**NATIONAL SENIOR CERTIFICATE**

**GRADE 12: MATHEMATICS LITERACY P1**

**FEBRUARY/MARCH 2011**

**MARKS: 150**
**TIME: 3 hours**

This question paper consists of 12 pages and 3 annexures.

**INSTRUCTIONS AND INFORMATION**

1. This question paper consists of SIX questions. Answer ALL the questions.
2. QUESTION 3.2 and QUESTION 6.2.2 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. You may use an approved calculator (non-programmable and non-graphical), unless stated otherwise.
6. Show ALL the calculations clearly.
7. Round off ALL the final answers 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 Write 148% as a common fraction in simplified form(2)

1.1.2 Convert 1,256 cm to millimetres. (1)

1.1.3 Simplify: $1\frac{1}{2}(1{,}26 + 32{,}62) - \sqrt{2{,}25}$ (3)

1.1.4 Convert 150 minutes to hours. (2)

1.1.5 Determine the price per banana, if the price per dozen bananas isR12,99. (2)

1.1.6 Convert 1 220 South African rands (ZAR) to Mexican pesos (MXN) if 1 ZAR = 1,6915 MXN. (2)

1.1.7 The growth of a tree is dependent on its age. Calculate the growth of a tree in its $10^{th}$ year.

Use the formula:

**Annual growth (in cm) =** $\frac{50}{t}$, where ***t*** is the age in years of the tree. (2)

1.2 Ma Khumalo has 12 grandchildren whose ages are as follows:

1 2 3 3 4 10 11 11 11 12 15 16

1.2.1 Seven of her grandchildren are boys. How many more grandsons does she have than granddaughters? (2)

1.2.2 Write down the modal age. (1)

1.2.3 Determine the mean (average) age. (3)

1.2.4 What is the probability that a grandchild selected at random is ten years old? (2)

1.3 Maria's Restaurant makes a cocoa drink by adding boiling water to a mixture of cocoa powder, sugar and milk powder.

Maria mixes the cocoa powder, sugar and milk powder together in the ratio **1 : 2 : 3** to produce the cocoa drink.

1.3.1 Suppose Maria makes the mixture using 10 spoons of cocoa powder.
How many spoons of sugar would she need? (2)

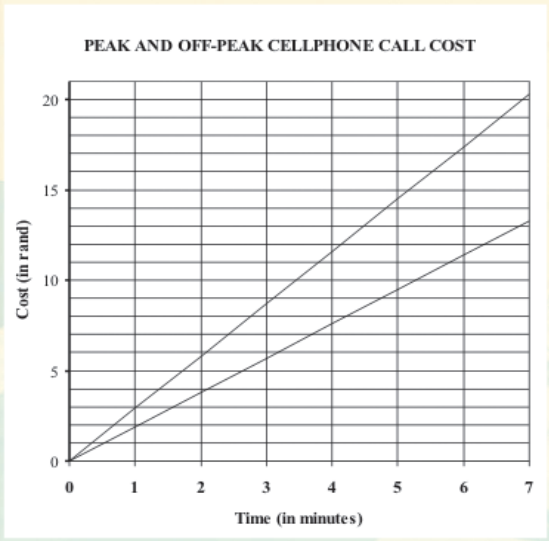
1.3.2 Maria made 900 g of the mixture. Determine the mass, in grams, of milk powder in the mixture. (3)

1.4 The **peak time cost** of a cellphone call is R2,90 per minute.

The **off-peak time cost** of a cellphone call is R1,90 per minute.

**Peak time:** From 07:00 to 20:00 weekdays

**Off-peak time:** From 20:00 to 07:00 weekdays and all day
Saturdays, Sundays and on public holidays




1.4.1 Calculate the cost of a cellphone call of five minutes made at 13:24 on a Monday. (2)

1.4.2 Calculate the cost of a cellphone call of five minutes made on a Saturday. (2)

1.4.3 You only have R9,00 worth of airtime. Write down the maximum number of minutes that you can talk for on a Tuesday at 09:00. (2)

**[33]**

**QUESTION 2**

2.1 Contract workers are employed for a fixed period of time. The following advertisement for contract positions (jobs) appeared in the newspaper, *The Star*, on 7 April 2010:

**TABLE 1: Contract positions available**

| POSITION | DURATION OF CONTRACT | STARTING DATE | MONTHLY SALARY |
|---|---|---|---|
| Accounts manager | 4 months | Immediately | R25 000 |
| Hotel coordinator | 4 months | Immediately | R20 000 |
| Administration coordinator | 3 months | 1 May 2010 | R15 000 |
| Data manager | 4 months | Immediately | R22 000 |

[Source: *The Star Workplace*, 7 April 2010]

2.1.1 Arrange the contract positions in order according to the corresponding ascending order of the monthly salaries. (2)

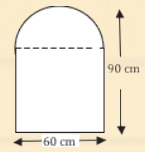
2.1.2 Calculate the total income that the data manager will receive for the duration of the contract. (2)

2.1.3 What is the termination date for the position of administration coordinator? (2)

2.1.4 Write down, in simplified form, the ratio of the monthly salaries of the accounts manager to that of the administration coordinator. (3)

2.2 A bedroom mirror, consisting of a square-base section and a semicircular section on top, is shown in the sketch alongside.

The total height of the mirror is 90 cm and the width is 60 cm.




2.2.1 Write down the length of the radius of the semicircular section. (1)

2.2.2 Calculate the area of the mirror.

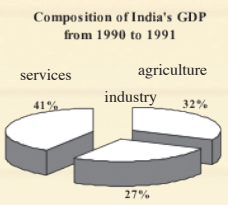
Use the formula:

**Area of the mirror**
**= area of semicircle + area of square**

**=** $\frac{1}{2}$ **x** $\pi$ **x** $\left(\frac{\text{diameter}}{2}\right)^2$ **+ (side)**$^2$, using $\pi = 3{,}14$ (5)

2.3 India has experienced an impressive economic growth over the past decade. The country's economy has grown from US$250 billion during the period 1990 to 1991 to US$1 000 000 billion during the period 2009 to 2010.

The two pie charts below show how the contribution to the GDP from the various economic sectors has changed during the period 1990 to 2010.



**NOTE:**
- We measure the economic growth of a country by looking at the gross domestic product (GDP) of the country.
- The GDP is the total value of goods and services produced in a country in one year.
- The GDP represents the monetary value of all goods and services produced within a country's geographical borders over a specified period of time.

2.3.1 Convert US$250 billion into millions, if 1 billion = 1 000 million. (2)

2.3.2 During the period 1990 to 1991, what percentage of India's GDP did not come from services? (2)

2.3.3 Calculate the percentage of India's GDP that came from services during the period 2009 to 2010. (2)

2.3.4 During the period 1990 to 1991 India's GDP was US$250 billion.
How much of this (in billions of US$) came from industry? (3)

2.3.5 Calculate the difference in percentage of the GDP that came from agriculture during the periods 1990 to 1991 and 2009 to 2010. (2)

2.3.6 During the period 2009 to 2010, the GDP was US$1 000 000 billion.

Determine the amount (in billions of US$) that came from agriculture during this period. (3)

**[29]**

**QUESTION 3**

Mr Siyo, who lives in Bloemfontein, wants to hire a car for a day to travel to Kimberley and back again. The distance from Bloemfontein to Kimberley is 180 km. He contacts a car-hire company and is given two options: **Option X** and **Option Y**.

**Option X:** The company charges a set fee of R450 per day plus 50 cents (R0,50) for every kilometre travelled.

**TABLE 2: Cost of hiring a car using Option X**

| **Distance (km)** | 0 | 100 | 160 | 220 | 300 | 360 | 400 |
|---|---|---|---|---|---|---|---|
| **Cost (R)** | 450 | 500 | **A** | 560 | 600 | 630 | 650 |

**Option Y:** The company charges a set fee of R200 per day for the first 100 km or part thereof. They charge R2 per kilometre for every additional kilometre travelled after the first 100 km.

**TABLE 3: Cost of hiring a car using Option Y**

| **Distance (km)** | 0 | 100 | 160 | 220 | 300 | 360 | 400 |
|---|---|---|---|---|---|---|---|
| **Cost (R)** | 200 | 200 | 240 | 400 | **B** | 600 | 800 |

3.1 Calculate the following missing values:

3.1.1 **A** (2)

3.1.2 **B** (3)

3.2 Use the grid provided on ANNEXURE A, showing the cost of hiring a car, and draw line graphs representing Option X and Option Y. Clearly label the two graphs. (9)

3.3 Use the tables or the graphs to answer the following questions:

3.3.1 After how many kilometres will the cost for Option X and for Option Y be the same? (2)

3.3.2 Write down the break-evencost. (1)

3.4 Mr Siyo travelled the distance between Bloemfontein and Kimberley at an average speed of 100 km/h. How long (in hours and minutes) did his journey take?

Use the formula: $\textbf{Time} = \frac{\textbf{distance}}{\textbf{average speed}}$ (3)

3.5 Petrol costs R8,07 per litre. Mr Siyo paid R258,24 for the petrol he had used. How many litres of petrol did he use? (3)

**[23]**

## QUESTION 4

4.1 Mr Plaatjies wants to build on an L-shaped patio (verandah/stoep) at the front of his house. The patio will be fenced and tiled. The dimensions of the patio are indicated in the diagram below.

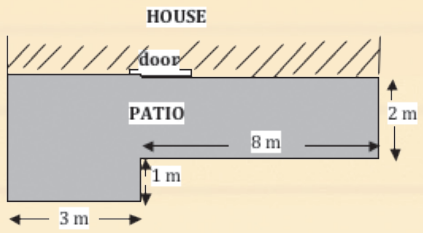



**Diagram of Mr Plaatjies' patio**

4.1.1 Calculate the total length of the fencing required for thepatio. (3)

4.1.2 Determine the area of the patio.

Use the formula: **Area of rectangle = length x breadth** (4)

4.2 The table below shows the relationship between the number of workers Mr Plaatjies employs and the time taken to build the patio.

**TABLE 4: Relationship between the number of workers and hours taken to build the patio**

| **Number of workers** | 1 | 2 | 3 | **B** | 5 |
|---|---|---|---|---|---|
| **Hours taken** | 60 | **A** | 20 | 15 | 12 |

4.2.1 Determine the following missing values:

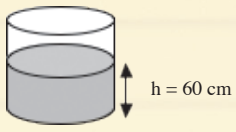
(a) **A** (2)

(b) **B** (2)

4.2.2 State the type of proportion represented by the relationship between the number of workers employed and the time taken to build the patio. (1)

4.3 Mr Plaatjies wants to use cylindrical flowerpots to decorate the patio.

The radius of the flowerpot is 20 cm.



4.3.1 Calculate the volume of the soil in the flowerpot if the flowerpot is filled with soil to a height of 60 cm.
Use the formula:
**Volume of a cylinder = $\pi$ x (radius)$^2$ height,** using $\pi$ = 3,14 (3)

4.3.2 The height of the flowerpot is 80 cm. Calculate the lateral surface area of the flowerpot.
Use the formula:
**Lateral surface area of a cylinder = 2 x $\pi$ x radius height,** using $\pi$ = 3,14(2)

4.4 Each flowerpot costs R45,50 and each bag of soil costs R19,99.
Calculate how much Mr Plaatjies will pay in total for SIX flowerpots and FOUR bags of soil. (4)

**[21]**

## QUESTION 5

Thembeka works at a call centre in Greytown in KwaZulu-Natal. She would like to relocate to Johannesburg in Gauteng.

5.1 The table below shows the number of people that relocated (moved) between five provinces in South Africa between January 2006 and December 2009.

**TABLE 5: The number of people that relocated (moved) between five provinces between January 2006 and December 2009 in South Africa**

| | | **Province people now stay in (in 2009)** | | | | |
|---|---|---|---|---|---|---|
| | | **EC** | **FS** | **GP** | **KZN** | **LIMP** |
| **Province people lived in (in 2006)** | **Eastern Cape (EC)** | | 14 700 | 93 400 | 84 200 | 10 200 |
| | **Free State (FS)** | 7 600 | | 57 500 | 5 900 | 9 700 |
| | **Gauteng (GP)** | 31 500 | 31 000 | | 56 400 | 33 300 |
| | **KwaZulu- Natal (KZN)** | 18 600 | 8 500 | 117 100 | | 6 300 |
| | **Limpopo (LIMP)** | 3 700 | 5 600 | 21 000 | 5 900 | |

[Midyear population estimates 2009: Statistics South Africa]

5.1.1 How many people relocated from Limpopo to Gauteng? (2)

5.1.2 Calculate the total number of people who relocated to Gauteng from the other four provinces. (3)

5.1.3 To which TWO provinces do most people from the Eastern Cape relocate? (2)

5.1.4 Calculate the difference between the number of people who relocated from KwaZulu-Natal to Gauteng and the number of people who relocated from Gauteng to KwaZulu-Natal. (4)

5.2 Thembeka compared the monthly salaries of the employees at two call centres, one in Greytown and the other in Johannesburg.

The following are the monthly salaries, in rand, earned by call-centre agents:

**Greytown:**
4 200 4 320 4 500 4 650 4 650 4 650 5 500 5 650 7 250

**Johannesburg:**
5 500 5 525 5 980 6 250 6 250 6 250 6 300 7 800 8 200 8 900

5.2.1 Determine the range of the monthly salaries earned at the Greytown agency. (2)

5.2.2 Write down the median monthly salary earned at the Greytown agency. (2)

5.2.3 Calculate the average (mean) monthly salary earned at the Johannesburg agency. (3)

5.2.4 Calculate the percentage of the monthly salaries earned in Johannesburg that are higher than the maximum monthly salary earned in Greytown. (3)

5.3 Thembeka invested R6 350 in a savings account so that she would have enough money to pay for her move to Johannesburg. The amount was invested at an interest rate of 5,8% per annum compounded annually.

Calculate the final amount that Thembeka will receive after two years.

Use the formula: $\mathbf{A = P(1 + i)^n}$ where **A** = final amount
**P** = amount invested
***i*** = interest rate
***n*** = investment period (4)

**[25]**

## QUESTION 6

Luke van Wyk is originally from Mafikeng. He is now a student at the Central University of Technology, Free State, in Bloemfontein and lives at the university residence.

6.1 Luke uses a map to help him travel around the city.

A map of Bloemfontein is printed on ANNEXURE B. Use the map to answer the following questions:

6.1.1 Write down the grid reference for the National Museum. (1)

6.1.2 Nelson Mandela Drive is a one-way street (traffic flows in one direction only). Write down the names of TWO other one-way streets where the traffic flows in the same direction as the traffic in Nelson Mandela Drive. (2)

6.1.3 The entrance to Luke's university residence is in St George Street.

Use ANNEXURE B and describe the shortest route that Luke will travel by car to the Ramblers Club, the entrance of which is in Zastron Street. (4)

6.1.4 Luke went for a walk. When measured on the map, the distance he walked measures 7 cm. Calculate the actual distance (in km) he walked if the scale of the map is 1 : 20 000. (3)

6.2 Luke was the scorekeeper at an intervarsity rugby match on campus. In rugby, points are scored for tries, conversions, penalties and drop goals.

6.2.1 At one of the matches, Central University of Technology's team scored three tries, no conversions, four penalties and one drop goal. Calculate their final score.

Use the formula:

**Final score**
**= (tries scored 5) + (conversions 2) + (penalties + drop goals) 3** (4)

6.2.2 Luke kept a record of how the team's points were scored during the rugby season. The following table shows the record:

**TABLE 6: Record of points scored during the rugby season**

| METHODS OF SCORING POINTS | HOME GAMES | AWAY GAMES |
|---|---|---|
| **Tries** | 15 | 10 |
| **Conversions** | 12 | 6 |
| **Penalties** | 21 | 27 |
| **Drop goals** | 12 | 15 |

Luke represented the data on a compound bar graph. Part of the compound bar graph for games played at home and away is already drawn on ANNEXURE C. Complete the compound bar graph. (5)

**[19]**

**TOTAL: 150**

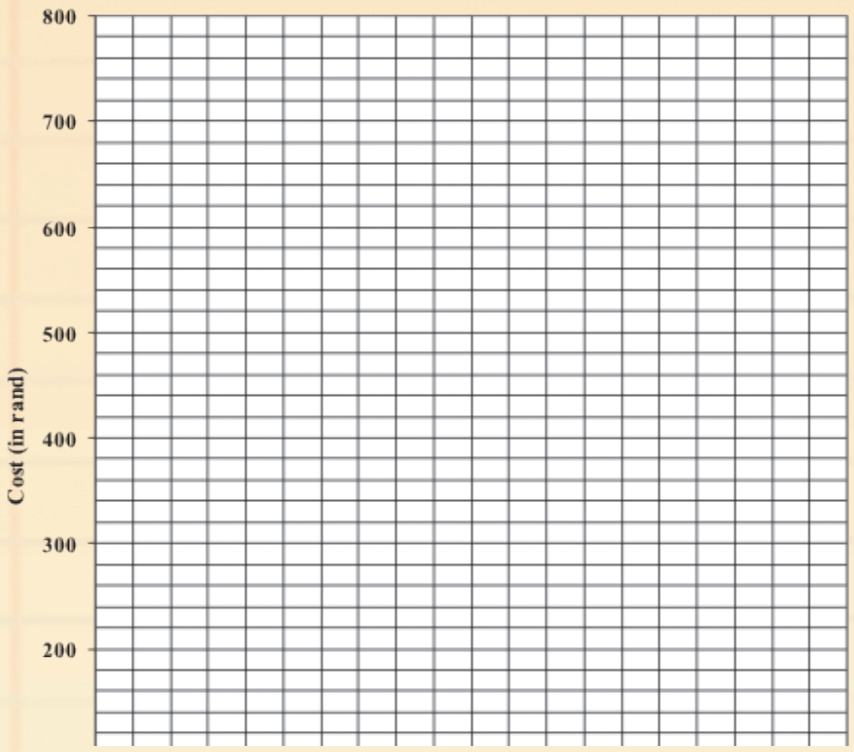
CENTRE NUMBER:

EXAMINATION NUMBER:

**ANNEXURE A**

**QUESTION 3.2**

**COST OF HIRING A CAR**




**ANNEXURE B**

**QUESTION 6.1: MAP OF BLOEMFONTEIN**

Entrance to the Ramblers Club

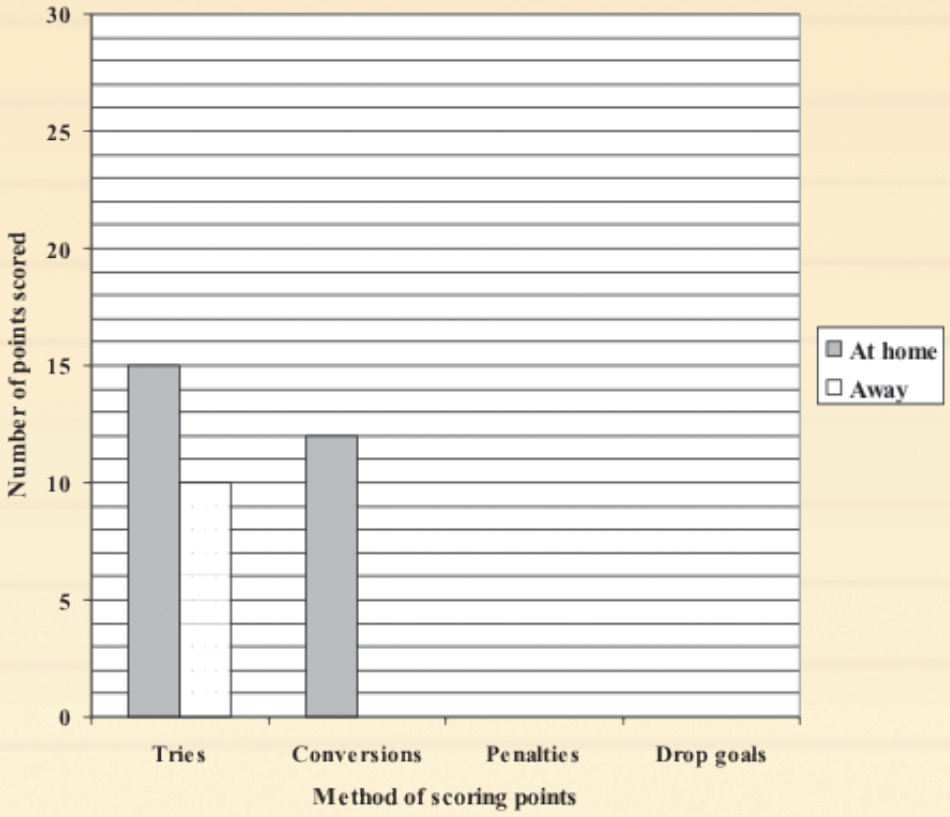
CENTRE NUMBER:

EXAMINATION NUMBER:

**ANNEXURE C**

**QUESTION 6.2.2**

**TABLE 6: Record of points scored during the rugby season**

| METHODS OF SCORING POINTS | HOME GAMES | AWAY GAMES |
|---|---|---|
| Tries | 15 | 10 |
| Conversions | 12 | 6 |
| Penalties | 21 | 27 |
| Drop goals | 12 | 15 |

**RECORD OF POINTS SCORED**