NATIONAL SENIOR CERTIFICATE EXAMINATION
NOVEMBER 2015

MATHEMATICAL LITERACY: PAPER II

Time: 3 hours 150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of:
   - 9 pages
   - 4 questions
   - **Answer Sheet** of 1 page
   - Appendix with 6 Annexures:
     Annexure 1 – South African Average House Prices Forecast to 2020
     Annexure 2 – South African House Prices v Total Population
     Annexure 3 – What do South Africans spend their money on?
     Annexure 4 – House Prices in Different Price Categories
     Annexure 5A – Figures 1 and 2 of shelf
     Annexure 5B – Figures 3 and 4 of shelf
     Annexure 6 – 2015 Tourist Class Train Routes, Schedules and Fares

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

   Ensure that your question paper is complete.

2. Answer ALL the questions.

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

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

5. An approved (non-programmable, non-graphical) calculator may be used.

6. ALL necessary calculations must be clearly shown.

7. Units of measurement must be included where applicable.

8. Round off appropriately according to the context, unless otherwise stated.

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

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

QUESTION 1

1.1 ABSA Bank recorded the average South African house price in 1981 as R50 143,00. By 2010, this average house price had risen to R1 029 331,00. Calculate the percentage by which the price of an average house had increased. Round your answer to the nearest whole number. (5)

1.2 The average house price, along with the projected average house price for the first 21 years of this century, is shown on Annexure 1. Refer to the graph on Annexure 1 in order to answer the questions that follow.

1.2.1 Mary was in Grade 8 in 2005. She passed every grade and went on to study at university for 4 years immediately after her Matric year. The year after graduating (passing her course at university), Mary investigated the possibility of buying a house. State both the year and the average price of a house (rounded to the nearest hundred thousand) in that year. (3)

1.2.2 Determine which range in house prices is greater: from 2000 to, and including, 2010 or from 2011 to, and including, the projected price of 2020. Motivate your answer showing all calculations. (5)

1.2.3 Determine the median price of a house from 2005 to, and including, 2014. (3)

1.2.4 During which year would the value of your house have doubled if you bought a house for the quoted average price in 2004? (2)

1.2.5 Calculate the projected mean house price from 2016 to, and including, 2020. (4)

1.3 Refer to Annexure 2 in order to answer the questions that follow.

1.3.1 Annexure 2 shows graphs of the South African population and the average house prices in South Africa. Describe the trends in the average house prices and population figures in South Africa. (2)

1.3.2 Write down the approximate projected average house price and the approximate projected population for November 2047. (4)

1.3.3 The line showing the Average House Price appears to begin at zero. Why? (2)

1.4 Annexure 3 shows a breakdown of how South Africans spend their money according to a survey done between September 2010 and August 2011.

1.4.1 (a) According to the data given in Annexure 3, 32% of what an average household spends is on housing, water, electricity, gas and other fuels and amounts to R30 505. Calculate the amount of their total annual expenditure. (4)

(b) If this expenditure group (housing, water, electricity, gas and other fuels) is combined with one other expenditure group, it accounts for almost 45% of a household's annual expenses. State what the other group is. (2)

1.4.2 (a) Write down the percentage spent on education to percentage spent on clothing and footwear, as a ratio in its simplest form. (3)

(b) Calculate the missing value:

For every R1 an average household spends on Education, they spend R... on Clothing and Footwear. (3)

1.5 According to an informal poll done amongst South African families, the amount of money spent on groceries for a family of 3 is R54 000 per year.

[Source: <http://www.zaparents.com/we-spent-what-on-groceries/>]

The average rate of inflation over the past 3 years has been 5,17% per year.

If the average rate of inflation remains the same for the next 3 years, show that a family of 3 can expect to pay more than R5 200 per month for groceries in 3 years' time. Show all working. (8)

1.6 Refer to Annexure 4 to answer the questions that follow. Write down only the missing figure for Questions 1.6.1 to 1.6.4 in your Answer Book.

1.6.1 In the year …, a house costing R550 000 lay on the 95^{th} percentile. (2)

1.6.2 In 1995, a house costing R100 000 lay on the … percentile. (2)

1.6.3 If a house lies on the 80^{th} percentile, this means that … % of the houses cost more than this house. (2)

1.6.4 If there were a group of 20 houses in 2005, then it is safe to say that out of those 20 houses … (a) … house(s) would cost more than R1,2 million and … (b) … house(s) would cost less than R1,2 million. (4)

1.6.5 In 1998, even though he only paid R100 000 for his house, Pete bragged to all his friends about living in a really expensive house. By making reference to the percentiles, decide whether Pete had any reason to brag. Explain your answer. (3)

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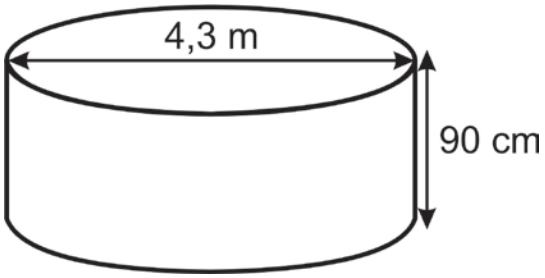
QUESTION 2

Bongani enjoys doing DIY (Do-It-Yourself) Projects.

2.1 Bongani's last successful project was digging a cylindrical hole to secure a trampoline for his children.

The hole Bongani dug



The dimensions of the hole he dug

The finished project

Although Bongani has reused some of the excavated (dug up) sand, he still has two-thirds of the sand left over. A company is prepared to collect the sand free of charge provided it is more than 5 m^3.

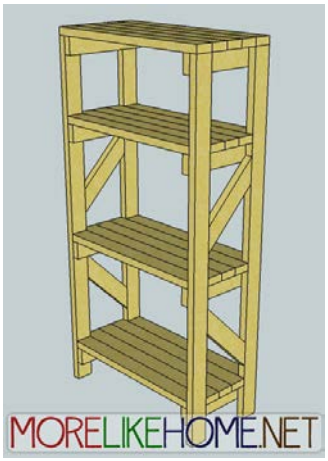
2.1.1 Calculate the area of the base of the hole in square metres, rounded off to 2 decimal places.

Area = $\pi \times r^2$ where r = radius and $\pi = 3{,}14$ (3)

2.1.2 Determine, showing all calculations, whether there is enough sand for the company to come and collect free of charge.

Volume = Area of base × height (5)

2.2 Bongani's latest project is to build a set of shelves.



A picture of the shelves he is hoping to build is alongside. (See also Annexure 5A, Figure 1.)

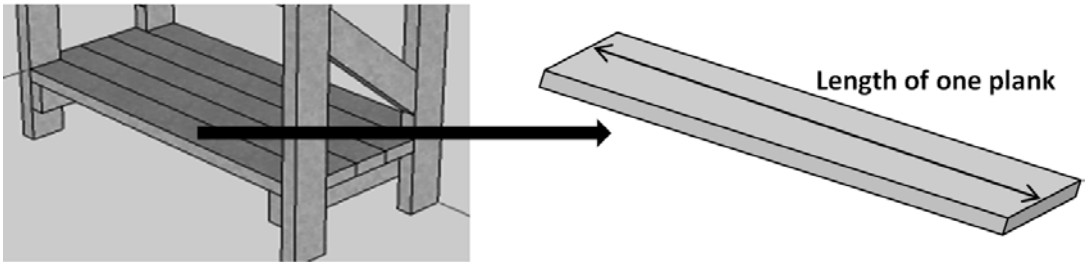
The plans for the shelves, along with all of the dimensions (given in inches), are given on Annexures 5A and 5B.

1'' (inch) = 2,54 cm

2.2.1 Refer to Figure 2, Annexure 5A. Bongani does not want a shelf that is higher than 1,9 m. Do these shelves meet his requirements? Justify your answer by showing all working. (5)

2.2.2 To build the shelves, Bongani will use planks that are 1 m in length and just cut them to the correct size.

Calculate the total wood wasted from the 5 planks used to build the bottom shelf. Refer to Figure 3 and Figure 4 found in Annexure 5B.



(9)

2.2.3 The wood that Bongani wants to use for the shelves costs R27,53/m excluding VAT (Value Added Tax) of 14%. According to his calculations, it will cost him less than **R1 000** for all the wood, including VAT.

By making use of the values given on the Answer Sheet, and by completing the missing values, determine whether Bongani is correct in his calculation. (9)

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QUESTION 3

Samantha and Nivaan live in London and are going on holiday to Germany and South Africa. From Frankfurt in Germany, they will land at Cape Town International Airport and, after spending a few days in Cape Town, make their way to Johannesburg.

3.1 When arriving in Cape Town, they need to exchange their remaining euros (from Germany) and some pounds (from England) into South African rands. Calculate the amount of South African rands they will have to spend if they land in Cape Town with 180 euros and 800 British pounds. Use the following exchange rates:

1 euro = R13,56
1 British pound = R17,13

(6)

3.2 The map below shows the direct route, as the crow flies, between Cape Town and Johannesburg.

If the distance, as the crow flies, between Cape Town and Johannesburg is 1 237 km, determine the scale, **to the nearest million**, of the map in the form of 1: ... (5)

3.3 If they drive from Cape Town to Johannesburg, they can expect to drive approximately 1 397 km in 15.5 hours.

3.3.1 Determine their average speed for the trip. Round your answer to the nearest whole number.

Distance = Speed × Time (4)

3.3.2 According to the *Arrive Alive* website, a driver should have a 15-minute break after every 2 hours. If Samantha and Nivaan rest as they should, how long will the journey take them if the originally estimated 15,5 hours did not include the breaks? (6)

3.4 Samantha and Nivaan also consider taking the train from Cape Town to Johannesburg. They will leave Cape Town on a Thursday. The train schedule is shown on Annexure 6.

Samantha is not excited to take the train because she says it will take twice as long as the car trip. By calculating the duration of the journey by train, determine whether she is correct. (3)

3.5 If Samantha and Nivaan make their decision to get to Johannesburg (during the month of April) based purely on cost, which method of travel should they use? Justify your answer by showing the cost of each option.

The following conditions must be taken into consideration:

They can borrow a friend's car but must pay for their own petrol. They will get the car with a full tank of petrol, but Samantha and Nivaan must leave the car with a full tank of petrol in Johannesburg.

- The average fuel consumption of the car is 5,8 ℓ/100 km.
- The average price of petrol is R11,07/ℓ.
- Tolls from Cape Town to Johannesburg total R138,50. (12)

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QUESTION 4

4.1 Isabel is buying a lounge suite and sees the following advertisement:

[Source: *Highway Mail*; *House and Home*, February 2015]

Isabel does not have the cash to purchase the lounge suite so is interested in the payment terms offered by the shop.

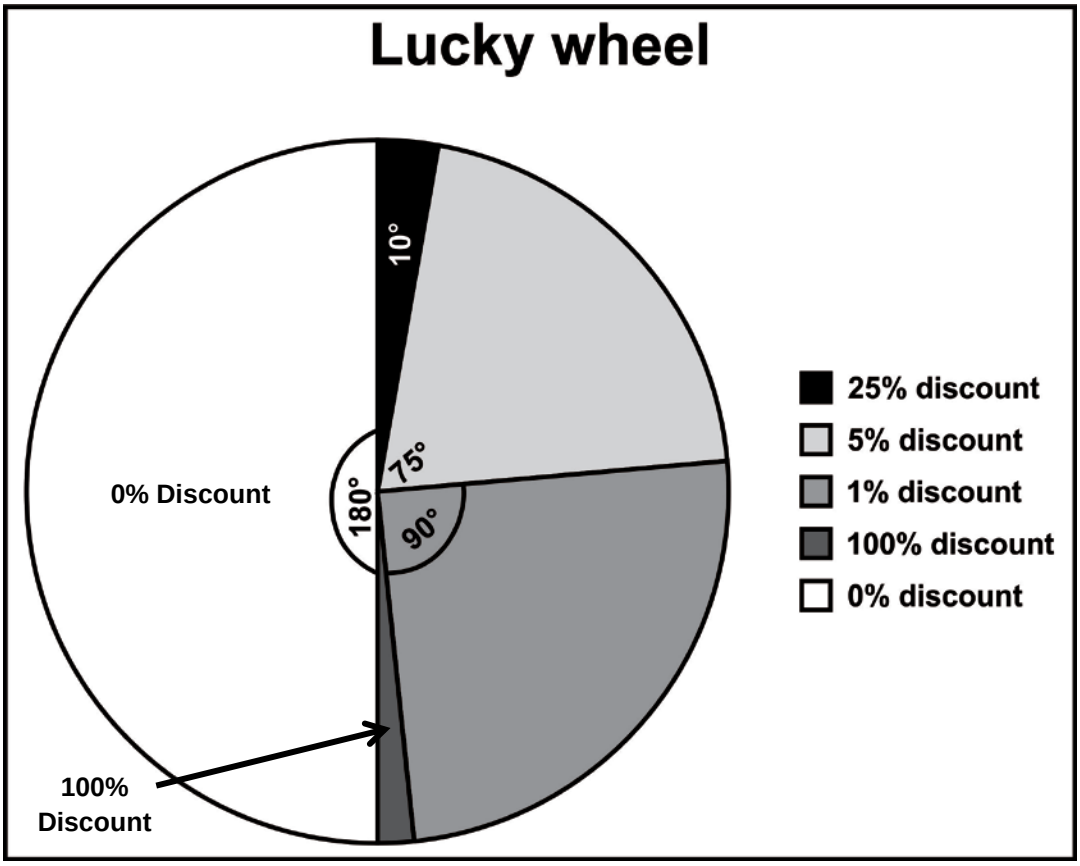
4.1.1 Does the **Total Payable** amount include the deposit? Substantiate your answer. (4)

4.1.2 If Isabel buys this lounge suite on hire purchase, how much extra (in rands) does she end up paying? (4)

4.1.3 Name one advantage and one disadvantage of buying an item on hire purchase. (2)

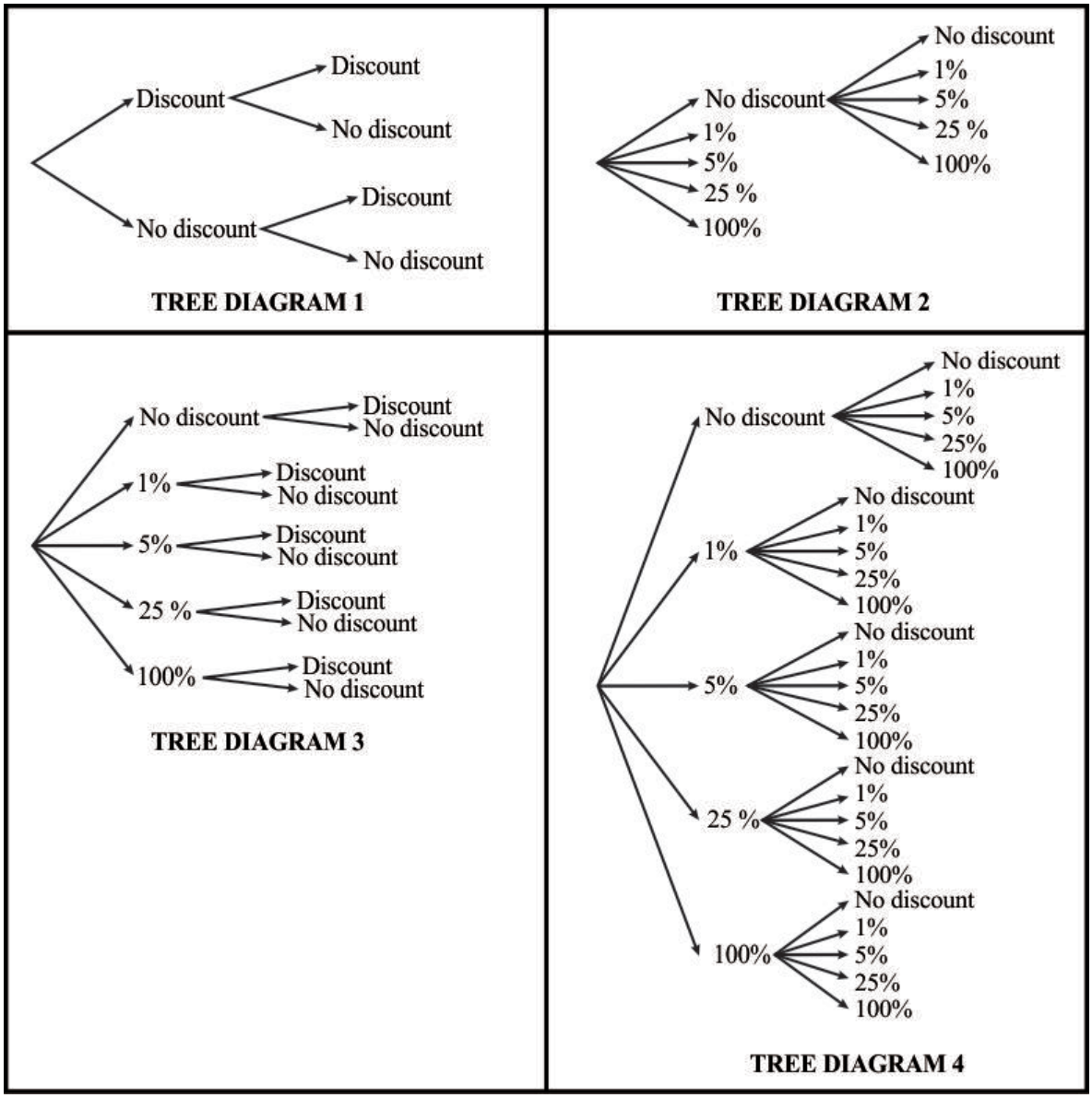
4.2 Whilst buying her lounge suite, Isabel has the opportunity to spin a 'Lucky Wheel', and in so doing, she may get a discount on the cost of the lounge suite.

The wheel looks as follows:



4.2.1 If there are 360° in a circle, determine the probability of Isabel getting a 100% discount for her purchase. Write the probability as a fraction in its simplest form. (4)

4.2.2 (a) As Isabel receives no discount on her first spin, she may spin the wheel again. Which tree diagram below accurately represents her scenario?



(2)

(b) Isabel has a 50% chance of getting no discount. Determine the probability of Isabel getting no discount on both her spins. (4)

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Total: 150 marks