



NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2009

MATHEMATICAL LITERACY: PAPER I

Time: 3 hours

150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. The question paper consists of 12 pages and an Answer Booklet of 4 pages (Page i – iv). Please check that your paper is complete.
 2. Answer ALL the questions.
 3. Answer Question 4, Question 5 and Question 6.3.6 in the Answer Booklet provided.
 4. Number your answers clearly and exactly as the questions are numbered in the question paper.
 5. You may use an approved non-programmable calculator.
 6. Answers must be rounded off to two decimal digits, unless otherwise stated.
 7. It is in your own interest to **show all** working details, to write legibly and to present your work neatly.
 8. Not all diagrams are drawn to scale.
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QUESTION 1

1.1 Write the answers to the following in simplest form showing all necessary steps:

1.1.1 $\frac{1}{3} - \frac{1}{4} \times \frac{1}{3}$ (2)

1.1.2 $7 + 3(9 - 2)$ (2)

1.2 Find the value of x if:

$480 : 200 = 36 : x$. (2)

1.3 The distance to the Sun from the Earth is approximately 146 000 000 km. Write this distance in scientific notation. (2)

1.4 Calculate the following:

1.4.1 28% of R2 859,50 (2)

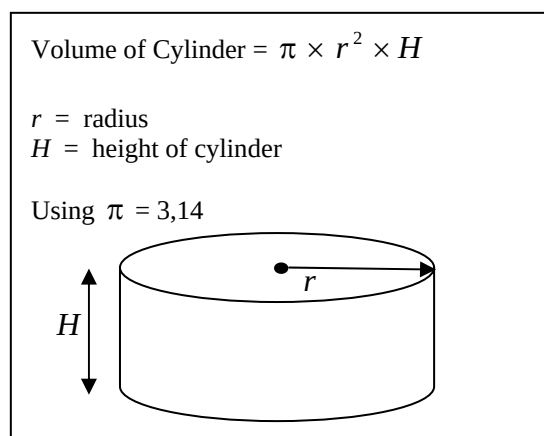
1.4.2 If 1 kg = 2,2046 pounds, convert a 45 kg weight into pounds. Round your answer to the nearest pound. (2)

1.4.3 If N = the number of guests
 C = total cost, in rands, of running a matric dance

Determine the total cost of the matric dance if 300 guests attended, using the following formula:

$$C = 1\,000 + \frac{9}{2}N$$
 (2)

1.5 A circular pool above the ground has a diameter of 5,5 m and a height of 1,2 m.



Calculate the volume (in m^3) of the pool.
 Give your answer rounded off to one decimal place. (3)

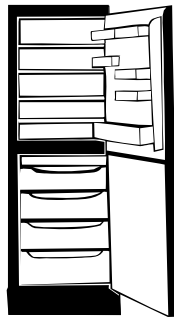
- 1.6 A fudge making company usually buys 75 kg of sugar for every 50 kg of butter they buy. Due to the current demand for fudge they need to buy 125 kg of sugar.

How much butter will they need to order, if the ratio of sugar to butter remains the same? Round off your final answer to the nearest kilogram. (3)

- 1.7 A computer normally sells for R6 800. Instead it is being sold for four-fifths of the normal selling price. Calculate the new selling price. (2)

- 1.8 It takes approximately 5 minutes for a water heater to boil 2,5 litres of water. How long would it take the same heater to boil 50 litres of water? Give your answer in hours and minutes. (3)

- 1.9 A fridge is advertised at R4 999 for cash. Alternatively, a customer may use hire-purchase and pay a deposit of 10% and then repay the balance with monthly instalments of R289 for 3 years.



Calculate:

- 1.9.1 The amount of the deposit required. (2)

- 1.9.2 The total amount you would repay over the 3 year period. (2)

- 1.9.3 The total amount paid for the fridge on hire purchase. (2)

31 marks

QUESTION 2

2.1 The cost of maintaining a car for 12 months is shown in the table below:



Car Licence	R255,15
Tyres (4 needed)	R695,00 per tyre
Tune-up	R495,50
Insurance	R246,80 per month
Wheel Alignment	R198,50
Grease and oil change	R364,00

Calculate the following, showing all necessary steps:

2.1.1 The total paid for insurance annually. (2)

2.1.2 The cost to replace all four tyres of the car. (2)

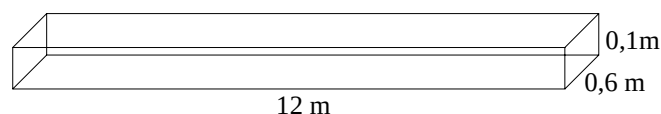
2.1.3 The total amount to maintain the car for 12 months. (3)

2.1.4 Calculate the average cost per kilometre, if during the 12 months the car was driven 10 265 kilometres. Give your answer to the nearest cent. (3)

2.2 A bag of ready-mix cement makes $0,027 \text{ m}^3$ of concrete.
The cost per bag of ready-mix cement is R169,99.

$$\text{Volume} = \text{Length} \times \text{Breadth} \times \text{Height}$$

A rectangular concrete pathway, 12 metres long, 0,6 metres wide and 0,1 metres deep needs to be laid, as shown in the diagram below.



2.2.1 Calculate the volume of cement (in m^3) required for the pathway. (2)

2.2.2 How many bags of ready-mix cement will be required for the pathway? (2)

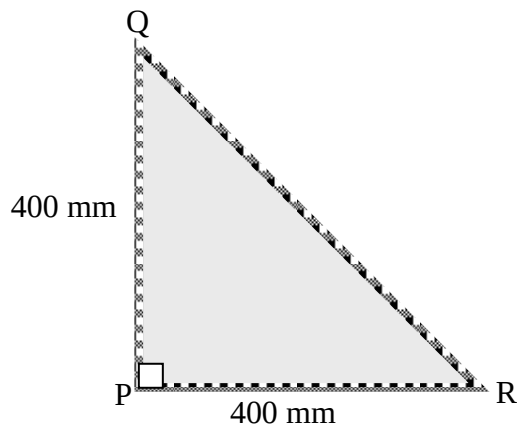
2.2.3 Calculate the total cost of the ready mix cement required for the pathway. (2)

2.2.4 A 5% discount is given for cash on delivery. A local supplier delivers the bags of ready mix cement. Using your answer obtained in Question 2.2.3, calculate the discount amount that will be received. (2)

18 marks

QUESTION 3

A worker is employed to make triangular placemats, as shown by the right-angled triangle PQR in the diagram below.

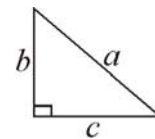


$$\text{Area of triangle } A = \frac{1}{2} \times b \times h$$

b = base

h = height

$$1 \text{ m} = 1\,000 \text{ mm}$$



$$a^2 = b^2 + c^2$$

- 3.1 Calculate the area in square metres, of one placemat. (3)
- 3.2 Calculate the length in metres, of diagonal QR of the placemat. (3)
- 3.3 The worker would like to put fancy edging on the placemats. Calculate the total length of edging in metres, that would be required per placemat. (3)

The average placemat takes 3 minutes for cutting the material, 2 minutes 45 seconds for sewing the edging and 3 minutes 15 seconds for the final finishing.

- 3.4 How long does it take to produce one placemat? (3)
- 3.5 Calculate the fraction of the total time that is spent on cutting. (2)
- 3.6 Calculate the number of complete placemats that can be produced per hour. (3)
- 3.7 For each placemat produced a worker is paid R4,20. Calculate the amount, in rands, a worker will earn in one hour. (2)
- 3.8 A tourist from America would like to import the placemats to America. A set of placemats costs R129,95. If the exchange rate is \$1 = R8,13, calculate the cost in US dollars, of a set of placemats. (2)

21 marks

QUESTION 4

Use the table in the Answer Booklet provided to answer all parts of this question.

When someone is buying a house, banks will only grant a bond with monthly repayments to a maximum of 30% of that person's monthly salary.



- 4.1 A house valued at R1 200 000 will cost Mr Dlamini R14 502 per month in monthly bond repayments. What minimum amount must Mr Dlamini earn monthly to qualify to be granted a bond?

(4)

Before purchasing the house, Mr Dlamini will need to consider a number of hidden costs involved with the purchase. Answer the questions that follow which relate to these hidden costs.

4.2 **Transfer duty**

This is the amount payable for transferring the property into your name.

Transfer duty is a percentage of the purchase price which is payable as follows:

Up to R500 000	No transfer duty
From R500 000,01 to R850 000	Transfer duty is calculated at 5% on the value of the house above R500 000
From R850 000,01	R25 000 + 8% of the value above R1 million

Calculate the transfer duty, according to the value of Mr Dlamini's house.

(4)

4.3 **Security assessment**

The bank charges a levy for conducting an assessment of the property you wish to purchase. This fee is R1 315 and VAT (Value Added Tax) of 14% is added to this amount.

Calculate the security assessment fee, according to the value of Mr Dlamini's house.

(2)

4.4 **Home loan initiation fee**

This is a once off fee levied by all banks for initiating the new home loan account. The amount of R1 250, inclusive of VAT (Value Added Tax) is charged for every new home loan, where the loan amount is greater than R500 000.

Determine the home loan initiation fee for Mr Dlamini's house.

(1)

4.5 Deeds office registration fee

The deeds office charges a fee for the registration of the title deeds and mortgage bonds according to **the value of the house**.

Value of property	Amount per registration
Up to R80 000	R55
R80 001 – R150 000	R200
R150 001 – R300 000	R260
R300 001 – R500 000	R340
R500 001 – R1 000 000	R400
Over R1 000 000	R500

Calculate the deeds office registration fee, according to the value of the house. (1)

4.6 Calculate the final amount due for the **hidden costs of the house. (3)**

Hidden Costs = Transfer fee + Security Assessment fee + Home loan initiation fee + Deeds office fee

15 marks

QUESTION 5

Mr Sithole purchased a car for R100 000. He will only be able to replace his car after 5 years.

The value of the car depreciates at a rate of 25% per year for the next 5 years.

- 5.1 Complete the table, **in your Answer Booklet**, for the depreciation of Mr Sithole's car for the next 5 years using the following formula: (8)

$$A = P \left(1 - \frac{r}{100} \right)^n$$

A = Depreciated value of car

P = Initial value of car

r = Interest rate

n = Time period

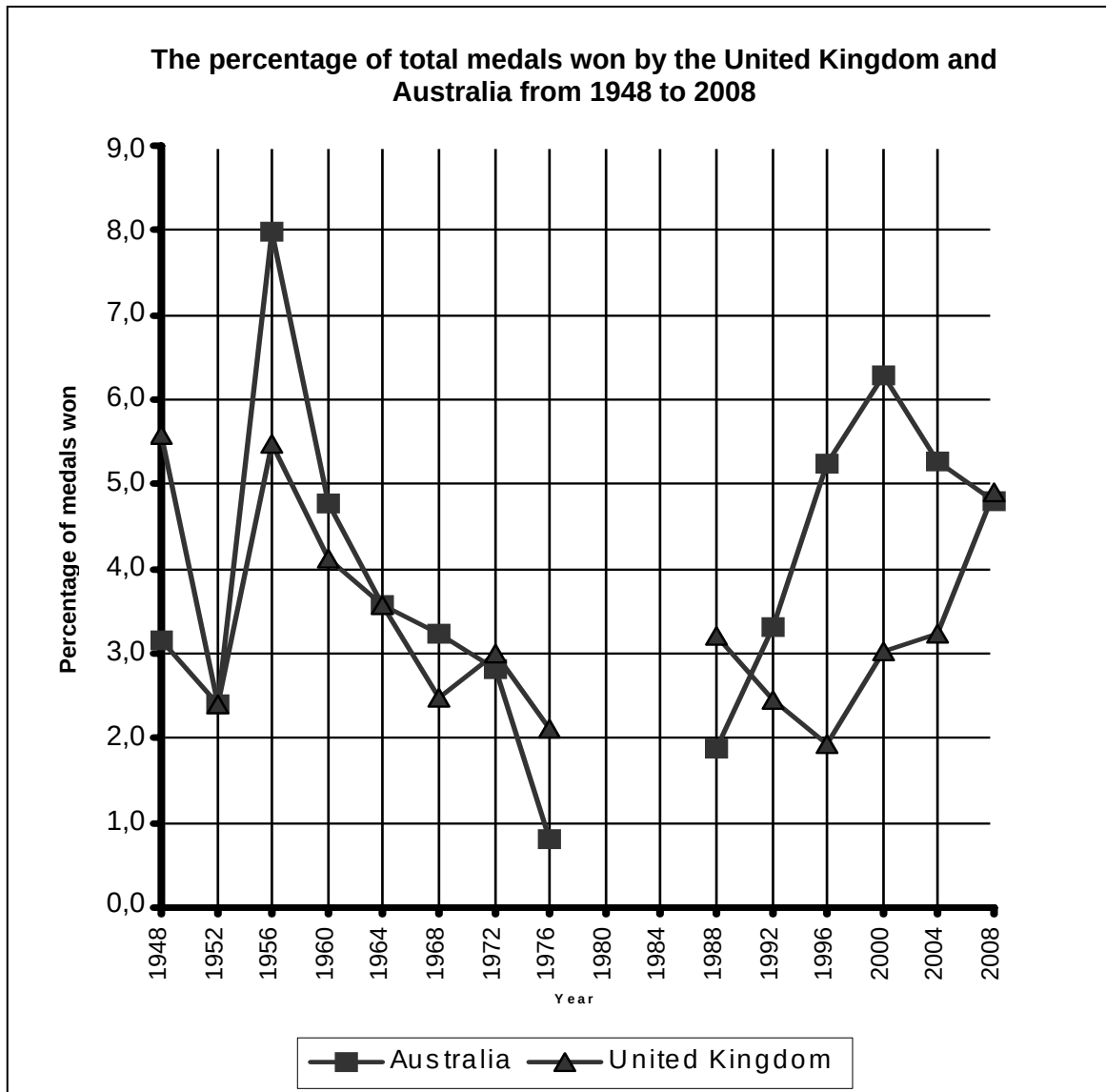
The depreciated value after 3 years has already been calculated in the table and shown.

- 5.2 Refer to the completed table in Question 5.1. Draw a line graph on the set of axes provided **in your Answer Booklet**, to show the depreciation of Mr Sithole's car over the 5 years. (8)
- 5.3 Using the letter **A**, show on your graph what Mr Sithole's car will be worth after 2,5 years. (1)

17 marks

QUESTION 6

The graph below indicates the percentage of medals won at the Olympic Games from 1948 to 2008 for Australia and the United Kingdom. The results for 1980 and 1984 have been removed due to boycotts by major participating countries.



- 6.1 In which years did the United Kingdom and Australia record their best results? (2)
- 6.2 According to the graph, for how many Olympic Games did Australia win more medals than the United Kingdom? (2)

- 6.3 The following data in the table shows the percentage of the gold medals won by countries hosting the Olympic Games compared to when they attended the Olympic Games in another country.

COUNTRY	% GOLD medals	
	HOSTING	NOT HOSTING
Australia (AUS)	31	30
United Kingdom (UK)	13	30
Italy (ITL)	36	34
Japan (JPN)	55	32
Canada (CAN)	0	25
United States of America (USA)	44	23
China (CHN)	51	33

[Source: <<http://plus.maths.org>>]

Use the table above to answer the following questions:

- 6.3.1 How many countries, when hosting the Olympic Games, won more gold medals compared to when attending an Olympic Games in another country? (2)
- 6.3.2 How many countries that attended the Olympic Games in other countries have a higher percentage of gold medals as part of their overall total of gold medals compared to when hosting the Olympic Games? (2)
- 6.3.3 Calculate the average percentage of gold medals won by the countries that hosted the Olympic Games. (2)
- 6.3.4 Calculate the average percentage of gold medals won by the countries that attended the Olympic Games in other countries. (2)
- 6.3.5 By what average percentage does the number of medals won increase or decrease between hosting an Olympic Games or attending an Olympic Games? (3)
- 6.3.6 Draw a compound bar graph **in your Answer Booklet** to represent the information of the percentage of medals won by each country when hosting and not hosting the Olympic Games. (9)

24 marks

QUESTION 7

The table below shows how many learners and educators there were during 2008 in State and Independent schools for each province in South Africa.



Province	State Schools		Independent Schools	
	Learners	Educators	Learners	Educators
Eastern Cape	2 037 777	64 371	42 217	2 165
Free State	656 074	22 696	14 514	687
Gauteng	1 716 196	53 017	177 831	11 290
KwaZulu-Natal	2 725 855	83 760	45 565	3 223
Limpopo	1 735 806	55 647	28 863	1 436
Mpumalanga	1 034 719	32 784	16 812	860
North West	765 762	25 736	13 498	884
Northern Cape	263 086	8 835	2 780	184
Western Cape	937 887	31 214	24 121	2 164

[Adapted: <<http://www.education.gov.za>>]

Use the table to answer the following questions. All relevant calculations must be shown:

Determine:

- 7.1 The province with the highest number of learners in State schools. (1)
- 7.2 The mean number of learners in Independent schools. (3)
- 7.3 The range of the number of educators in Independent schools. (2)
- 7.4 The median number of learners in State schools. (2)
- 7.5 The percentage of the provinces in State schools that have less than 1,1 million learners in the classroom. (3)

11 marks

QUESTION 8

Gugu and her best friend Zama entered a TV game show. They were asked by the director to randomly select a ball out of a black holder containing 3 yellow balls, 4 red balls and 2 orange balls. The balls they selected determined which team they played for. After each selection, the ball was returned to the holder.



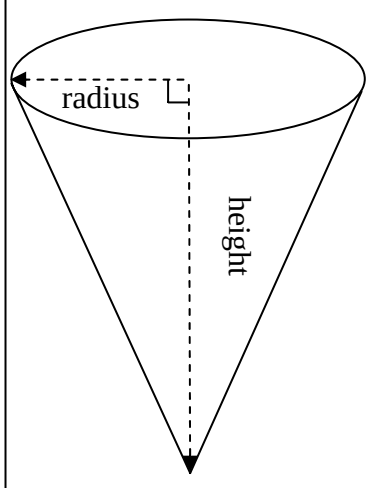
8.1 Calculate the probability of randomly selecting:

8.1.1 a yellow ball. (2)

8.1.2 a red ball. (2)

8.2 After the show, Gugu and Zama discussed the shape of the bag. They realised the holder was conical in shape and decided to investigate the shape further.

Information about the cone and the sphere is shown below:

Volume of a cone = $\frac{1}{3} \times \pi \times r^2 \times h$ r = radius of the base h = height of the cone using π as 3,14 Volume of a sphere (solid shape of a ball) $= \frac{4}{3} \times \pi \times r^3$ r = radius of the sphere 	
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8.2.1 If the conical holder has a height of 40 cm and the radius of the base is 20 cm, calculate the volume of the holder, giving your answer to the nearest whole number. (3)

8.2.2 If the coloured balls each had a radius of 5 cm, calculate the volume of a ball, giving your answer to the nearest whole number. (3)

8.2.3 Determine the amount of space left in the conical plastic holder if all the balls were placed inside the holder. (3)

13 marks

Total: 150 marks