



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

MATHEMATICAL LITERACY

(Second paper)

NQF LEVEL 3

(10401023)

26 November 2020 (Y-paper)

13:00–16:00

Nonprogrammable calculators may be used.

This question paper consists of 9 pages and 3 addenda.

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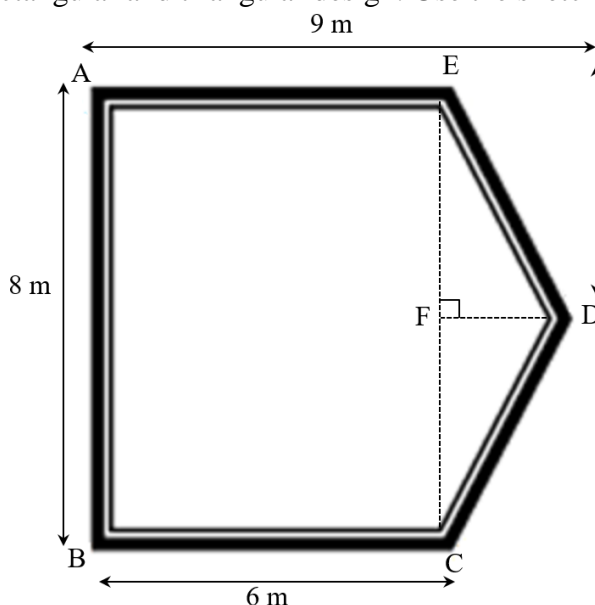
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|---|
| <p>TIME: 3 HOURS MARKS: 150</p> |
|---|

INSTRUCTIONS AND INFORMATION

1. Answer all the questions.
 2. Read all the questions carefully.
 3. Number the answers according to the numbering system used in this question paper.
 4. Start each question on a new page.
 5. Show all the calculations clearly.
 6. Round off your answers correctly according to the given context. In all other cases, where the context is not specific, round off your answers correctly to two decimal places.
 7. Indicate units of measurement, where applicable.
 8. Diagrams are not necessarily drawn to scale.
 9. Write neatly and legibly.
 10. Answer QUESTION 2.1.1 on ADDENDUM A, QUESTION 3.1.4 on ADDENDUM B and QUESTION 4.1.5 on ADDENDUM C. Write your examination number in the spaces on ADDENDUM A, ADDENDUM B and ADDENDUM C and hand in the ADDENDA with your ANSWER BOOK.
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QUESTION 1

- 1.1 The sketch of a swimming pool ABCDE with some dimensions is represented below. The pool has a combination of a rectangular and triangular design. Use the sketch to answer the questions.



- 1.1.1 DF is the height of $\triangle EDC$.

Show that the length of DF is equal to 3 m.



(2)

- 1.1.2 DF is also the perpendicular bisector of EC. Determine the length of EF.

(2)

- 1.1.3 Calculate the perimeter of the swimming pool.

Formula: Perimeter = distance around an object

$$ED^2 = EF^2 + DF^2$$

(10)

- 1.1.4 Calculate the area of the swimming pool in m^2 .

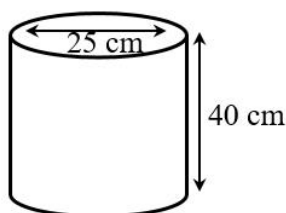


Formula: Area of rectangle = length \times breadth

$$\text{Area of triangle} = \frac{1}{2} \times \text{base} \times \text{perpendicular height}$$

(7)

- 1.2 A cylindrical plant pot has an interior diameter of 25 cm and a height of 40 cm. Potting mix is sold in 2 kg bags. Use the information to answer the questions.



- 1.2.1 Calculate the interior volume of the cylindrical plant pot.

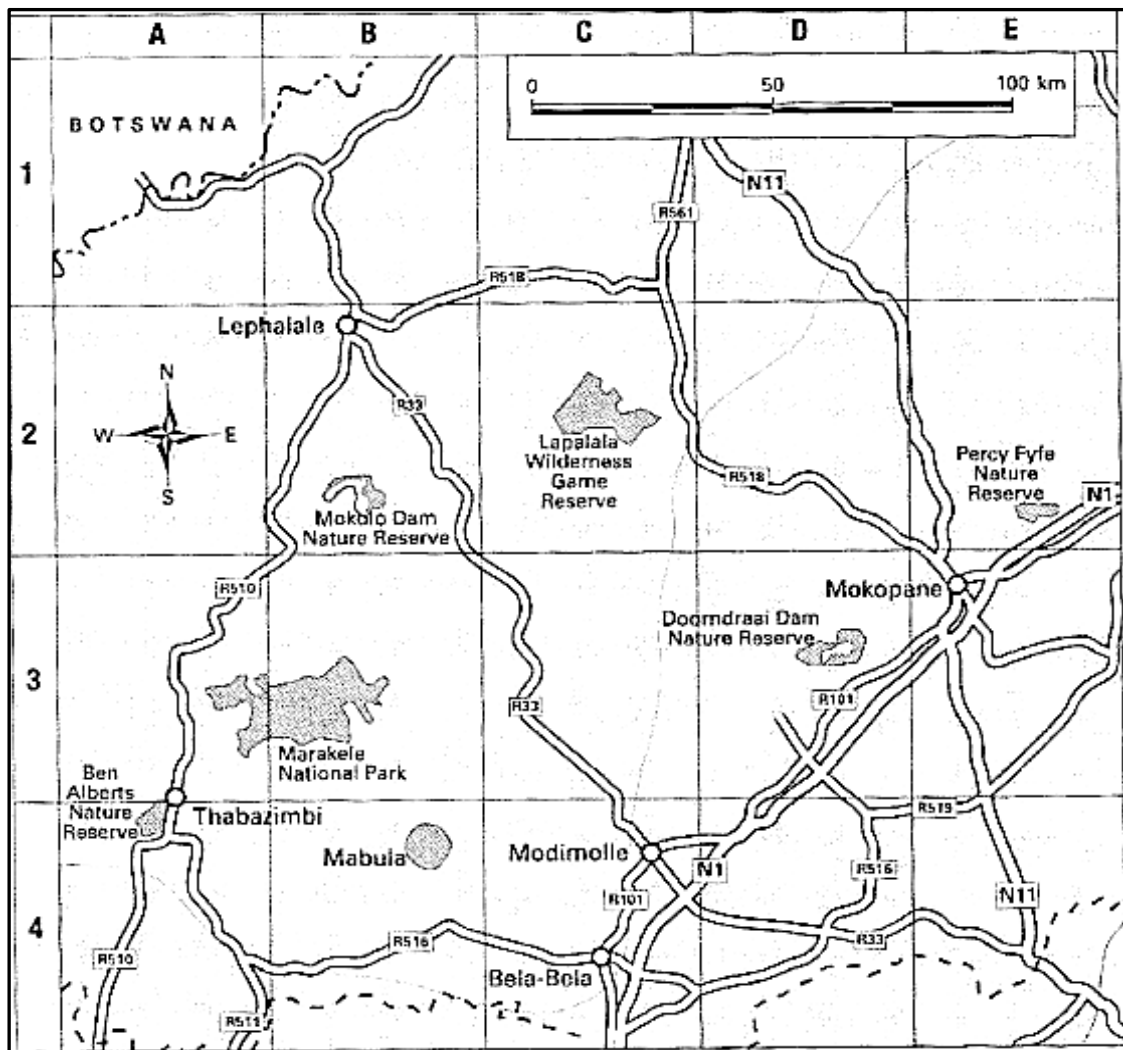
Formula: $\text{Volume} = \pi \times r^2 \times h$, where $\pi = 3,14$ (5)

- 1.2.2 If a 2 kg bag of potting mix fills $0,05 \text{ m}^3$ of the volume in similar cylindrical plant pots, determine how many 2 kg bags of potting soil will be needed to fill 6 cylindrical plant pots.

Hint: $1 \text{ m}^3 = 1\,000\,000 \text{ cm}^3$ (6)



- 1.3 Below is a picture of the route map of the south-western part of the Limpopo Province.



- 1.3.1 Which grid block on the map contains the Percy Fyfe Nature Reserve? (1)

- 1.3.2 What is the compass direction of Modimolle from Lephalale? (2)



- 1.3.3 The scale on the original route map is 1 : 500 000. The map distance between Modimolle and Lephalale is 305 mm along the R33 route.

Determine the actual distance (in kilometres) between Modimolle and Lephalale. Show all calculations. (5)

[40]

QUESTION 2

- 2.1 Thoko makes beaded necklaces and sells them at a market stall which she rents for R750,00 per month. Her monthly transport to the market is R180,00. The production cost per necklace is R56,10. Thoko sells each necklace at R75,00.



The table below represents Thoko's monthly expense of making and selling necklaces and her income from selling the necklaces:

| No. of necklaces | 0 | 10 | 20 | 30 | ... | 60 |
|------------------|---------|-----------|-----------|-----------|-----|-----------|
| Monthly Expense | R930,00 | R1 491,00 | R2 052,00 | R2 613,00 | ... | R4 296,00 |
| Monthly Income | R0,00 | R750,00 | R1 500,00 | R2 250,00 | ... | R4 500,00 |

- 2.1.1 Use the table above to draw and label two line graphs of the monthly expense of making necklaces and the monthly income from selling necklaces on the grid found in ADDENDUM A (attached). Label each graph clearly. (12)
- 2.1.2 If Thoko makes and sells 40 necklaces in one month, would she make enough money to break even? Use the graph drawn in QUESTION 2.1.1 to justify your answer. (2)
- 2.1.3 Use the graphs to determine the approximate breakeven value for Thoko's business. Give the number of necklaces that must be sold as well as the income needed to break even. (2)

- 2.2 Thoko purchased a laptop for use in her business. She paid a VAT inclusive amount of R1 494,99 for the laptop. VAT is calculated at 15%.



Calculate the amount of VAT added to the VAT inclusive price. (5)

- 2.3 Thoko uses her income from her business to pay for her home's water account. The table below represents the water tariff of her local municipality. Use the water tariff table to answer the questions:

| CONSUMPTION | INCREMENTAL TARIFF (per kℓ), VAT exclusive |
|--------------------------------|--|
| First 6 kℓ | Free |
| In excess of 6 kℓ up to 10 kℓ | R5,84 |
| In excess of 10 kℓ up to 15 kℓ | R6,69 |
| In excess of 15 kℓ up to 20 kℓ | R9,98 |
| In excess of 20 kℓ up to 30 kℓ | R13,50 |
| In excess of 30 kℓ up to 40 kℓ | R13,87 |
| In excess of 40 kℓ | R16,85 |

- 2.3.1 Determine how much Thoko will be charged for water consumption if she uses 26,7 kℓ of water in one month. (6)
- 2.3.2 VAT is calculated at 15%. Calculate the total amount due by Thoko on the water consumed in QUESTION 2.3.1. (3)

- 2.4 Thoko plans to buy a small new car for her business in three years' time. The current cash price of the car is R149 900,00. The table below shows the predicted inflation rate for the next three years.

| YEAR | PREDICTED INFLATION RATE |
|-------------|--------------------------|
| 2020 – 2021 | 8,7% |
| 2021 – 2022 | 5,6% |
| 2022 – 2023 | 6,5% |

Use the predicted inflation rates to determine the price of the same type of new car in three years' time. Show all calculations.

(10)
[40]

QUESTION 3

- 3.1 Mapitsi owns a company that delivers the local daily newspaper. He employs TVET students to deliver papers on a part time basis. The table below represents the number of students required to deliver the daily newspaper:

| | | | | | | | | |
|---|----|----|---|---|---|---|----|----|
| Number of Students | 1 | 2 | 3 | A | 6 | 8 | 12 | 24 |
| Time taken to deliver all papers (in hours) | 24 | 12 | 8 | 6 | 4 | 3 | 2 | 1 |



Use the information and the table above to answer the questions:

- 3.1.1 Calculate the missing value of A. (2)

- 3.1.2 Give a reason why it is not advisable for Mapitsi to employ less than 4 students. (2)



- 3.1.3 Mapitsi plans for the students to start delivering newspapers at 05:00 and he wants them to complete all deliveries by 08:00. What is the least number of students he must hire? (2)

- 3.1.4 Use the table above to draw a line graph on the grid found in ADDENDUM B (attached). Provide a suitable title for the graph and label the axes. (11)


- 3.2 Mapitsi's wife makes hot dogs and sells them at a market stall for which the daily rental is R120,00. It costs her R8,00 to make one hot dog and she sells it for R15,00.

The table given below shows the income and expenses for the hot dog business. Study the table and answer the questions that follow.

| | | | | | |
|-----------------------|-----|-----|-----|-----|-------|
| Number of hot dogs | 0 | 10 | 20 | C | 75 |
| Daily expenses (in R) | 120 | 200 | B | 440 | 720 |
| Daily income (in R) | 0 | A | 300 | 600 | 1 125 |



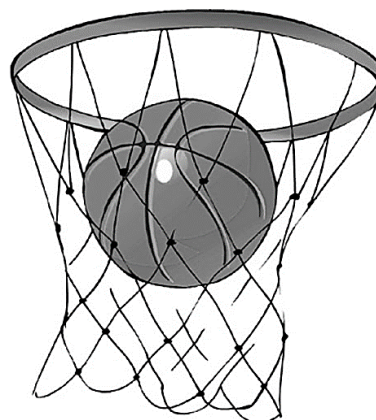
Use the information and the table to answer the questions.



- 3.2.1 Calculate the missing value of A, show all calculations. (2)
- 3.2.2 Calculate the missing value of B, show all calculations. (3)
- 3.2.3 Calculate the missing value of C, show all calculations. (2)
- 3.2.4 Derive a formula to calculate the daily income.  (2)
- 3.2.5 Derive a formula to calculate the daily expenses. (3)
- 3.2.6 Calculate the profit if Mapitsi's wife makes and sell 30 hot dogs in one day. (3)
- 3.2.7 Is the Daily expense or the Daily income an example of a direct proportion relationship? Give two reasons for your answer. (3)
- [35]**

QUESTION 4

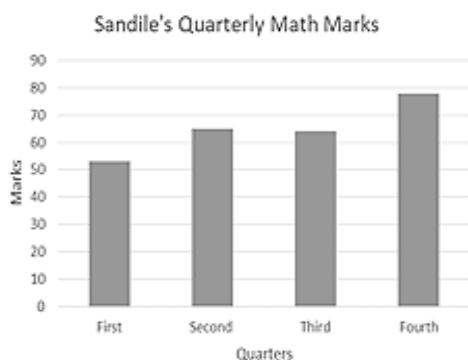
- 4.1 The gender and heights of students who tried out for the college basket ball teams on the first day of trials are represented in the table below. Use the table to answer the questions.

| Gender | Height in metres | Gender | Height in metres |
|--------|------------------|--------|------------------|
| M | 1,73 | M | 1,74 |
| M | 1,76 | F | 1,65 |
| F | 1,57 | M | 1,81 |
| M | 1,89 | F | 1,65 |
| M | 1,73 | M | 1,84 |
| M | 1,9 | F | 1,56 |
| F | 1,74 | F | 1,55 |
| F | 1,47 | M | 1,75 |
| F | 1,54 | M | 1,61 |

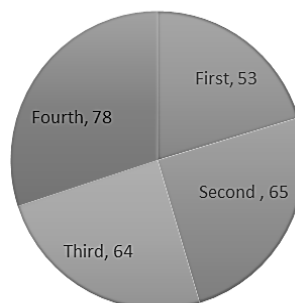


- 4.1.1 Sort the data in ascending order according to the gender and height of the students separately.  (4)
- 4.1.2 Calculate the median of the heights of the male and female students separately. (4)
- 4.1.3 Calculate the mean of the heights of the male and female students separately. Write the answers correct to 2 decimal places. (4)
- 4.1.4 Use the answers in QUESTION 4.1.2 and QUESTION 4.1.3 to compare and comment on the heights of the male and female students. (2)
- 4.1.5 Complete the height distribution table provided on ADDENDUM C. Write only the number of male and female students per height category. (4)
- 4.1.6 What type of data does the height distribution table in QUESTION 4.1.5 represent?  (1)

- 4.2 The graphs below represent the quarterly percentage marks Sandile obtained in Mathematics for the year.



Sandile's Quarterly Math Marks



- 4.2.1 What is the trend of Sandile's marks? (1)
- 4.2.2 Which graph best represents Sandile's marks? (1)
- 4.2.3 Give one reason why the bar graph is misleading. (2)
- 4.2.4 Give one reason why the pie graph is misleading. (2)



- 4.3 Given below is an incomplete frequency table showing the number of times the following artists/group were nominated for SAMA awards for various categories of performances:

| ARTIST/GROUP | FREQUENCY | TALLY |
|----------------|-----------|-------|
| Black Coffee | 5 | |
| Freshly Ground | | |
| Zonke Dikana | 4 | |

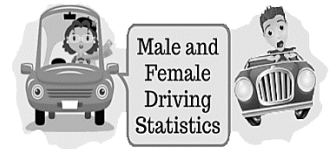
- 4.3.1 Determine from the frequency table for how many categories Freshly Ground was nominated. (1)
- 4.3.2 What is the probability that Black Coffee will be nominated to receive an award at the next SAMA awards? Write down the answer in its simplest ratio form. (3)




- 4.4 The table below shows the data collected by an insurance company regarding the number of accidents involving female and male drivers.



| AGE GROUP | NUMBER OF ACCIDENTS | | TOTAL |
|----------------|---------------------|--------------|-------------|
| | MEN | WOMEN | |
| 18–25 years | 23,8% | 16,4% | 40,2% |
| 26–40 years | 25,1% | 14,2% | 39,3% |
| 41–55 years | 6,3% | 5,7% | 12,0% |
| Above 55 years | 4,1% | 4,4% | 8,5% |
| TOTAL | 59,3% | 40,7% | 100% |



- 4.4.1 What is the probability, given as a percentage, of a person in the 26–40 year age group being involved in an accident? (1)
- 4.4.2 If 1 200 men aged 18–25 years took out insurance policies, how many of them, may be involved in an accident? Show all calculations.  (3)
- 4.4.3 Explain why your answer in QUESTION 4.4.2 is a prediction and not a certainty. (2)

[35]

TOTAL: 150

MATHEMATICAL LITERACY L3 P2

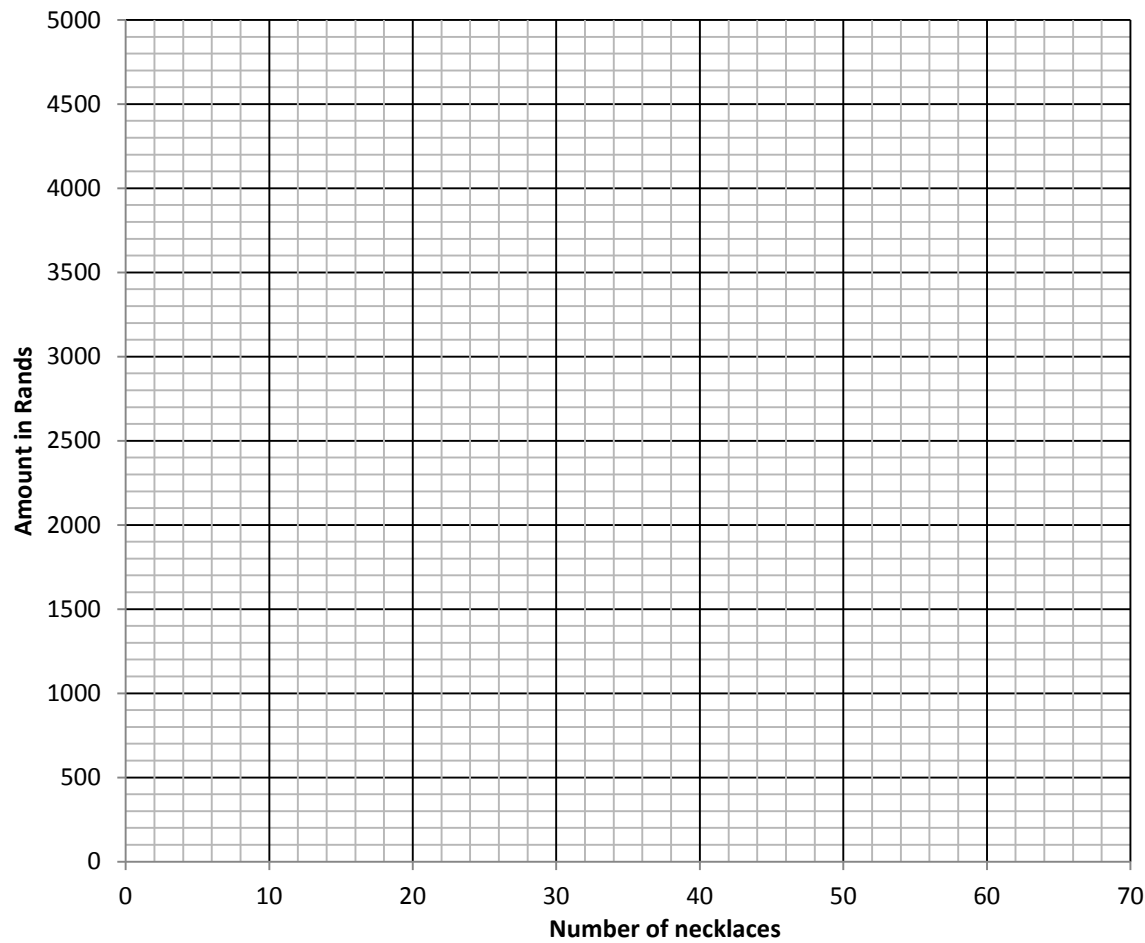
ADDENDUM A

EXAMINATION
NUMBER:

| | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|

QUESTION 2.1.1

Monthly Expense vs Income



DETACH THE ADDENDUM AND HAND IT IN WITH THE ANSWER BOOK.

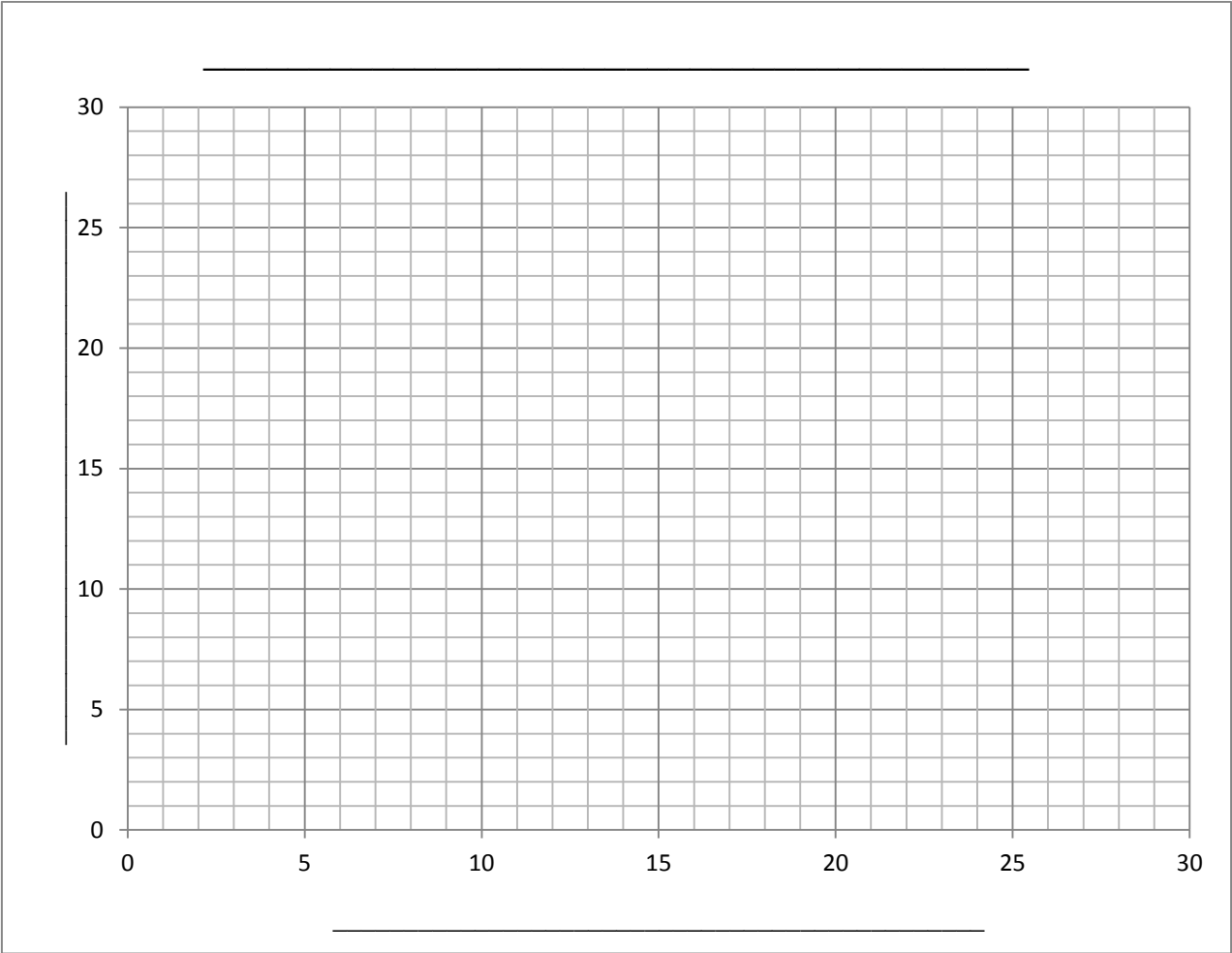
MATHEMATICAL LITERACY L3 P2

ADDENDUM B

EXAMINATION
NUMBER:

| | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|

QUESTION 3.1.4



DETACH THE ADDENDUM AND HAND IT IN WITH THE ANSWER BOOK.

MATHEMATICAL LITERACY L3 P2

ADDENDUM C

EXAMINATION
NUMBER:

| | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|
| | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--|--|--|

QUESTION 4.1.5

| Height distribution | | |
|---------------------|-----------|--------|
| Height category | Frequency | |
| | Male | Female |
| < 1,7 | | |
| 1,7–1,79 m | | |
| 1,8–1,89 m | | |
| 1,9–1,99 m | | |

DETACH THE ADDENDUM AND HAND IT IN WITH THE ANSWER BOOK.