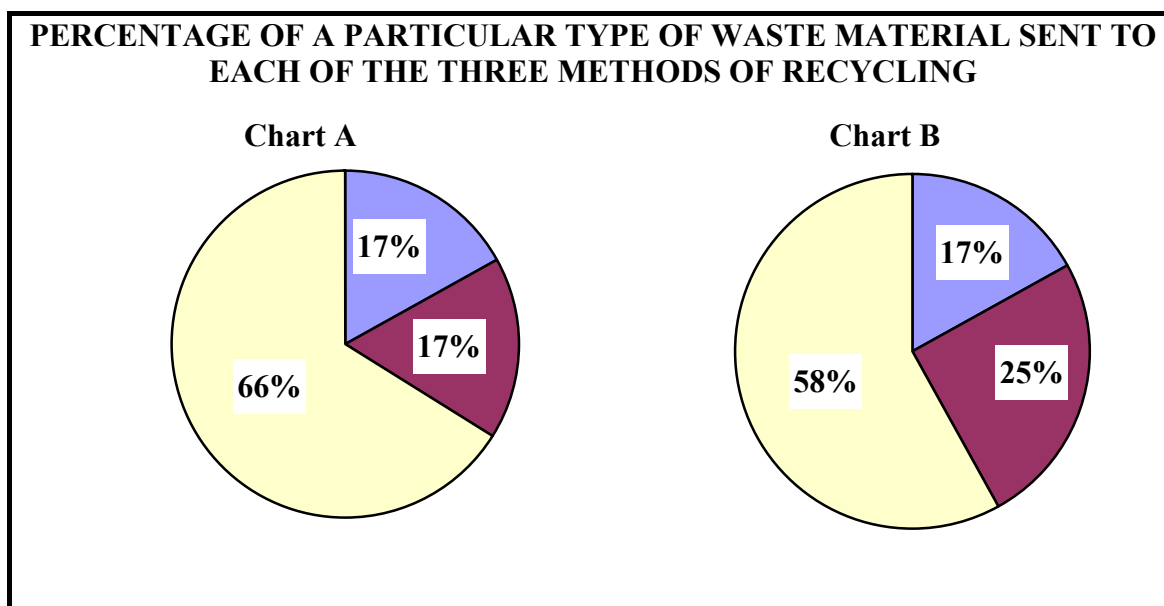**TABLE 3: Recycling of waste material in Australia**

TYPES OF WASTE	NUMBER OF HOUSEHOLDS THAT RECYCLED WASTE MATERIAL	METHODS OF RECYCLING		
		RE-USED AT HOME	SENT TO A CENTRAL COLLECTION POINT *	SENT TO A WASTE TRANSFER CENTRE **
Plastic bottles	592 000	7%	30%	63%
Aluminium cans	548 000	1%	39%	60%
Motor oil	62 000	17%	25%	58%
Paper/Cardboard	564 000	15%	6%	79%
Plastic bags	572 000	88%	9%	3%
Glass	581 000	17%	17%	66%

*   Given to individuals or organisations for re-use
**   Taken back to industry for recycling

[Source: www.abs.gov.au]

5.1   Of the various types of waste, which one was:

       5.1.1   Re-used the least at home   (1)

       5.1.2   Sent to a waste transfer centre the most   (1)

5.2   Mrs Lurie used six pie charts to illustrate the methods of recycling the various types of waste. Two of the pie charts are shown below.

PERCENTAGE OF A PARTICULAR TYPE OF WASTE MATERIAL SENT TO EACH OF THE THREE METHODS OF RECYCLING

Chart A   **Chart B**

Chart A: 17%, 17%, 66%

Chart B: 17%, 25%, 58%

       5.2.1   Which chart illustrates the recycling of glass?   (2)

       5.2.2   Which type of waste material is illustrated by the other chart?   (2)

5.3   640 500 Australian households took part in the original recycling survey.
        What percentage of these households recycled glass? Give your answer correct to
        ONE decimal place.   (4)

5.4   Mrs Lurie emphasised at the conference that the recycling of paper contributes to the
        conservation of trees. Trees are essential to remove carbon dioxide from the
        atmosphere.

        A South African delegate at the conference reported that during 2005, 2 144 000 tons
        of paper were used in South Africa and 935 000 tons of this paper was recycled.

        5.4.1   Write down the ratio of the mass of paper recycled to the total mass of
                  paper consumed in South Africa. Give the ratio in simplified form.   (2)

        5.4.2   Research has shown that paper produced from ONE ton of recycled paper
                  is equivalent to the paper produced from 17 trees.

                  How many trees were saved by the recycling of paper in South Africa
                  during 2005?   (2)

        5.4.3   Research has also shown that, on average, South Africans recycle 43% of
                  the paper used annually.

                  Suppose 2 560 000 tons of paper are used in the year 2010.

                  Predict, by means of calculation, the number of tons of this paper that
                  would be recycled.   (2)

5.5   At the same conference, the principal of Rethabile High School reported on their
        glass recycling project. The learners of the school agreed to bring all empty 1,25 ℓ
        returnable cooldrink bottles to the school.

        The bottling company promised to pay the following for the bottles returned to them:

        •   R3,00 per bottle for the first 200 bottles
        •   R3,50 per bottle for the next 200 bottles
        •   R4,00 per bottle for any number of bottles more than 400

        The school collected 650 bottles.

        Determine how much money the school raised by using the following formula:

        Amount raised in rand
        = (first 200 bottles × R3,00) + (second 200 bottles × R3,50) + (number of bottles more than 400 × R4,00)   (4)

                                                                                                   [20]

QUESTION 6

Lourens and his five friends are planning a five-day holiday. As none of them own a car, they have decided to hire a Toyota Avanza from OOM PIET'S car hire for 5 days. They will have to pay a rental cost plus an additional cost for petrol used.

As part of their rental costs, OOM PIET'S car hire offers 200 km free per day.

Total rental cost for 5 days = R2 000,00 + (number of kilometres over 1 000 km) × R3,00

Lourens worked out the total rental cost for 5 days for various distances travelled. He then drew a graph to illustrate his calculations.

TOTAL RENTAL COST
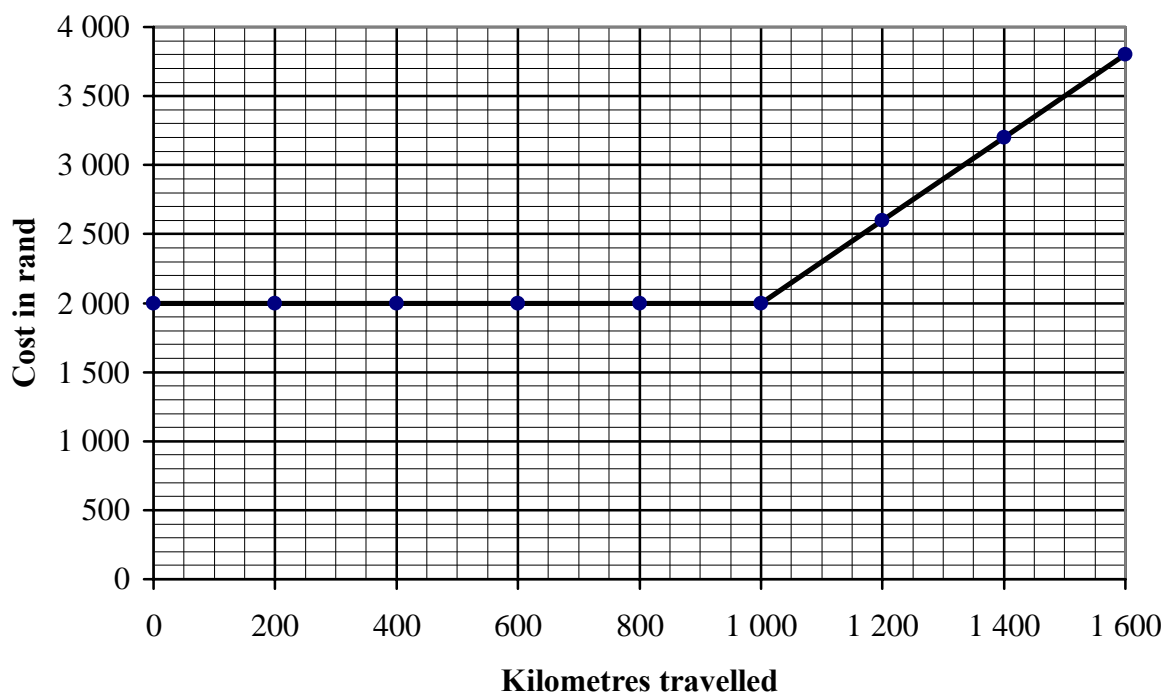
6.1   Use the graph to:

     6.1.1   Write down the total rental cost over the five days if Lourens and his friends travel:

          (a)   950 km   (1)

          (b)   1 300 km   (2)

     6.1.2   Determine the maximum number of kilometres they could travel in five days if they set aside R3 500 to pay for car hire.   (2)

6.2   A Toyota Avanza covers 10 km on 1 litre of petrol. Suppose the friends travelled 1 400 km and petrol costs R10,40 a litre, calculate the petrol bill for the journey, using the following formula:

$$\textbf{Petrol bill} = \frac{\textbf{Number of kilometres travelled}}{\textbf{10}} \times \textbf{cost of 1} \ell \textbf{ of petrol}$$
(3)

6.3   On a particular day Lourens and his friends covered a distance of 360 km. TABLE 4 illustrates the time taken to travel the 360 km at different speeds.

TABLE 4: Time taken to travel 360 km for different speeds

Speed in kilometres per hour	10	20	30	45	B	90	100	120
Time taken in hours	36	18	A	8	6	4	3,6	3

6.3.1   Determine the values of **A** and **B**.
Use the formulae:

$$\textbf{Time} = \frac{\textbf{distance}}{\textbf{speed}} \qquad \text{or} \qquad \textbf{Speed} = \frac{\textbf{distance}}{\textbf{time}}$$
(4)

6.3.2   Use the grid drawn on ANNEXURE B to draw a line graph representing the information in TABLE 4 above.
(5)

6.4   The bill for the car hire came to R4 236,00. The six friends decided to share the bill equally. How much did each one have to pay?
(2)

[19]

QUESTION 7

Sachin and Haroun are both good swimmers and are hoping to qualify for the 100 m freestyle event at the Commonwealth Games. The Commonwealth Games qualifying time for the 100 m freestyle is 49,23 seconds.

A swimmer has to swim faster than the Commonwealth Games qualifying time in order to qualify to swim in the Olympic Games.

Sachin and Haroun have the same coach and swim every morning and every evening. Their coach times their 100 m freestyle regularly, as shown in the table below.

Sachin's times are arranged in ascending order.

TABLE 5: Time (in seconds) taken to swim 100 m freestyle

Sachin	49,21	49,28	50,12	50,48	50,48	51,24	51,48	52,24	52,54
Haroun	49,20	51,24	51,24	50,58	50,26	49,21	50,56	52,56	

7.1   7.1.1   Determine the percentage of the recorded times for the 100 m freestyle that Sachin swam in 49,23 seconds or less. Round off the answer to TWO decimal places.   (3)

          7.1.2   Write down Sachin's **median** time.   (1)

          7.1.3   Determine the **range** of Sachin's times.   (2)

7.2   7.2.1   Arrange Haroun's times in ascending order and write down his **median** time.   (3)

          7.2.2   Determine the **mode** of Haroun's times.   (1)

          7.2.3   Determine the **mean** of Haroun's times, rounded off to TWO decimal places.   (3)

          7.2.4   Use Haroun's times for his eight time trials to determine the probability that his next time trial will be less than 49,23 seconds.
Use the formula:

$$\text{Probability (time less than 49,23 seconds)} = \frac{\text{number of trials less than 49,23 seconds}}{\text{total number of trials}}$$

    (2)

[15]

TOTAL: 150

CENTRE NUMBER:

EXAMINATION NUMBER:

ANNEXURE A
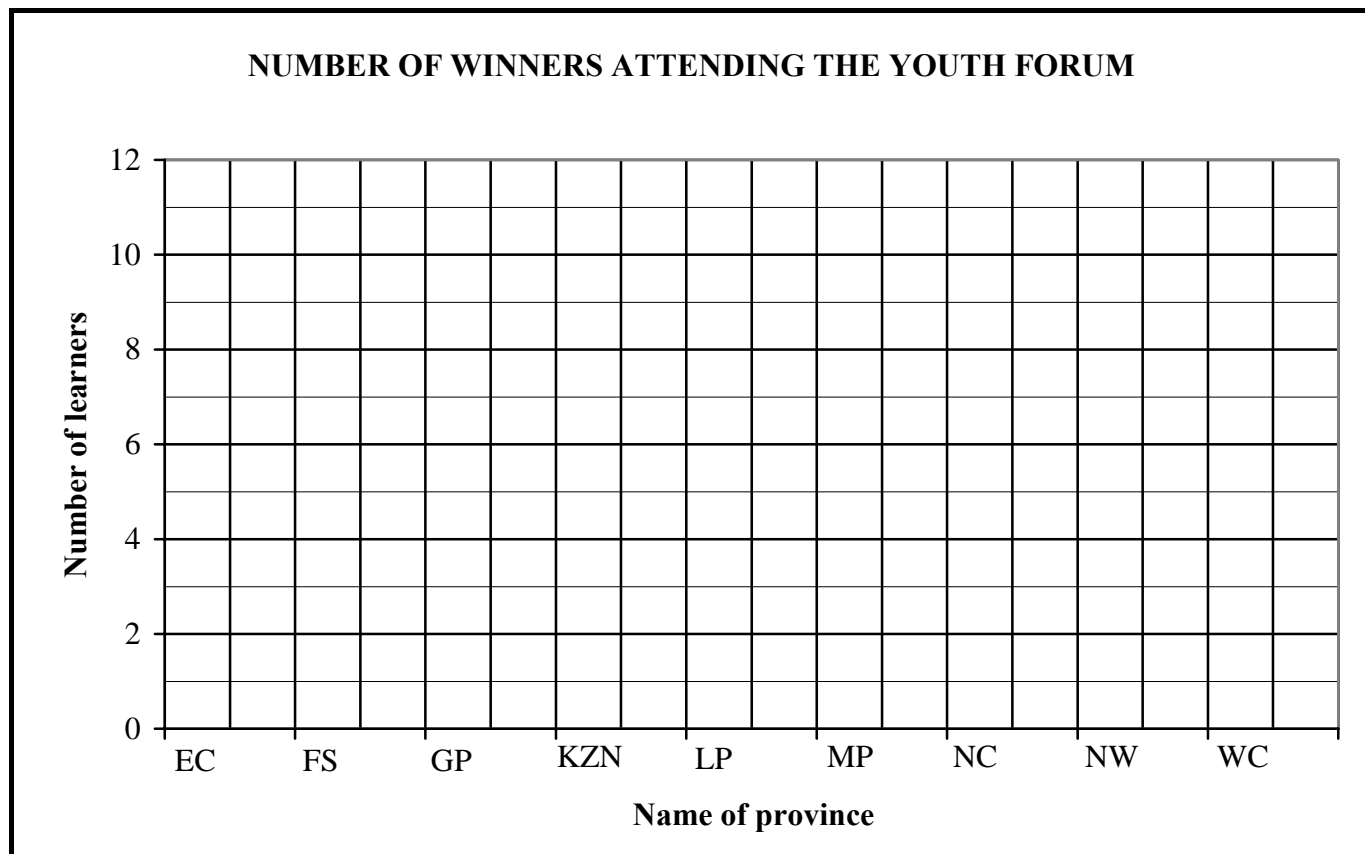
QUESTION 2.2.4

TABLE 1: Number of winners from each province

PROVINCE	NUMBER OF WINNERS
Eastern Cape	8
Free State	6
Gauteng	10
KwaZulu-Natal	11
Limpopo	8
Mpumalanga	7
Northern Cape	5
North West	6
Western Cape	9
	70

NUMBER OF WINNERS ATTENDING THE YOUTH FORUM

Number of learners

Name of province

EC   FS   GP   KZN   LP   MP   NC   NW   WC

CENTRE NUMBER:

EXAMINATION NUMBER:

ANNEXURE B

QUESTION 6.3.2

TABLE 4: Time taken to travel 360 km for different speeds

Speed in kilometres per hour	10	20	30	45	B	90	100	120
Time taken in hours	36	18	A	8	6	4	3,6	3

TIME TAKEN TO TRAVEL 360 km

Time in hours

Speed in kilometres per hour