NATIONAL SENIOR CERTIFICATE EXAMINATION
SUPPLEMENTARY EXAMINATION – MARCH 2017

MATHEMATICAL LITERACY: PAPER II

Time: 3 hours   150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1.   This examination paper consists of:
- A question paper of 9 pages
- Four questions
- An Appendix that consists of 4 Annexures
- An Answer Sheet of 2 pages.

        Detach the Appendix from the centre of the question paper.

2.   Please check that your question paper is complete.

3.   Answer all the questions.

4.   It is strongly suggested that all working details be shown.

5.   Round all the final answers off to TWO decimal places, unless stated otherwise OR where the context requires rounding up or down.

6.   Approved non-programmable calculators may be used in all questions.

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

8.   Map and diagrams are not necessarily drawn to scale, unless stated otherwise.

9.   **Please start each of the four questions on a new page.**

QUESTION 1

The Castle of Good Hope is a star fort built in the 17th century in Cape Town, South Africa. It is the **oldest building in South Africa** and although it was once a fort, today it functions as a showcase of the Cape's early days. In 1936 the Castle was declared a National Monument.

[Source: <https://www.citysightseeing.co.za>]

[Source: <http://www.capetown.travel>]

Each weekday at 10 a.m. and 12 p.m. a "Key Ceremony" is still performed by the castle guards, replicating the ceremonial unlocking of the Castle in olden times.

[Source: <http://www.southafrica.net>]

[Source: <www.travelground.com>]

1.1 According to historians, the first stone was laid in January 1666 and it was completed approximately 13,25 years later. Determine the year and month in which it was completed. (2)

1.2 A group of 25 tourists wants to visit the castle. The group consists of 19 adults, of which 8 are pensioners (4 foreigners and 4 South Africans), and 6 are children. The children are all between the ages of 5 and 16 years old. By referring to the tariffs shown below, calculate the cost for the tour group to visit the Castle.

> **Entry Fee:**
>
> Adults: R30
> Pensioners (SA card holders only): R15
> Children/Students (5–16 yrs): R15
> Booked School Groups: R5

(6)

1.3   Mr and Mrs Bright are two of the foreigners in the group. The hotel they are staying at for 6 nights costs R1 459 per person per night. Calculate how many euros it will cost them if R1 = €0,06. Give your answer to the nearest Euro.   (6)

1.4   Mr and Mrs Bright would like to make the most of their visit to the castle. They take note of the following:

*   The castle is open seven days a week, except on Christmas Day and New Year's Day. The castle gates open at 9 a.m. and close at 4 p.m., with the last visitors admitted at 3:30 p.m.
*   They can go on a guided tour between Monday and Saturday at 11h00, 12h00 and 14h00 (no tours on Sundays). The tour is approximately one hour long.
*   The Key Ceremony is performed Monday to Friday at 10h00 and 12h00, and takes 7 minutes in total.
*   They can even go on a horse and carriage ride. Rides take place daily at 10h30, 12h45 and 14h45, and take about an hour.

1.4.1   Mr and Mrs Bright wish to take the guided tour, watch the Key Ceremony and also go on a horse and carriage ride (in any order). They will be going to the castle on a Wednesday.

Determine what the best order would be if they want to leave the castle at 1 p.m. and if they arrive at 9:30 a.m.   (3)

1.4.2   When not on a planned activity, Mr and Mrs Bright would like to rest. Calculate the total time available for them to rest.   (4)

1.5   **Annexure 1** shows a plan of the castle, along with the names of the five corners of the castle. Refer to this plan in order to answer the questions that follow.

1.5.1   The perimeter of the castle measures 900 m. The ratio scale given on the map is 1 : 1 500. Show by using calculations that the scale is not accurate.   (5)

1.5.2   We are given the choice of two scales on this plan. Will using either scale result in the same distance? Justify your answer by showing calculations.   (4)

1.6   The marketing department had a fundraiser on the day the Brights visited the castle. If you could correctly guess the circular distance around the castle as shown in the picture below, you won a prize.
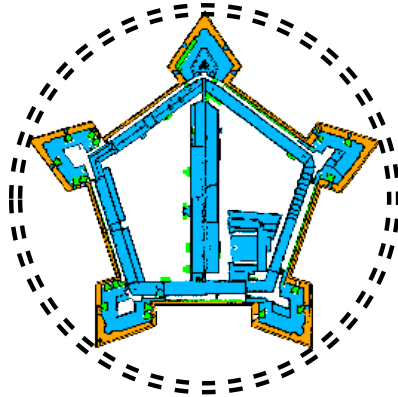
Circumference = π × diameter

π = 3,14

Mr Bright guessed that it was one kilometre. If the distance of the radius of the circle is 7 575 cm, determine, showing all calculations, whether or not Mr Bright won a prize.   (4)

1.7   One of the souvenirs for sale at the Castle is shown below:

Castle Of Good Hope

Water globes

| Description | Additional Information |

Additional Information

| WEIGHT | 0,63 kg |
| DIMENSIONS | 9,5 × 9,5 × 12 cm |

| **WEIGHT** | *0,63 kg* |
| **DIMENSIONS** | *9,5 × 9,5 × 12 cm* |

[<http://www.onestopcurios.com>]

1.7.1   The souvenir is an irregular shape, yet three dimensions are given. Describe what the three dimensions are referring to. (You may use a diagram to help with your description.)   (2)

1.7.2   Mrs Bright wants to buy some of these water globes to give to her family and friends as gifts. Because they are fragile, she will take them in her hand luggage when flying back home. The maximum weight the airline will allow for hand luggage is **15,4 pounds**. She has already used up 80% of her hand luggage weight allocation. Determine how many of these souvenirs Mrs Bright will be able to take in her hand luggage before she exceeds the weight allowed.
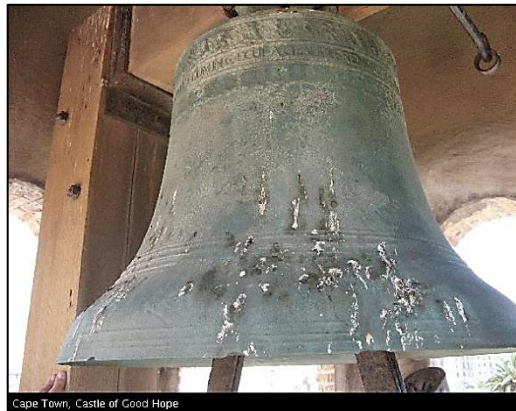
1 kg = 2,2 pounds (lb)   (7)

1.8   In 1684 a bell tower was established and the bell, now the oldest in South Africa, was rung to warn citizens in times of danger. The bell could be heard about 10 km away. It was also rung to call residents and soldiers to the Castle for important announcements.
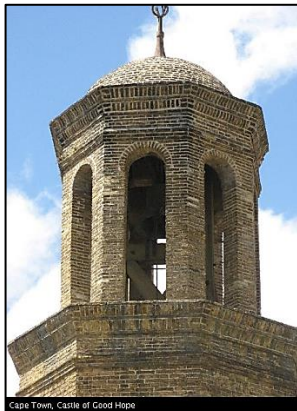
[Source: <http://garlyn-forwhatitsworth.blogspot.co.za>]


[Source: <https://digital.lib.sun.ac.za>]

Refer to **Annexure 2** to answer this question.

If the bell was still able to be heard 10 km away, show that someone standing at the GrandWest Casino and Entertainment World would not be able to hear it.   (4)

1.9   After spending the day at the Castle of Good Hope, Mr and Mrs Bright need to make their way to the airport. The map below illustrates the route between the two locations.
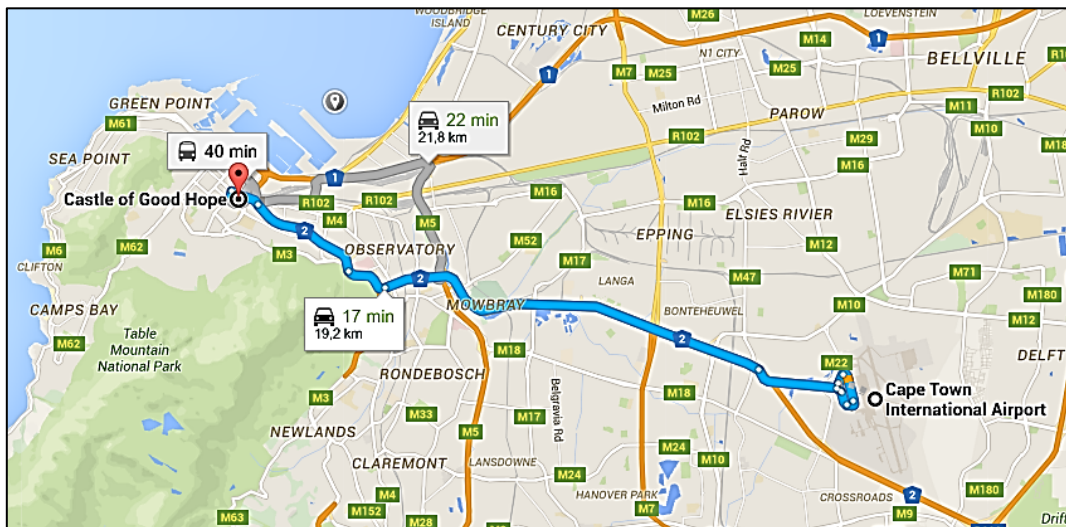
1.9.1   The estimated time for a bus to complete the 19,2 km distance is 40 minutes, whereas it is estimated that a car would take 17 minutes. Show that the difference in the speed between the two vehicles is greater than 35 km/hr.

$$Distance = Speed \times Time$$ (7)

1.9.2   The speed limit on the N2 is 120 km/h. Explain why the estimated speed is so much slower.   (2)

1.9.3   Determine the cost of the fuel needed for the journey between the Castle and the airport, if petrol costs R13,85 per litre and the vehicle travels 11,5 km on one litre of petrol.   (3)
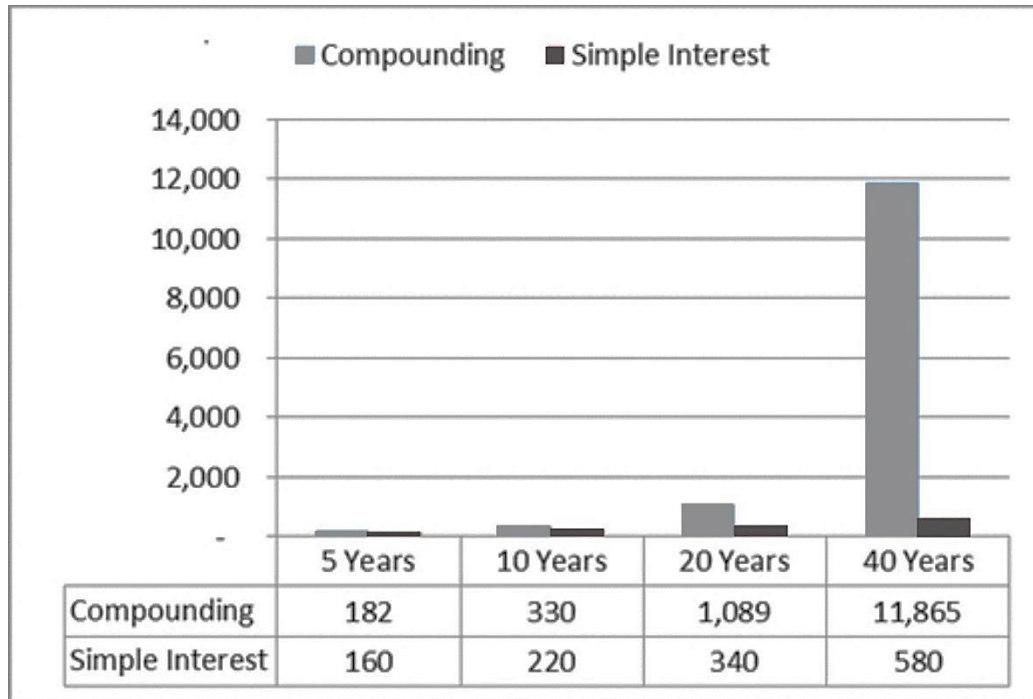
[59]

QUESTION 2

2.1   The graph below shows the growth of an investment, with both simple interest and compound interest, over the course of 40 years.

The initial amount invested was R100.

	5 Years	10 Years	20 Years	40 Years
Compounding	182	330	1,089	11,865
Simple Interest	160	220	340	580

2.1.1   Explain why there is such a significant difference in the amount gained after 40 years.   (2)

2.1.2   Calculate the percentage by which the value of the money increased over 40 years when it was invested in a compound interest account.   (4)

2.1.3   After five years the value of the simple interest investment was R160. Calculate the annual rate of interest that was given. Show all working.   (4)

2.2   Ayanda's great-grandmother, Gogo, does not deposit her money into a bank account. She keeps all her money in a safe place in the house, despite her family telling her how unsafe it is.

The table provided in **Annexure 3** gives a summary of Gogo's financial records.

2.2.1   Complete the table by calculating the missing values (a) to (d).   (8)

2.2.2   Gogo receives notice of an increase every year during December and the increase takes effect during January of the following year. Gogo's employer uses the inflation rate of the present year to determine the increase for the following year. The average rate of inflation in 2013 was 5,77%. Did Gogo receive a fair increase in 2014? Justify your answer showing all calculations.   (6)

2.2.3   Ayanda tries to explain to Gogo why it is always important to receive an increase that is greater than the rate of inflation. Why is Ayanda correct?   (2)

2.2.4   A stacked bar graph illustrating Ayanda's great-grandmother's finances over the years is given below. On the ANSWER SHEET provided, add all relevant headings and labels.   (7)
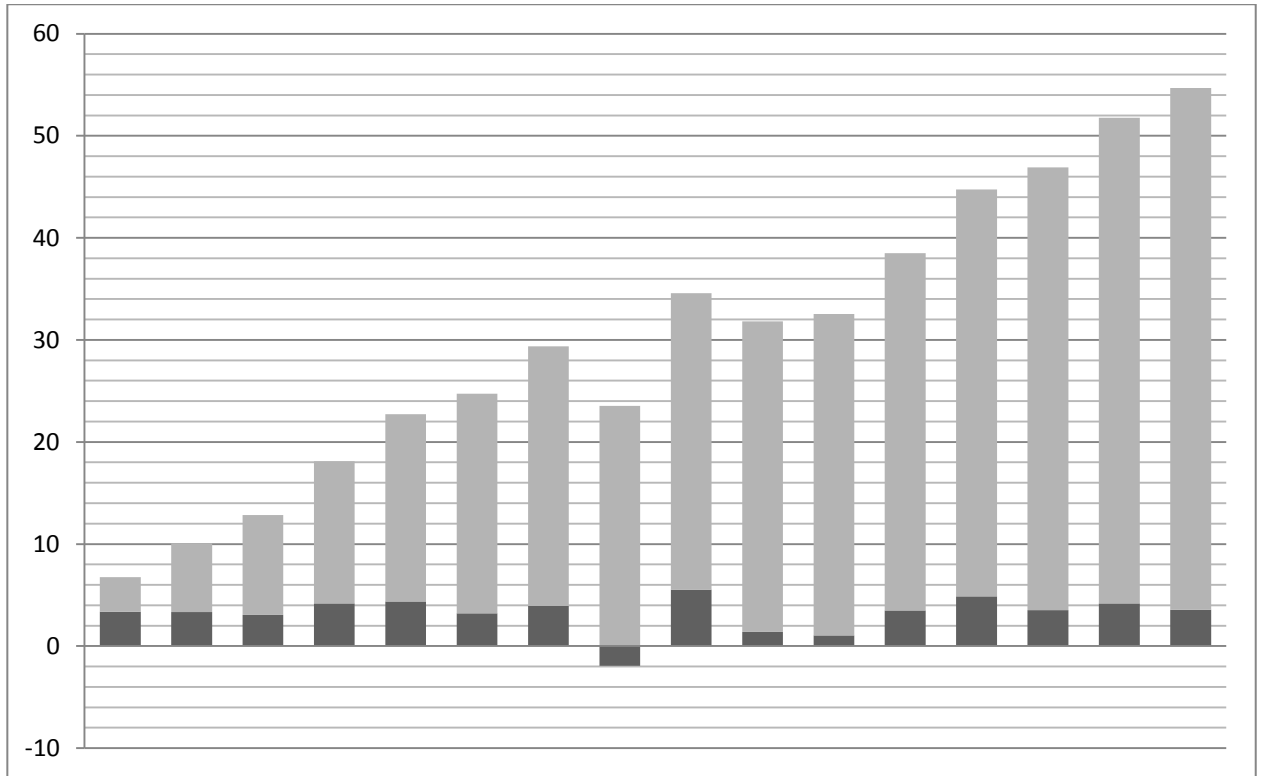
2.2.5   One of the bars is below zero. What does this mean in relation to Gogo's finances?   (2)

[35]

QUESTION 3

Annexure 4 shows the results of the 4×100 m Mixed Medley race that took place at the 2015 World Swimming Championships held in Kazan.

A mixed medley consists of a team of 4 swimmers who each swim a different stroke:

1st swimmer	– Butterfly
2nd swimmer	– Backstroke
3rd swimmer	– Breaststroke
4th swimmer	– Freestyle

3.1   Refer to **Annexure 4** to answer the questions that follow.

     3.1.1   At these Championships, the winning team finished the race in a time of 3 minutes, 41 seconds and 71 hundredths of a second. Calculate the mean (average) time for the race, taking all 8 countries (teams) into consideration.   (6)

     3.1.2   Calculate the range in times between the 8 teams.   (3)

     3.1.3   Which stroke takes the longest to complete?   (2)

     3.1.4   How many seconds separated the team that came third from the team that came fourth?   (2)

     3.1.5   A "Dream Team" consists of the fastest swimmer for each stroke.

          (a)   Which four swimmers would form the dream team for this medley?   (4)

          (b)   What would the total time of their race have been?   (5)

3.2   Inspired by these swimmers, Ismail convinces his parents to install a swimming pool at their home. He receives the following three quotations:

Prices:
- 5 m **x** 3 m pool – R74 550,00 (Excl. VAT)
- 6 m **x** 3 m pool – R83 650,00 (Excl. VAT)
- 8 m **x** 4 m pool – R106 760,00 (Excl. VAT)

                                      VAT @ 14%

[Source: <http://www.nspi.co.za>]

     3.2.1   Show that the smallest pool is not the most cost effective, excluding VAT, per square metre.   (7)

     3.2.2   Ismail's parents decide to install the biggest pool. Calculate the difference in price per square metre for the cost of the pool including VAT and excluding VAT.   (4)

                                                  [33]

QUESTION 4

Jennifer's class is having a raffle. Each child in her class has to sell a minimum of 20 tickets. There are 24 children in her class.

4.1   If each ticket costs R5, calculate the minimum amount of money the school can expect to raise.   (3)

4.2   All the tickets are sold including some extra. Altogether her class sells 550 tickets. Jennifer herself bought 5 of those tickets. Determine the probability, as a percentage rounded to the nearest whole number, that she has of winning the raffle.   (4)

4.3   On the day that they draw the tickets for the raffle, Jennifer's class also has a cake sale.

     Jennifer's teacher is trying to estimate how much money they might raise from the cake sale. She knows that last year, 184 of the 360 children at the school spent R10 and over. If there are 387 children in the school this year, what is the minimum amount of money she can expect to raise?   (6)

4.4   The cake sale is a huge success. The pie chart below shows a breakdown of their income.

Income from Cake Sale
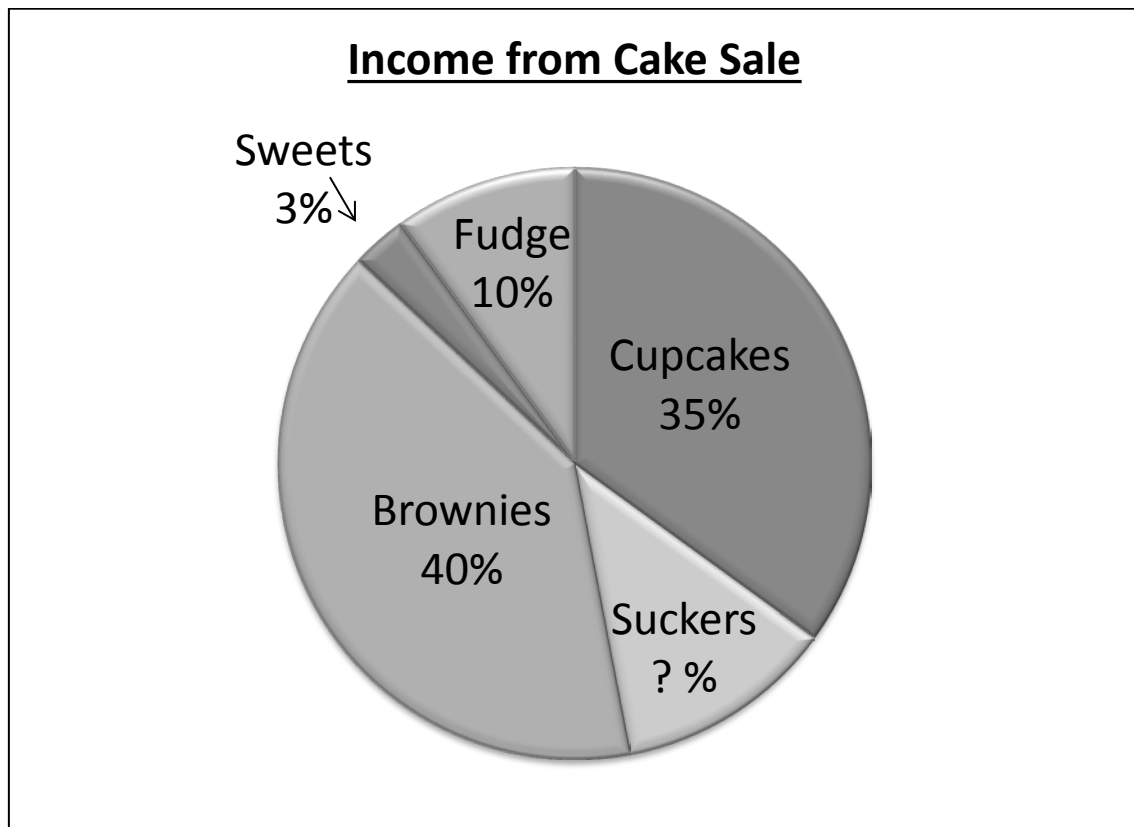
4.4.1   Calculate the size of the angle that represents brownies.   (3)

4.4.2   The class made a total of R5 375,00 from the cake sale. This includes the money made from the 550 raffle tickets sold. Show that the money made from the sale of suckers did not exceed R400 as was anticipated by the class.   (7)

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Total: 150 marks