MATHEMATICAL LITERACY: PAPER I

Time: 3 hours   150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1.   This question paper consists of:
        - 10 pages
        - 5 questions
        - An Answer Sheet of 4 pages
        - Annexure A – Map of Sun City
        - Annexure B – Social Media Statistics 2014

        Detach the Answer Sheet from the centre of the question paper. Hand it in with your Answer Book.

2.   Ensure that your question paper is complete.

3.   Answer ALL the questions.

4.   Start each question on a new page.

5.   Number the answers exactly as the questions are numbered.

6.   A non-graphical, non-programmable calculator may be used.

7.   All necessary calculations must be clearly shown.

8.   Units must be included where applicable.

9.   Round off to two decimal places, unless stated otherwise OR where the context requires rounding up or down.

10.   It is in your own interest to write legibly and to present your work neatly.

11.   Maps and diagrams are not necessarily drawn to scale unless otherwise stated.

QUESTION 1

Dineo is planning on opening a restaurant. In order to do this, she first needs to find suppliers and equipment.

1.1   She finds two meat suppliers in her area – Meat-Mania Butchery and Ridge Butchery. Meat-Mania Butchery charges R60,00 per kilogram and it includes delivery. Ridge Butchery charges only R50 per kilogram, but they also charge R200 per delivery.

      1.1.1   Determine the missing values for A, B and C in the table below.   (7)

Mass in kg	0	10	35	C
Meat-Mania Butchery	R0,00	R600,00	A	R3 000,00
Ridge Butchery	R200,00	R700,00	B	R2 700,00

      1.1.2   Use the table above to draw the graphs illustrating the costs of the two meat suppliers on the axes on the Answer Sheet provided.   (9)

      1.1.3   Indicate with the letter 'X' (on the graph), the point where the prices from both suppliers are the same.   (2)

      1.1.4   If Dineo decides to order 15 kg of meat, then determine using your graph which meat supplier will be cheaper. Answer this on the space provided on the Answer Sheet.   (2)

      1.1.5   Determine from the graph, the amount Dineo will pay for the 15 kg of meat with the cheaper supplier. Answer this on the space provided on the Answer Sheet.   (2)

1.2   Dineo decides that she needs to purchase a freezer to store all her frozen products. She finds an advert for a chest freezer as shown below:

Save 110
2889
Deposit 289 • 195 × 30 months
Total payable 5850 at 22,85% interest

DEFY
METALLIC CHEST FREEZER
• New Design Handle and Lock
• Model DMF451

[Source: House & Home]

      1.2.1   Determine the original cash price of the chest freezer before the saving.   (2)

1.2.2 Show, with calculations, what percentage the deposit is of the purchase price. (2)

$$\% \text{ deposit} = \frac{\text{deposit}}{\text{purchase price}} \times 100\%$$

1.2.3 Show, with calculations, how the amount of R5 850 was derived, if the hire-purchase option was used. (2)

1.2.4 Determine which amount in the advertisement has been excluded from the total amount payable. (2)

1.2.5 Determine the full cost of the freezer if it was bought on hire-purchase. (2)

1.3 The restaurant uses 653 kilowatt hours (kWh) of electricity for the month of June. Use the table below to answer the questions that follow.

Energy Charge (R/kWh)

Block Descriptor	kWh used	Rate per kWh (14% VAT exclusive)
Block 1	1 – 600 kWh	R0,9451
Block 2	> 600 to ≤ 700 kWh	R1,6064
Block 3	> 700 kWh	R4,5076

[Source: <www.ekhurulani.gov.za>]

Calculate the following:

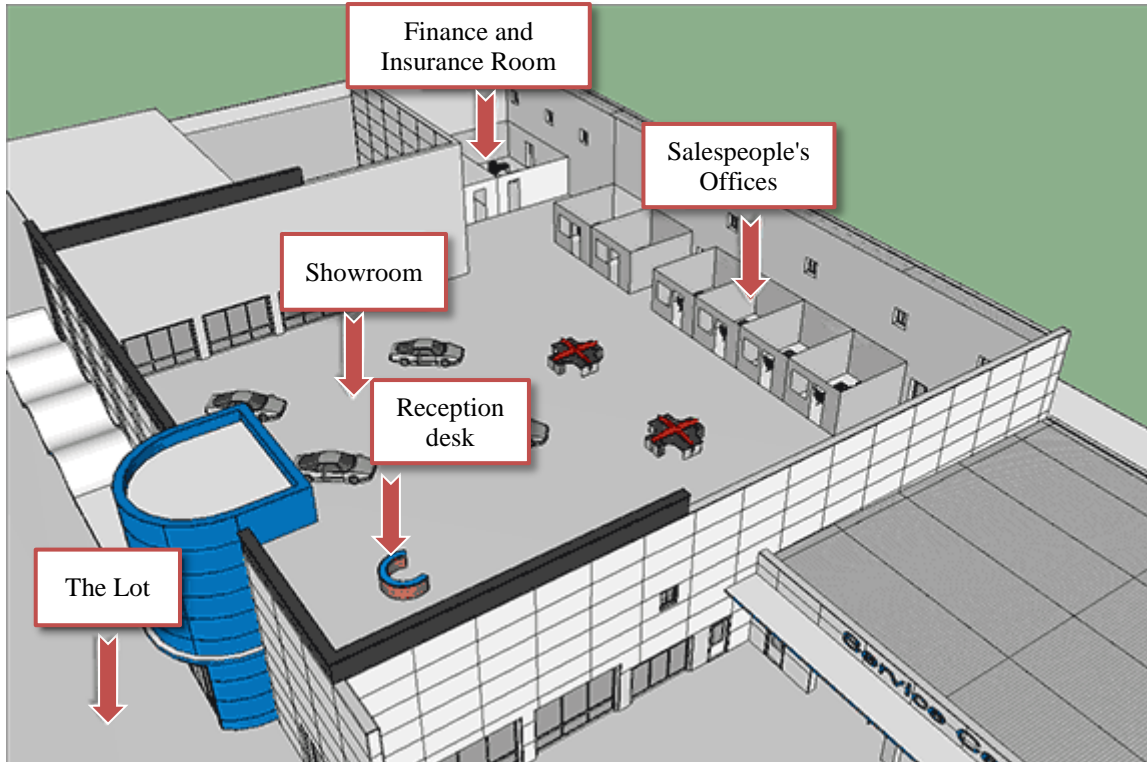1.3.1 the cost, excluding VAT, for the first 600 kWh used. (2)

1.3.2 the cost, excluding VAT, for the next 53 kWh of the 653 kWh used. (2)

1.3.3 the total cost, including the 14% VAT, for the full 653 kWh used. (4)

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QUESTION 2

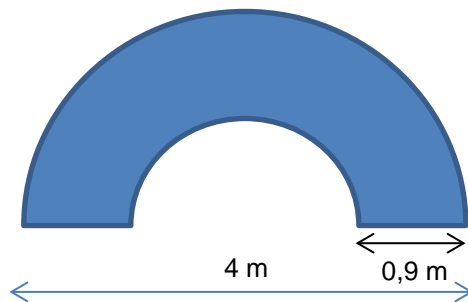The picture below is that of a showroom floor for a car sales company that is to be built.

[Source: <http://www.brimg.net/images/auto/floor-diagram-car-dealership-illustration.gif>]

2.1   The reception desk is semi-circular in shape. The owner decides to cut the top out of a solid piece of granite slab as shown below:

4 m   0,9 m

   2.1.1   Determine the minimum length and breadth of the rectangular piece of granite slab that this shape will need to be cut from.   (2)

   2.1.2   In order to calculate the surface area of the top of the reception desk, one of the salespeople completed the following calculation on the Answer Sheet provided. Complete the missing values on the Answer Sheet.   (11)

2.2   2.2.1   There are six salespeople's offices. The dimension of each office is 3 m by 4 m. Calculate the total floor area of all the salespeople's offices.   (3)

2.2.2 The owner decides to place laminate panels to cover the floor area of the offices. If each laminate panel has a width of 19 cm, calculate how many lengths of laminate panels will be required to fit across the width of one of the offices. (4)

2.2.3 Determine how many metres of skirting (boards placed on the edges of the floor against the wall inside the offices) will be required to go around the edge of each office. The width of each office door is 0,9 m. (4)

2.3 The owner wants to build a ramp (in the shape of a triangular and rectangular prism) to display the car of the month. It would look like the diagram below.
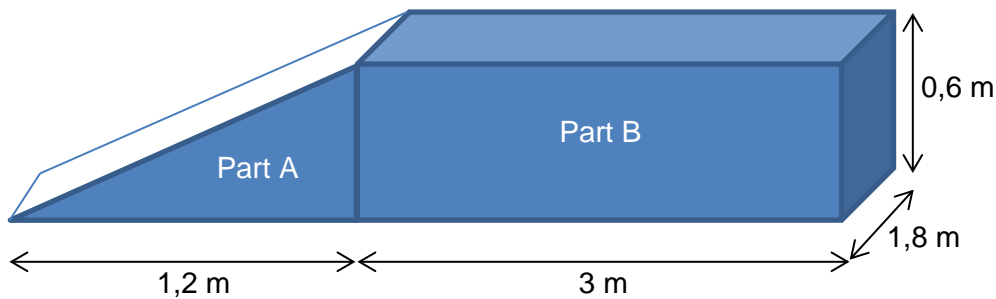
In order to build these ramps, the owner would need to first calculate the volume.

2.3.1 Calculate the volume of the triangular prism (Part A).

$$Volume_{Triangular\ prism} = \frac{1}{2}\ base \times \perp height \times width$$ (2)
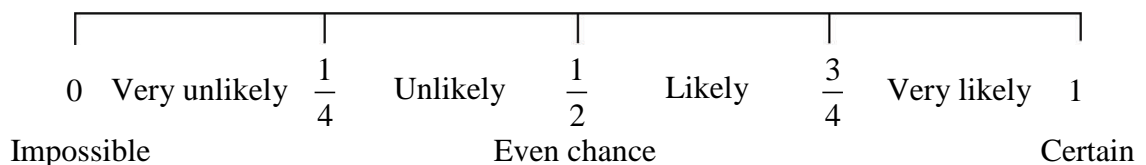
2.3.2 Calculate the volume of the rectangular prism (Part B).

$$Volume_{Rectangular\ prism} = length \times breadth \times height$$ (2)

2.3.3 Find the total volume. (2)

2.4 2.4.1 If there are three red cars, two white cars and one silver car, what is the probability that a customer goes for a test-drive in the silver car? Give your answer as a fraction. (2)

2.4.2 From the list of words, given in the probability scale below, write down the word that best describes the probability of selecting:

0   Very unlikely $\frac{1}{4}$ Unlikely $\frac{1}{2}$ Likely $\frac{3}{4}$ Very likely   1

Impossible   Even chance   Certain

(a)   a silver car

(b)   a white car

(c)   a red car (5)

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QUESTION 3

3.1   A family from Johannesburg wants to go on holiday to Sun City. Annexure A shows a map of Sun City. Use it to answer the questions that follow.

    3.1.1   In which compass direction is the Palace Hotel from the Cabanas Hotel?   (2)

    3.1.2   Identify the feature found to the east of the Gary Player Golf Course.   (2)

    3.1.3   With reference to scale on the map, determine the value of A in the following:

        1 cm represents A km.   (2)

    3.1.4   (a)   Measure the length of line AB on the map. Give your answer in centimetres.   (2)
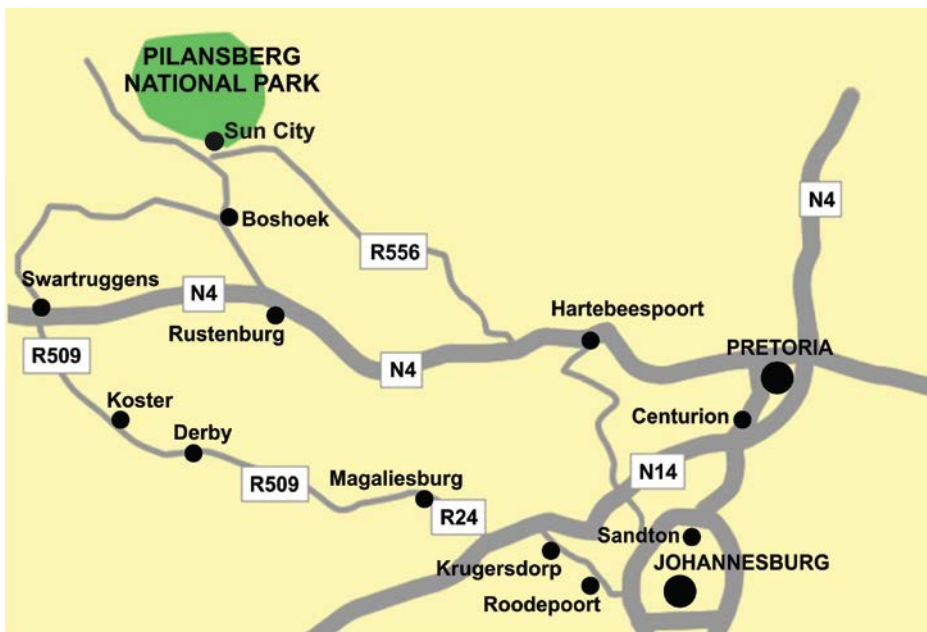
        (b)   Determine the actual distance of AB in kilometres.   (2)

        (c)   If the distance from B to C is 3 km, then calculate the area of the right-angle triangle that represents the area of Sun City.

            You may use the following formula:

$$Area_{Triangle} = \frac{1}{2}\ base \times \perp height$$ (3)

3.2   The map below shows the route from Johannesburg to Sun City. Use it to answer the questions that follow:

[Source: <airportshuttlesa.co.za/transport-to-pilansberg-game-reserve>]

    3.2.1   Which is the more direct route from Derby to Sun City: via Magaliesburg or via Swartruggens?   (2)

    3.2.2   If you are in Derby, name all the towns that you will pass through, on your way to Sun City.   (3)

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QUESTION 4

4.1   Annexure B has data showing social media statistics. Use it to answer the following questions:

        4.1.1   From the data in Annexure B, state the number of users of each of the top three social media sites.   (3)

        4.1.2   In 2015 the number of Internet users worldwide was 3,17 billion, up from 2,94 billion the previous year. Determine the number of extra users worldwide of the Internet in 2015.   (2)

        4.1.3   According to the statistics, 23% of Facebook users log-on at least 5 times a day. The remainder of the users have an average log-on of 2,65 times a day.

                (a)   State what percentage of users log on 2,65 times a day.   (2)

                (b)   Calculate the number of Facebook users that log-on at least 5 times a day. Write the number without using the word 'billion'.   (3)

                (c)   Assume that the 23% of Facebook users log-on 5 times a day. Calculate the total 'log-ons' altogether.   (4)

4.2   Study the graph below and answer the questions that follow.

Social networking site use by age group, 2005–2013
% of Internet users in each age group who use social networking sites, over time
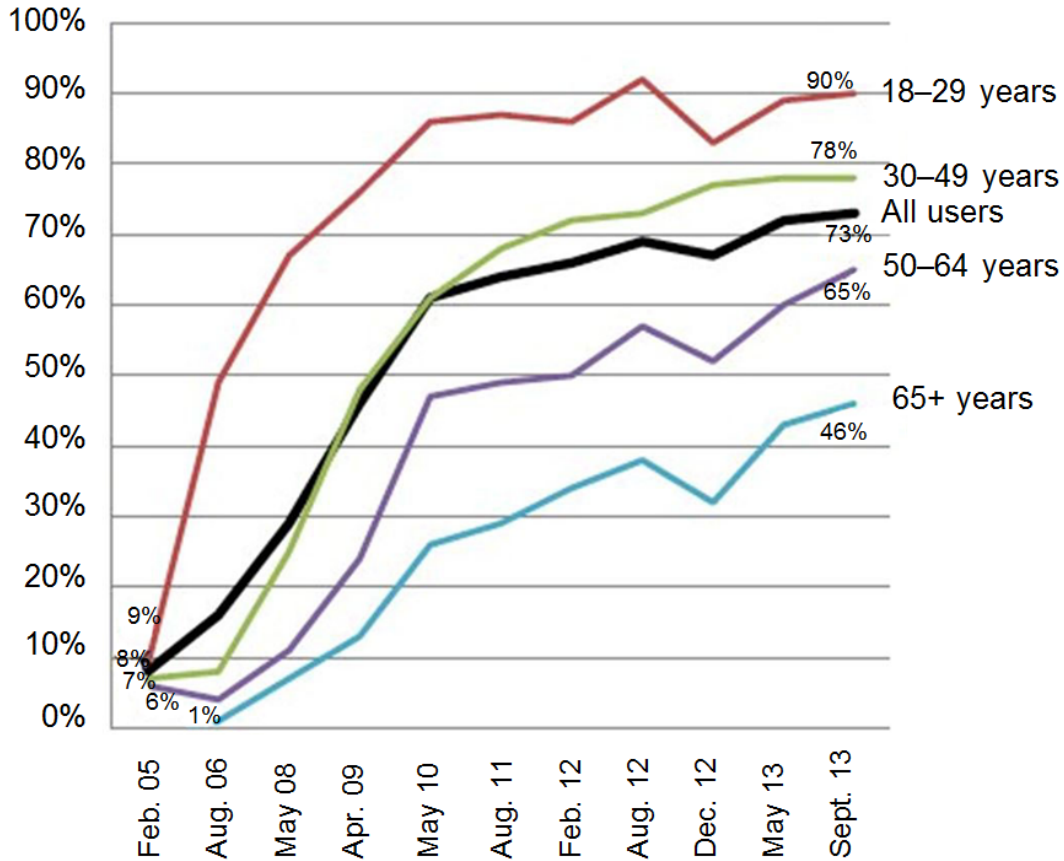
Source: Latest data from Pew Research Centre's Internet Project Library Survey, July 18–September 30, 2013. N=5,112 Internet users ages 18+. Interviews were conducted in English and Spanish and on landline and cellphones. The margin of error for results based on Internet users is ± 1,6 percentage points.

[Source: <www.pewinternet.org/fact-sheet/social-networking-fact-sheet>]

4.2.1   Identify which age group accesses the Internet the most.   (2)

4.2.2   Write down the percentage Internet users for age 50–64 during February 2012.   (2)

4.2.3   State which category of Internet users has been excluded from this graph.   (2)

4.2.4   Calculate the range of 'All users' shown above from Feb. 2005 to Sept. 2013.   (3)

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QUESTION 5

5.1

Deforestation is the permanent destruction of forests in order to make the land available for other uses. An estimated 18 million acres (7,3 million hectares) of forest, which is roughly the size of the country of Panama, are lost each year, according to the United Nations' Food and Agriculture Organization (FAO).

[Source: <http://www.livescience.com>]

    5.1.1   In the information above it is stated that 18 million acres is 7,3 million hectares. Write this in unit form (1 hectare: … acres), rounding to one decimal place. (3)

    5.1.2   If 1 km^2 = 247,105 acres, then determine the area being destroyed per year, giving your answer to the nearest km^2. (4)

5.2

One ream (500 sheets) uses 6 percent of a tree.

[Source: <www.bizjournals.com>]

    5.2.1   If 1 ream of paper uses 6% of a tree, then determine how many reams of paper one will get from an entire tree. (3)

    5.2.2   The following advertisement appeared in a Makro stores pamphlet.

TYPEK A4 Office Paper

Price   **45^{80} per ream**

[Source: <www.makro.co.za>]

Using the answer in Question 5.2.1, determine the total income one could generate from one tree. (2)

    5.2.3   There are 9,9 million trees destroyed every day.

        (a)   Write 9,9 million in full, without the comma. (2)

        (b)   Determine the value of paper destroyed in a day. (3)

5.3   The following statistics show four of the top ten most endangered forests.

Region	Remaining Habitat
Asia-Pacific	32%
North America	10%
South America	8%
Africa	31%

[Source: <www.statisticbrain.com>]

Use the above data to draw a bar graph on the grid provided on the Answer Sheet.   (6)

5.4   The following information shows the top nine countries contributing to deforestation.

	Country	Hectares lost per year
1	Brazil	3 466 000
2	Indonesia	1 447 800
3	Russian Federation	532 200
4	Mexico	395 000
5	Papua New Guinea	250 200
6	Peru	224 600
7	USA	215 200
8	Bolivia	135 200
9	Sudan	117 807

5.4.1   Determine the median hectares lost per year.   (2)

5.4.2   Calculate the average (mean) hectares lost per year. Round off your answer
        to the nearest hundred thousand.   (5)

5.4.3   Nigeria is ranked in the tenth slot. If the range for the top ten countries is
        3 384 000, determine how many hectares Nigeria lose per year.   (2)

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Total: 150 marks