basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

# SENIOR CERTIFICATE EXAMINATIONS/ NATIONAL SENIOR CERTIFICATE EXAMINATIONS

## MATHEMATICAL LITERACY P1

## 2021

**MARKS: 150**

**TIME: 3 hours**

**This question paper consists of 15 pages, 1 answer sheet and an addendum with 3 annexures.**

## INSTRUCTIONS AND INFORMATION

1. This question paper consists of FIVE questions. Answer ALL the questions.

2. 2.1 Use the ANNEXURES in the ADDENDUM to answer the following questions:

   - ANNEXURE A for QUESTION 2.1
   - ANNEXURE B for QUESTION 4.1
   - ANNEXURE C for QUESTION 5.3

   2.2 Answer QUESTION 2.2.3(a) on the attached ANSWER SHEET.

   2.3 Write your centre number and examination number in the spaces provided on the ANSWER SHEET. Hand in the ANSWER SHEET with your 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 calculations clearly.

7. Round off ALL final answers appropriately according to the given context, unless stated otherwise.

8. Indicate units of measurement, where applicable.

9. Maps and diagrams are NOT necessarily drawn to scale, unless stated otherwise.

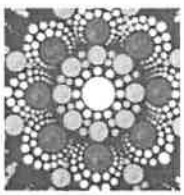
10. Write neatly and legibly.

## QUESTION 1

1.1 Hobby-X offers workshops where they teach art skills.
The information below shows the different workshops offered by Hobby-X. All prices shown exclude 15% VAT.
The first 10 participants in each of the workshops receives 7,5% discount.

**TYPES, DURATION AND COST OF THE WORKSHOPS**

| | |
|---|---|
| **Art for Beginners**<br>Duration: 90 minutes<br>Cost: R330,00<br>  | **Bunny Bin**<br>Duration: 120 minutes<br>Cost: R220,00<br>  |
| **Cheeseboard**<br>Duration: 90 minutes<br>Cost: R110,00<br>  | **Chef's Breadbin**<br>Duration: 150 minutes<br>Cost: R165,00<br>  |
| **Creative Hand Lettering**<br>Duration: 90 minutes<br>Cost: R220,00<br>  | **Creative Journaling**<br>Duration: 90 minutes<br>Cost: R275,00<br>  |

[Source: www.hobbyx.co.za]

Use the information above to answer the questions that follow.

1.1.1 The diameter of the cheeseboard is 300 mm.

Calculate the radius of the cheeseboard. (2)

1.1.2 Write the cost of the 90-minute workshops in descending order. (2)

1.1.3 Determine the VAT amount charged for the Creative Journaling workshop. (2)

1.1.4 Convert 150 minutes to hours. (2)

1.1.5 Calculate (excluding VAT) the total cost for a person attending all the workshops. (2)

1.1.6 Determine the discount amount offered for the Art for Beginners' workshop. (2)

1.2 Naomi bakes rusks and sells them in 500 g packs, at R55,00 per pack, at one of the workshops.

TABLE 1 below shows the main ingredients of the rusks.

**TABLE 1: MAIN INGREDIENTS TO BAKE 4 000 g OF RUSKS**

| | |
|---|---|
| Self-raising flour | 1 250 g |
| Bran flour | 5 cups |
| Raisins or dates | 100 g |
| Butter | 500 g |

[Adapted from www.food24.com/Recipes-and-Menus/South-African-Recipes]

A rusk is a hard, dry biscuit or twice-baked bread.

Use the information above to answer the questions that follow.

1.2.1 Convert 1 250 grams (g) to kilograms (kg). (2)

1.2.2 Determine the cost price of a 500 g pack if a profit of R30,30 per pack was made. (2)

1.2.3 Write (in simplified form) the ratio of self-raising flour to butter. (2)

1.2.4 Calculate the mass of raisins or dates needed to bake a 500 g pack of rusks. (3)

1.2.5 Calculate the number of cups of bran flour needed if Naomi bakes 8 000 g of rusks. (2)

1.3 The tables below represent the percentage interest that could be earned on your savings at two different banks.

Bank A's interest rate applies for a minimum investment of R100 000 and the rate changes over time.

**TABLE 2: INTEREST RATES OF BANK A**

| NUMBER OF MONTHS | AMOUNT IN RAND | INTEREST RATE (%) |
|---|---|---|
| 13–18 | 100 000 + | 7,10 |
| 19–24 | 100 000 + | 7,20 |
| 25–36 | 100 000 + | 7,35 |
| 37–48 | 100 000 + | 7,5 |

Bank B's annual interest rate varies according to the amount invested.

**TABLE 3: INTEREST RATE OF BANK B**

| AMOUNT IN RAND | INTEREST RATE (%) |
|---|---|
| 50 000–99 999 | 6,7 |
| 100 000–249 999 | 6,8 |
| 250 000–499 999 | 6,85 |
| 500 000–999 999 | 7,49 |

[Sources: www.capitec.co.za and www.standardbank.co.za]

Use the above information to answer the questions that follow.

1.3.1 Define the term *interest* in the given context. (2)

1.3.2 Write down the minimum number of months that Bank A offers an interest rate of 7,35% (2)

1.3.3 Name which bank offers the better interest rate for an amount of R145 000, invested for 2 years. (2)

1.3.4 Calculate the difference between the highest interest rate of Bank A and the lowest interest rate of Bank B. (3)
**[32]**

## QUESTION 2

2.1 A dental procedure, e.g. a crown implant, is performed by a dentist.

ANNEXURE A shows a quotation for a dental procedure for Ms Mpho Hendricks.

**NOTE:** A crown is a dental cap which completely covers a tooth.

Use ANNEXURE A to answer the questions that follow.

2.1.1 Write down the name of the dentist who is treating Mpho. (2)

2.1.2 State the year in which Mpho was born. (2)

2.1.3 Write down the amount that Mpho has to pay when the procedure is done. (2)

2.1.4 Calculate the total amount excluding 15% VAT. (3)

2.1.5 Calculate the price of ONE infection control measure. (2)

2.2 Mpho's sister, Anelle, has a vegetable garden. She grows vegetables that are considered useful for tooth growth. She sells mixed vegetable packs at a local market during weekends.

TABLE 4 shows the cost price for growing, processing and packaging the vegetables, as well as the selling price of each pack of mixed vegetables.

**TABLE 4: COST PRICE AND SELLING PRICE OF 1 kg MIXED VEGETABLES PACKS**

| ITEMS | COST PRICE | SELLING PRICE |
|---|---|---|
| Mixed vegetable pack (1 kg) | R12,50 | R25,00 |

TABLE 5 shows the monthly fixed cost.

**TABLE 5: MONTHLY FIXED COST**

| ITEM | PRICE |
|---|---|
| Rent for stall | R140,00 |
| Transport | R60,00 |

[Adapted from www.healthy-snacks]

Use TABLE 4 and TABLE 5 above to answer the questions that follow.

2.2.1 Calculate Anelle's total monthly fixed cost. (2)

2.2.2 The formula below is used to calculate Anelle's expenses for one month.

**Expenses (R) = 200,00 + 12,50 × number of packs**

**TABLE 6: INCOME AND EXPENDITURE OF 1 kg MIXED VEGETABLE PACKS**

| **Number of packs** | 0 | 5 | 10 | **B** | 35 | 40 | 50 |
|---|---|---|---|---|---|---|---|
| **Expenses (R)** | 200 | 262,20 | **A** | 400 | 637,50 | 700 | 825 |
| **Income (R)** | 0 | 125 | 250 | 400 | 875 | 1 000 | 1 250 |

[Adapted from www.evergreens.co.za]

Use the above formula to calculate the missing values **A** and **B**. (4)

2.2.3 Answer the questions that follow by using TABLE 6 and the graph drawn on the ANSWER SHEET showing the expenses for the mixed vegetable packs.

(a) Use the same grid provided on the ANSWER SHEET to draw another line graph showing the income from the sale of the mixed vegetable packs. (3)

(b) Explain the meaning of the term *break-even* in the given context. (2)

(c) Write down the number of mixed vegetable packs that must be sold to break even. (2)

2.3 Anelle wants to purchase a commercial vegetable slicer to assist with the chopping of the vegetables, as shown in the picture below.
The two payment options she can choose from are also shown below.

| | |
|---|---|
| **PAYMENT OPTION 1:**<br>Cash price of R1 799,00.<br><br>**PAYMENT OPTION 2:**<br>Monthly instalments<br>Deposit: 20% of cash price<br>24 monthly payments of R95,00 |  |

[Adapted from www.cateringequipment.co.za]

Use the information above to answer the questions that follow.

2.3.1 Anelle is thinking of using Payment Option 2.

(a) Calculate the deposit amount she has to pay. (2)

(b) Determine (rounded to the nearest rand) the total amount Anelle will have paid for the vegetable slicer after 24 months. (4)

2.3.2 Anelle's brother, Tony, who lives in the United States of America, decided to send her money to buy the vegetable slicer using Payment Option 1.

TABLE 7 below shows the exchange rate of South Africa in relation to the currencies of other countries.

**TABLE 7: EXCHANGE RATES TABLE ON 6 FEBRUARY 2020**

| | |
|---|---|
| 1 ZAR = 0,067251 US dollars ($) | US dollar ($) = ZAR14,86966737 |
| 1 ZAR = 0,061147 euros (€) | Euro (€) = ZAR16,35403209 |
| 1 ZAR = 0,051856 pounds (£) | Pound (£) = ZAR19,28417155 |
| 1 ZAR = 7,386276 yen (¥) | Yen (¥) = ZAR0,1352362217 |

[Adapted from www.x-rates.com/table]

Use the information and TABLE 7 above to answer the questions that follow.

(a) Explain what the term *exchange rate* means. (2)

(b) Identify the currency that is weaker than the rand. (2)

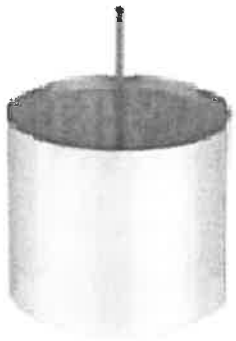
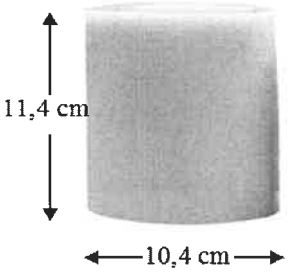
(c) Tony sent Anelle US$130,00.

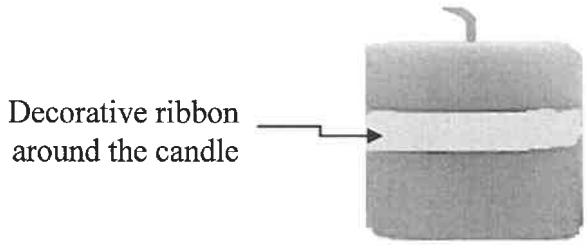
Determine, rounded to the nearest rand, the amount Anelle received from Tony. (3)

**[37]**

## QUESTION 3

3.1 Simphiwe makes candles as shown in the pictures below. He uses a cylindrical mould to make the candles. He also carves horseheads in some of the cylindrical candles.

| Candle mould | Cylindrical candle | Horsehead candle |
|---|---|---|
|  |   |  |




[Adapted from www.pinterest.co.za]

Use the pictures above to answer the questions that follow.

3.1.1 Simphiwe will pack 12 cylindrical candles in a box using a 4 by 3 arrangement.

Determine the minimum length and width of the box he needs if the candles are tightly packed, touching each other in the box. (4)

3.1.2 Simphiwe ties a decorative ribbon around the candles. The ribbon has an overlap of 3 cm. Determine the number of candles he will be able to decorate with a 20-metre long ribbon.

You may use the following formula:

**Ribbon needed for one candle (cm) $= 2 \times 3{,}142 \times$ radius $+ 3$** (5)

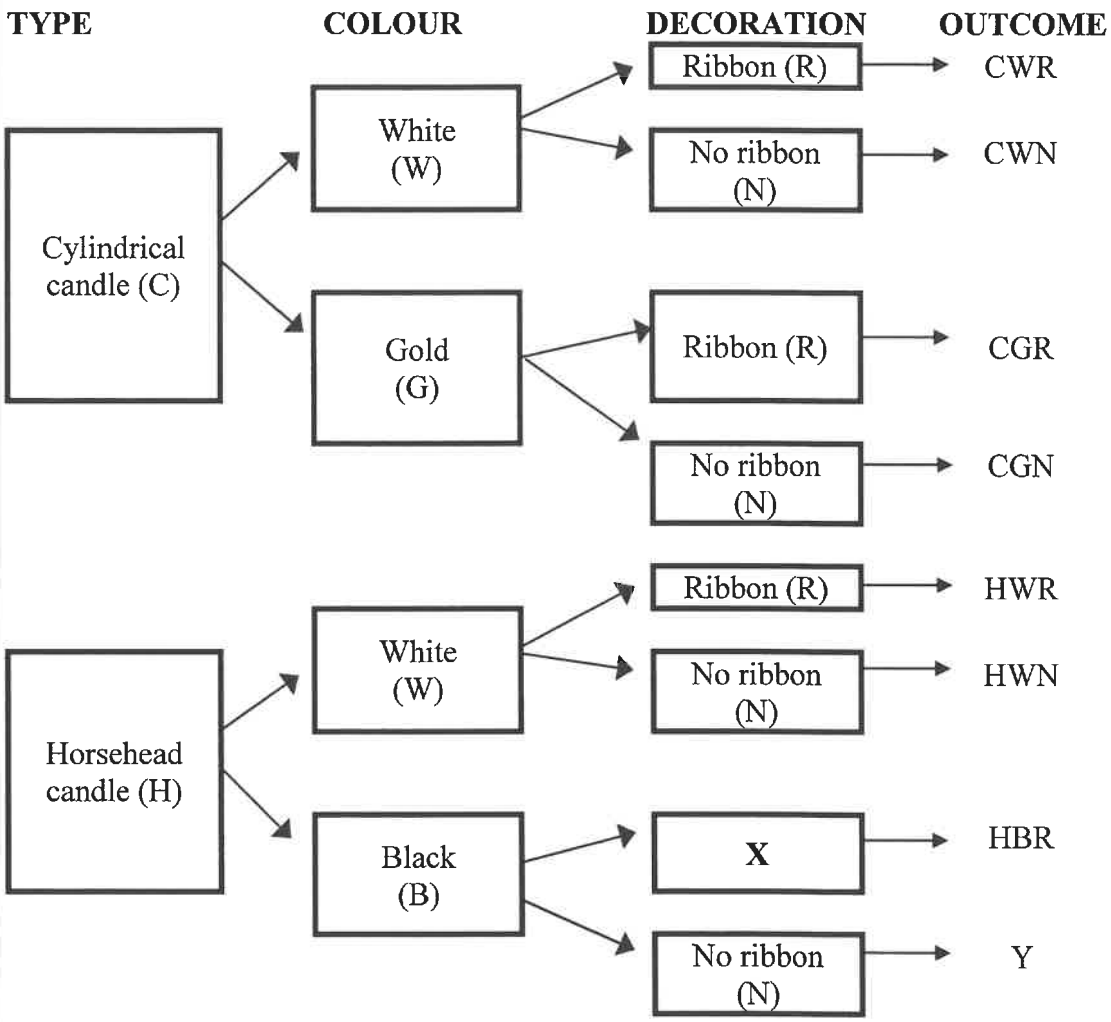
3.1.3 After carving a horsehead in a cylindrical candle, he collected the leftover wax, melted it and poured it in the mould. The leftover melted wax filled up $\frac{1}{3}$ of the mould. Calculate the volume of wax needed for one horsehead candle.

You may use the following formula:

**Volume of a cylinder $= 3{,}142 \times (\text{radius})^2 \times$ height** (4)

3.2 The tree diagram below shows the different options available for the candles that will be sold.

**TREE DIAGRAM FOR THE DIFFERENT CANDLE OPTIONS**




Use the tree diagram above to answer the questions that follow.

3.2.1 Write down the description for:

(a) X (2)

(b) Y (2)

3.2.2 Write down the probability of buying:

(a) Any candle with a ribbon, as a percentage (3)

(b) A gold horsehead candle, without a ribbon (2)

**[22]**

## QUESTION 4

4.1 Alida is a Grade 12 learner who lives in Grootdrink in the Northern Cape. She intends studying at a university in Bloemfontein. She and her parents plan to attend the university's open day for prospective students.

A map on ANNEXURE B shows a part of the Northern Cape, Free State and surrounding areas.

Use ANNEXURE B to answer the questions that follow.

4.1.1 Write down the general direction from Bloemfontein to Grootdrink. (2)

4.1.2 State the national road they will use to travel to Bloemfontein. (2)

4.1.3 Write down the name of the third town they will pass en route to Bloemfontein. (2)

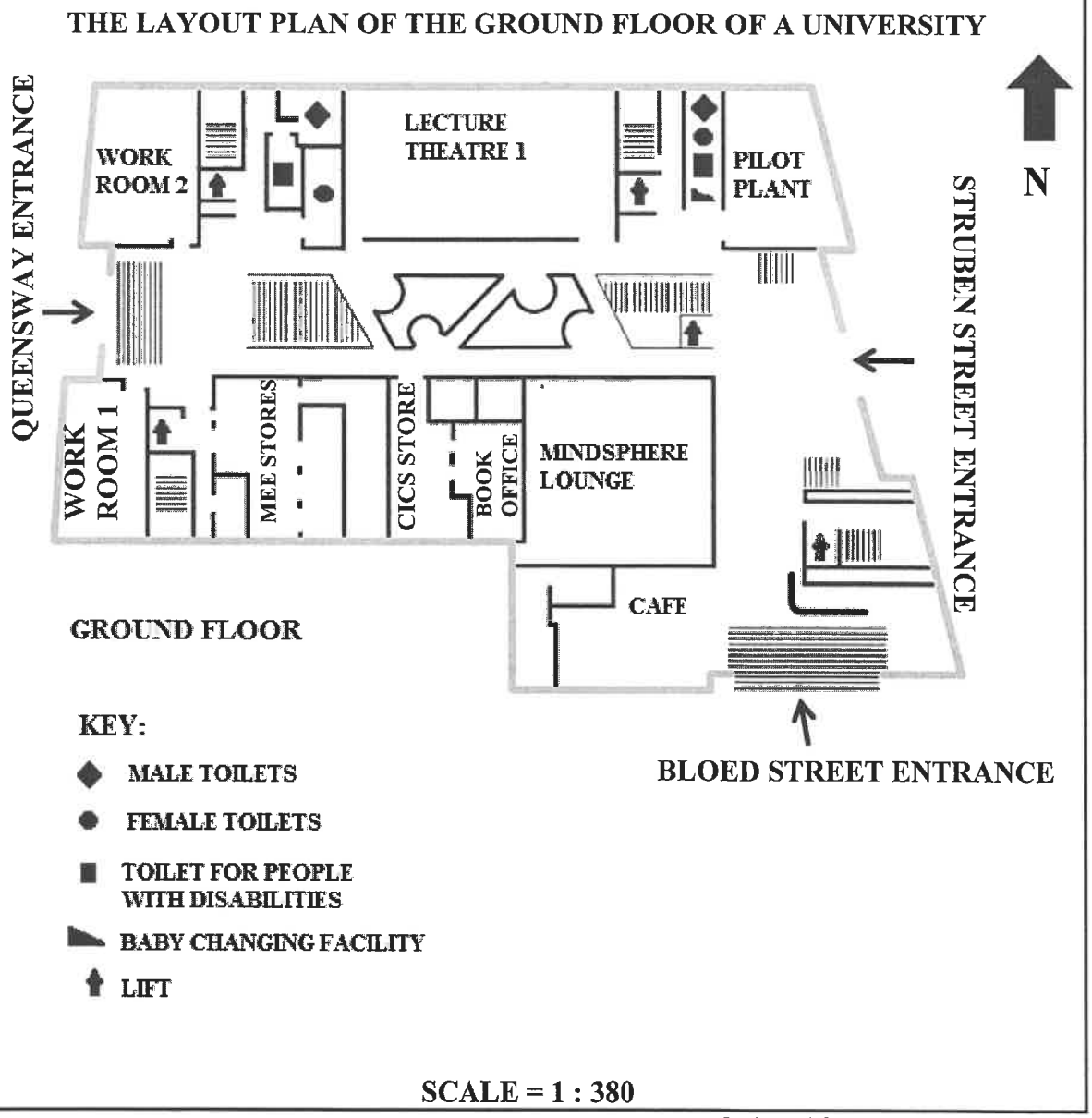
4.1.4 Alida and her parents will leave Grootdrink at 04:00 to travel the distance of 496,9 km to Bloemfontein.

Determine (to the nearest km/h) the average speed they must travel to be in Bloemfontein at 09:30.

You may use the following formula:

$$\textbf{Average speed} = \frac{\textbf{distance}}{\textbf{time}}$$ (4)

4.2 The layout plan of the ground floor of a university is given below.




[Adapted from www.pinterest.com]

Use the layout plan above to answer the questions that follow.

4.2.1 Explain the meaning of the given scale. (2)

4.2.2 Name a feature on the layout plan that indicates that this is a multi-level building. (2)

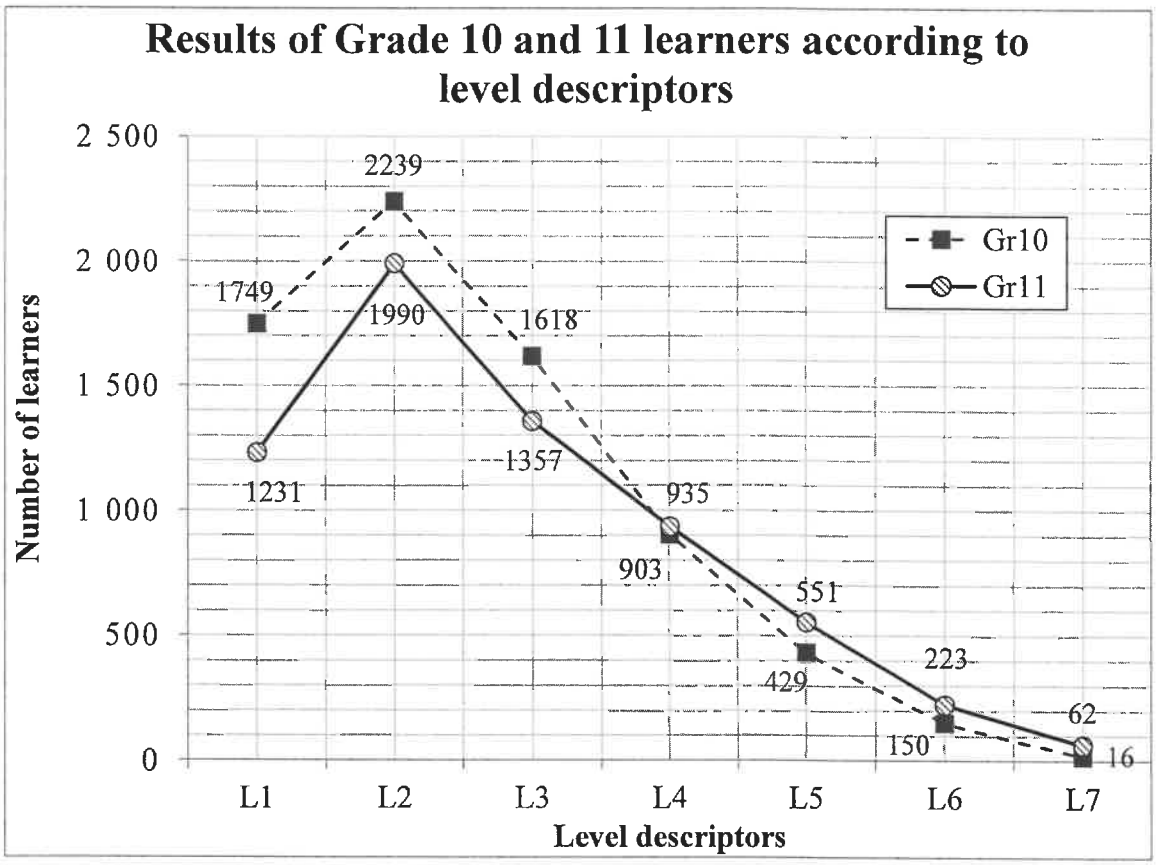
4.2.3 Determine the number of toilets not suitable for people with disabilities on this layout plan. (2)

4.2.4 Identify the entrance that will be closest to the cafe. (2)

4.2.5 Measure (in mm) the east-facing wall of the Mindsphere Lounge. (3)
**[21]**

## QUESTION 5

5.1 In South Africa, learners' marks are graded using level descriptors from level 1 (L1), the lowest marks, to level 7 (L7), being the highest mark. The information below shows the November 2019 Mathematical Literacy results for learners in a particular district in South Africa.




[Adapted from www.eduinfosearch.com]

Use the graph above to answer the questions that follow.

5.1.1 Define the term *range*. (2)

5.1.2 Identify the type of graph shown. (2)

5.1.3 State whether the learner numbers represent continuous or discrete data. (2)

5.1.4 Determine the total number of Grade 10 learners who sat for the examinations. (3)

5.1.5 Write down the level descriptors which show that the performance of the Grade 11 learners is below the performance of the Grade 10 learners. (3)

5.1.6 Determine the median level descriptor for the Grade 11 learners. (3)

5.2 The incomplete frequency table below shows the Mathematical Literacy marks of a group of 67 learners.

**FREQUENCY TABLE OF THE MATHEMATICAL LITERACY MARKS**

| INTERVAL As a % | TALLIES | FREQUENCY | CUMULATIVE FREQUENCY |
|---|---|---|---|
| 90–100 | | 0 | 0 |
| 80–89 | III | 3 | 3 |
| 70–79 | ... | ... | ... |
| 60–69 | 𝍸 𝍸 II | 12 | 21 |
| 50–59 | 𝍸 II | 7 | 28 |
| 40–49 | 𝍸 𝍸 𝍸 | 15 | 43 |
| 30–39 | 𝍸 𝍸 𝍸 II | 17 | 60 |
| 20–29 | IIII | 4 | 64 |
| 10–19 | II | 2 | 66 |
| 0–9 | I | 1 | 67 |

Use the frequency table above to answer the questions that follow.

5.2.1 Complete the tally for the 70–79% interval. (2)

5.2.2 Write down the frequency for the 70–79% interval. (2)

5.2.3 Show, by means of calculations, how the cumulative frequency for the 30–39% interval was determined. (2)

5.3 The graph on ANNEXURE C shows the number of candidates who sat for the NSC Examinations in Mathematics, Technical Mathematics and Mathematical Literacy for the period 2014 to 2019.

Use the graph on ANNEXURE C to answer the questions that follow.

5.3.1 Name the type of graph given in ANNEXURE C. (2)

5.3.2 Write down, in words, the number of learners who sat for the Mathematical Literacy examination in 2018. (2)

5.3.3 Determine how many more learners sat for Mathematical Literacy than for Mathematics and Technical Mathematics combined in 2019. (3)

5.3.4 Calculate the mean number of learners doing Mathematics over the period shown. (3)

5.3.5 Determine the range of the Mathematical Literacy learners over the period shown. (2)

5.3.6 The total number of candidates doing the examinations in the three subjects in 2019 was 530 311.

Calculate (rounded to ONE decimal place) the difference in the percentage of learners doing Mathematics instead of Mathematical Literacy in South Africa. (5)
**[38]**

**TOTAL: 150**

**ANSWER SHEET**

**QUESTION 2.2.3(a)**

**CENTRE NUMBER:**

**EXAMINATION NUMBER:**

**INCOME AND EXPENDITURE OF 1 kg MIXED VEGETABLE PACKS**