GAUTENG PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

PREPARATORY EXAMINATION

2022

10602

MATHEMATICAL LITERACY

PAPER 2

TIME: **3 hours**

MARKS: **150**

13 pages and an addendum of 5 pages

MATHEMATICAL LITERACY: Paper 2

10602E

X05

This question paper consists of 13 pages.
An addendum of 5 pages is included in the question paper.

P.T.O.

INSTRUCTIONS AND INFORMATION

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

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

   ANNEXURE A for QUESTION 2.2
   ANNEXURE B for QUESTION 4.2
   ANNEXURE C for QUESTION 5.1
   ANNEXURE D for QUESTION 5.2

3. Number your answers correctly according to the numbering system used in this question paper.

4. Start the answer to 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 drawn to scale, unless stated otherwise.

10. Write neatly and legibly.

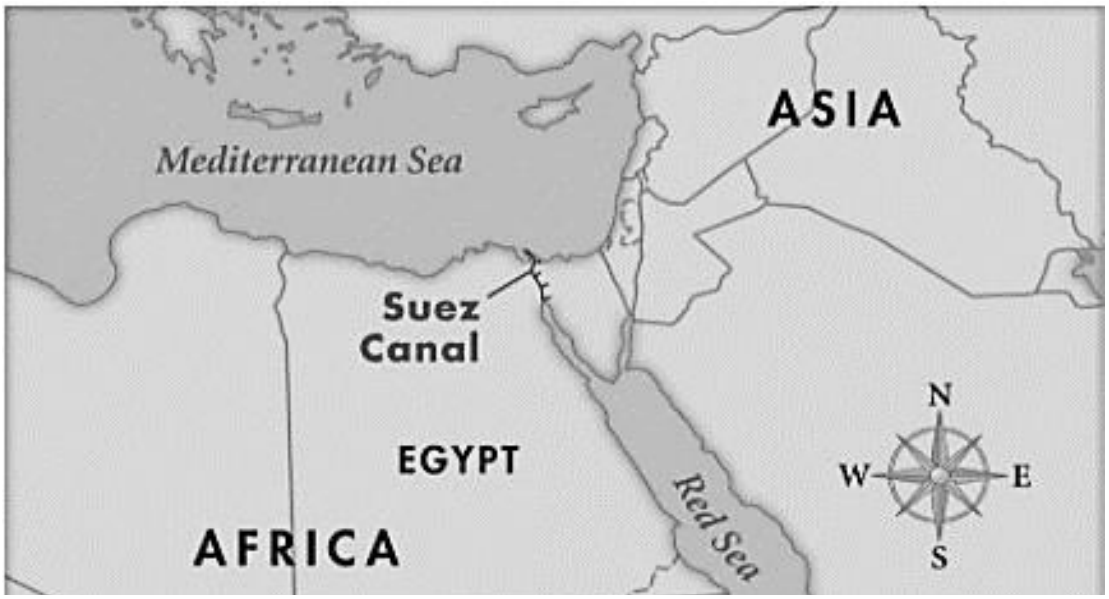
QUESTION 1

1.1 Study the information and the map below and answer the questions that follow.

The Suez Canal is an artificial sea-level waterway running 193 kilometres between Port Said in the north and Suez in the south. The Suez Canal offers a shorter route for major ships carrying cargo around the world. Construction of the Suez Canal started on 25 September 1859 and was first opened in 1869.

When first opened, the canal was 8 metres deep, 22 metres wide at the bottom and 61 to 91 metres wide at the surface. To allow ships to pass each other, passing bays were built every 8 to 10 km.

The map below shows the Suez Canal and its surrounding areas.



[Source: https://kids.britannica.com/kids/article/Suez-Canal/353819]

1.1.1 Identify the country that borders the Suez Canal on the western side. (2)

1.1.2 Write down the names of the continents separated by the Suez Canal. (2)

1.1.3 Identify the sea that is found on the southern side of the Suez Canal. (2)

1.1.4 Write down the distance between the city at the south of the Suez Canal and the city at the north of the Suez Canal. Give your answer in km. (2)

1.1.5 Mention ONE advantage that ships have when using the Suez Canal. (2)

1.1.6 Mention any TWO items that a ship using the Suez Canal could transport. (2)

1.1.7 Give ONE reason why "passing bays" were built every 8 to 10 km along the length of the canal. (2)

1.1.8 Determine the number of years it took for the Suez Canal to be opened to maritime (sea-going) traffic from the time construction began. (2)

1.2 On 23 March 2020, the 1 300 ft long ship, the *Ever Given* travelled from Asia to Europe. It entered the Suez Canal in the south and sailed north. The ship got stuck in the mud right across the southern part of the canal.

1.2.1 In which general direction was the *Ever Given* sailing through the Suez Canal? (2)

1.2.2 At which city did the *Ever Given* enter the Suez Canal? (2)

1.2.3 The “Ever Given” is 1 300 ft. long. Convert the length of this container ship to metres, given that **1ft = 0,3048 m.** (2)

1.3 The chef on the ship prepared chocolate mousse for the crew members. Study the recipe below that he used and answer the questions that follow.

CHOCOLATE MOUSSE RECIPE

INGREDIENTS	
200 g dark chocolate 30 ml brandy (optional) 3 eggs (whites only) 60 ml castor sugar 100 ml cream	

Preparation time: 10 minutes *Cooking time: 5 minutes* *Servings: 6 people*

METHOD

- Grate 50 g dark chocolate, break the rest into small pieces and melt in a pot.
- Stir in brandy (if using).
- Whisk egg whites until stiff, add sugar and whisk until smooth.
- Fold in cream and add two thirds of the grated dark chocolate.
- Spoon the mixture into 6 bowls, sprinkle the remaining grated chocolate and chill in the fridge for 2 hours.

1.3.1 Determine the total time (in hours) that it will take to prepare and cook the chocolate mousse. (2)

1.3.2 Convert the weight of the dark chocolate to kilograms. (2)

1.3.3 Write down the ratio of castor sugar to brandy in its simplest form. (2)

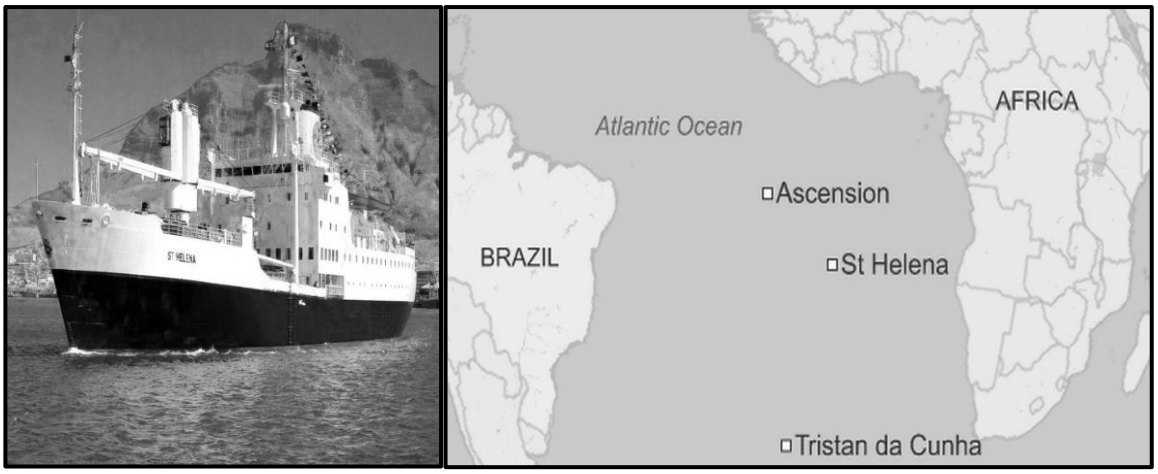
1.3.4 Determine the number of grams of grated chocolate that will be added to the cream. (2)

1.3.5 The chef started making the mousse at 11:55. At what time will it be ready for eating? (2)

[32]

QUESTION 2

2.1 The *Royal Mail Ship St Helena* was a unique cargo-passenger ship built in 1989, specifically to supply the Island of St Helena, a British overseas territory in the tropical South Atlantic Ocean. The *Royal Mail Ship St Helena* can accommodate 156 passengers and 56 crew members.



Study the information and the map above, and answer the following questions.

2.1.1 Determine the probability that if a person could be picked at random from the ship, it would be a crew member. Give the answer as a percentage. (3)

2.1.2 The passengers on the *Royal Mail Ship St Helena* are of the following nationalities:

Nationality	Number of passengers	Male	Female
South African	48	35	13
Russian	12	8	4
American	56	23	33
German	23	10	13

Determine the probability that if a passenger is selected at random, the passenger will be a Russian, male passenger or a South African, female passenger. (4)

2.2 The *Royal Mail Ship St Helena* departs from Cape Town to St Helena. Study the map of St Helena in ANNEXURE A and answer the questions that follow.

2.2.1 Where is the harbour on St Helena likely situated? (2)

2.2.2 Choose the correct letter that will make the following statement TRUE.

The town of Levelwood lies:

A South of Longwood
B West of Blue Hill
C South-west of Jamestown (2)

2.2.3 What type of scale is shown in ANNEXURE A? (2)

2.2.4 Use the scale on the map to determine the distance, as the crow flies, from Longwood (the town) to St Paul's (the town). Give the answer in kilometres.

NOTE: **1 mile = 1,60934 km.** (4)

2.2.5 Give ONE reason why certain towns on the map are indicated with larger dots than other towns on the map. (2)

2.2.6 Use a ruler to measure the approximate length, as the crow flies, of St Helena from the most south westerly end to the most north easterly part of the island. Give the answer in cm. (2)

2.2.7 The maximum breadth of the island is approximately 10 km. Use the scale of the map together with the answer to QUESTION 2.2.6 to determine the estimated area of the entire island. (4)

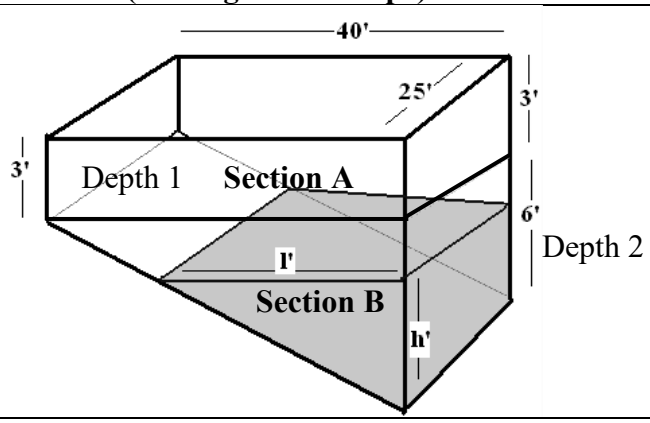
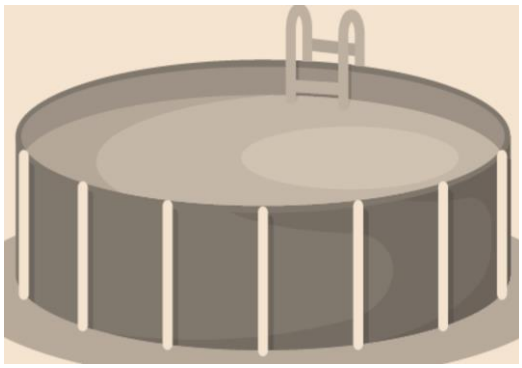
2.2.8 Population density is the number of people found living in each square kilometre of an area. According to the last census in 2016 there were 4 534 people living on St Helena. Use the answer to QUESTION 2.2.7 to determine the population density of St Helena. (3)

2.2.9 If you had the opportunity to start a business on St Helena, what type of business would it be? (2)

[30]

QUESTION 3

Mrs Phalatsi would like to have a swimming pool at her house. She is comparing the size of two shapes of swimming pools.
Pool A is rectangular in shape with the depth increasing uniformly from 3 feet to 9 feet.
Pool B is cylindrical in shape with a diameter of 5 m. Below are the diagrams of both pools.

POOL A (rectangular in shape)	**POOL B (cylindrical in shape)**
	
Pool A dimensions	**Pool B dimensions**
Length: 40 feet Width: 25 feet Depth 1: 3 feet Depth 2: 6 feet	Diameter: 5 m Depth : ……
The following formulae may be used: **Area of a rectangle** = length × width (depth) **Area of a triangle** = ½ × base × height **Area of a circle** = π × radius^2 (let π = 3,142) (depth) **Volume of a cylinder** = π × radius^2 × height **Circumference** = π × diameter ***π** = 3,142* ***1 m^3** = 1 000 litres* ***1 foot** = 0,3048 m*	

3.1 Explain the term *circumference*. (2)

3.2 Convert the length of the rectangular pool to metres (m). (2)

3.3 Mrs Phalatsi claims that pool A can hold over 169 000 litres of water. If the volume of water for section A of her pool is given as 84 951 ℓ, determine whether Mrs Phalatsi's claim is correct. (8)

PLEASE DETACH THIS ADDENDUM OF 5 PAGES.

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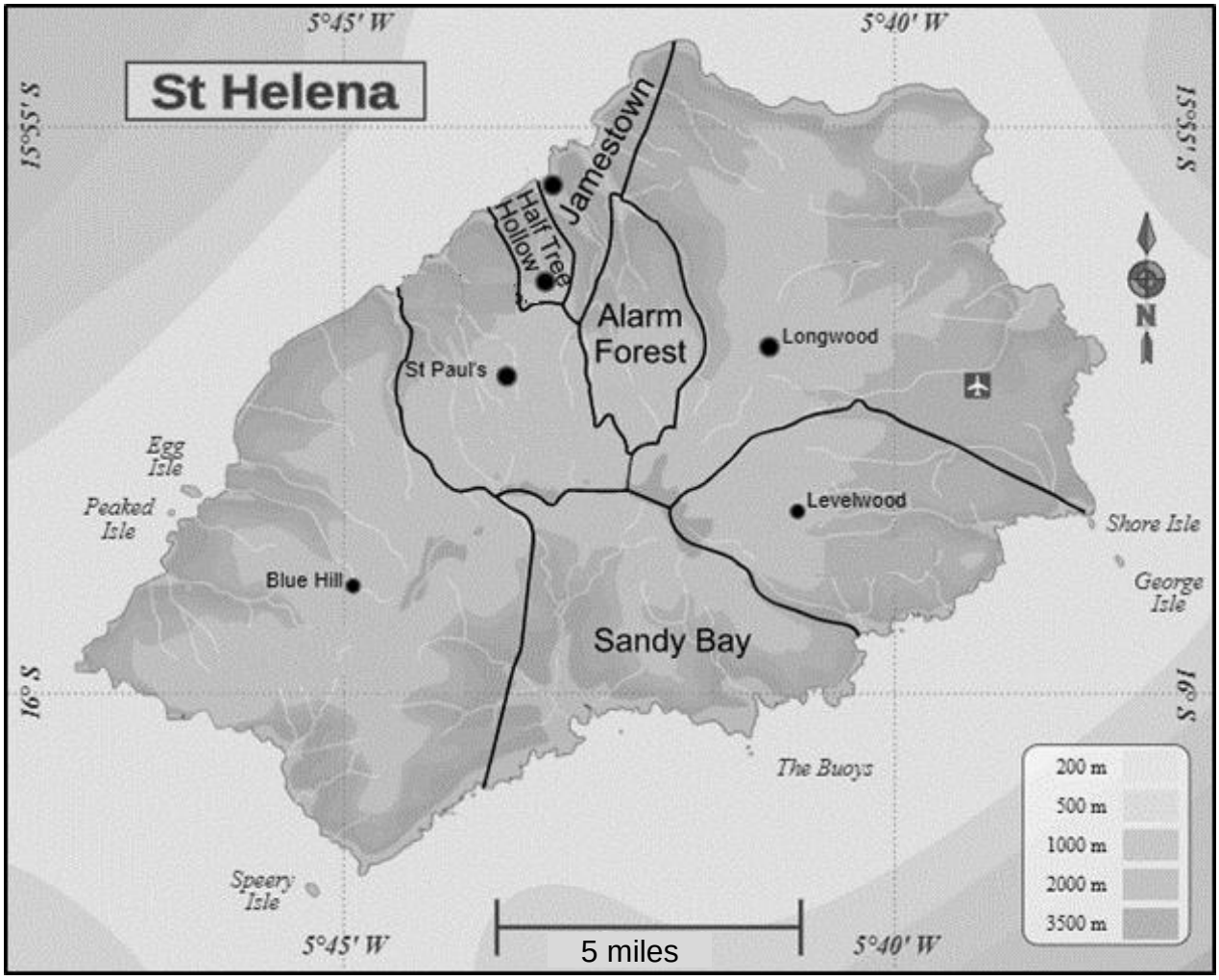
MATHEMATICAL LITERACY

ADDENDUM

PAPER 2

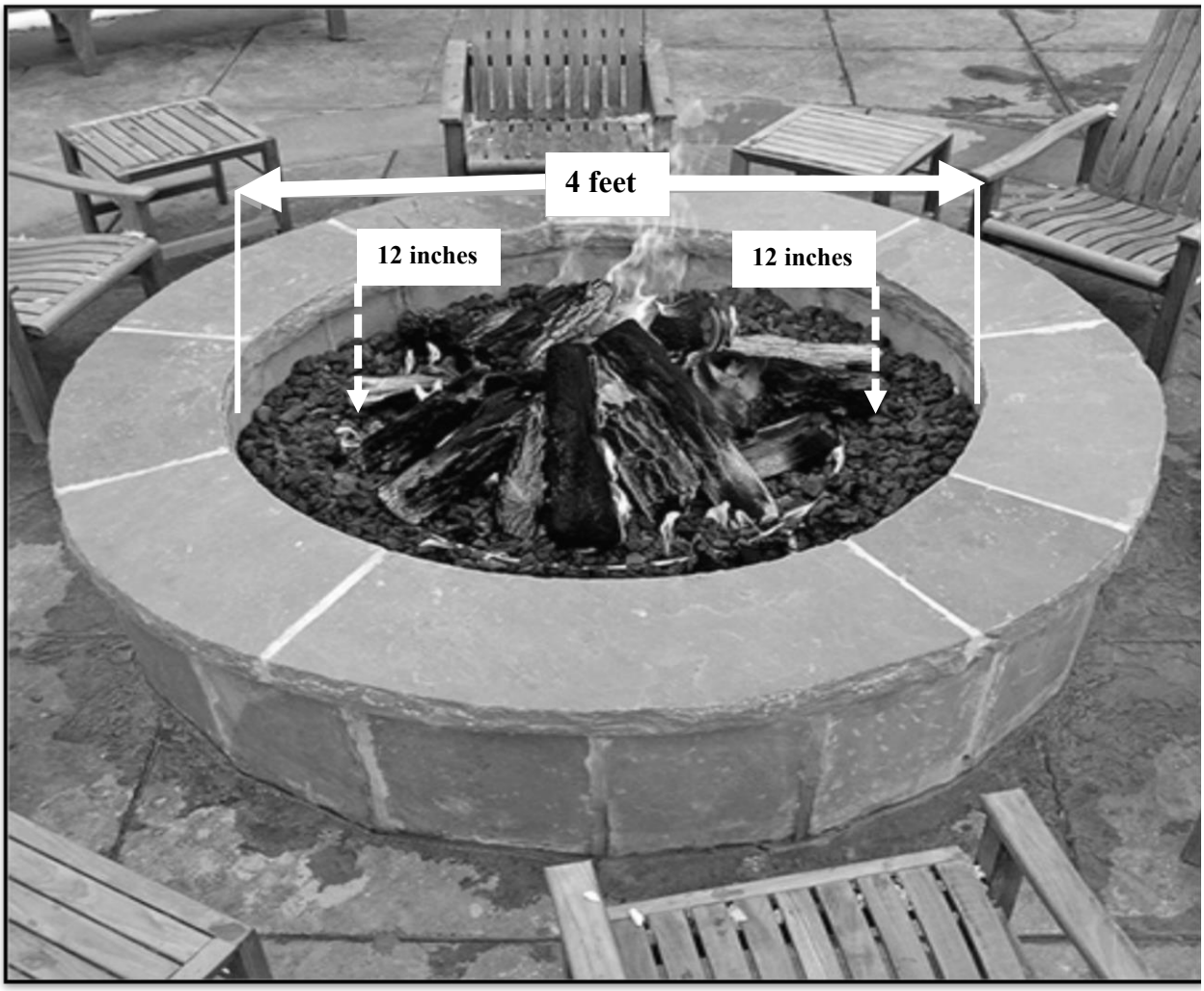
5 pages

ANNEXURE A: QUESTION 2.2



[Source: https://en.wikipedia.org/wiki/File:Districts of St Helena.svg]

ANNEXURE B: QUESTION 4.2



[Source: https://www.chimneyspecialistsinc.com/blog/in-ground-fire-pits-vs-above-gound-fire-pits/]

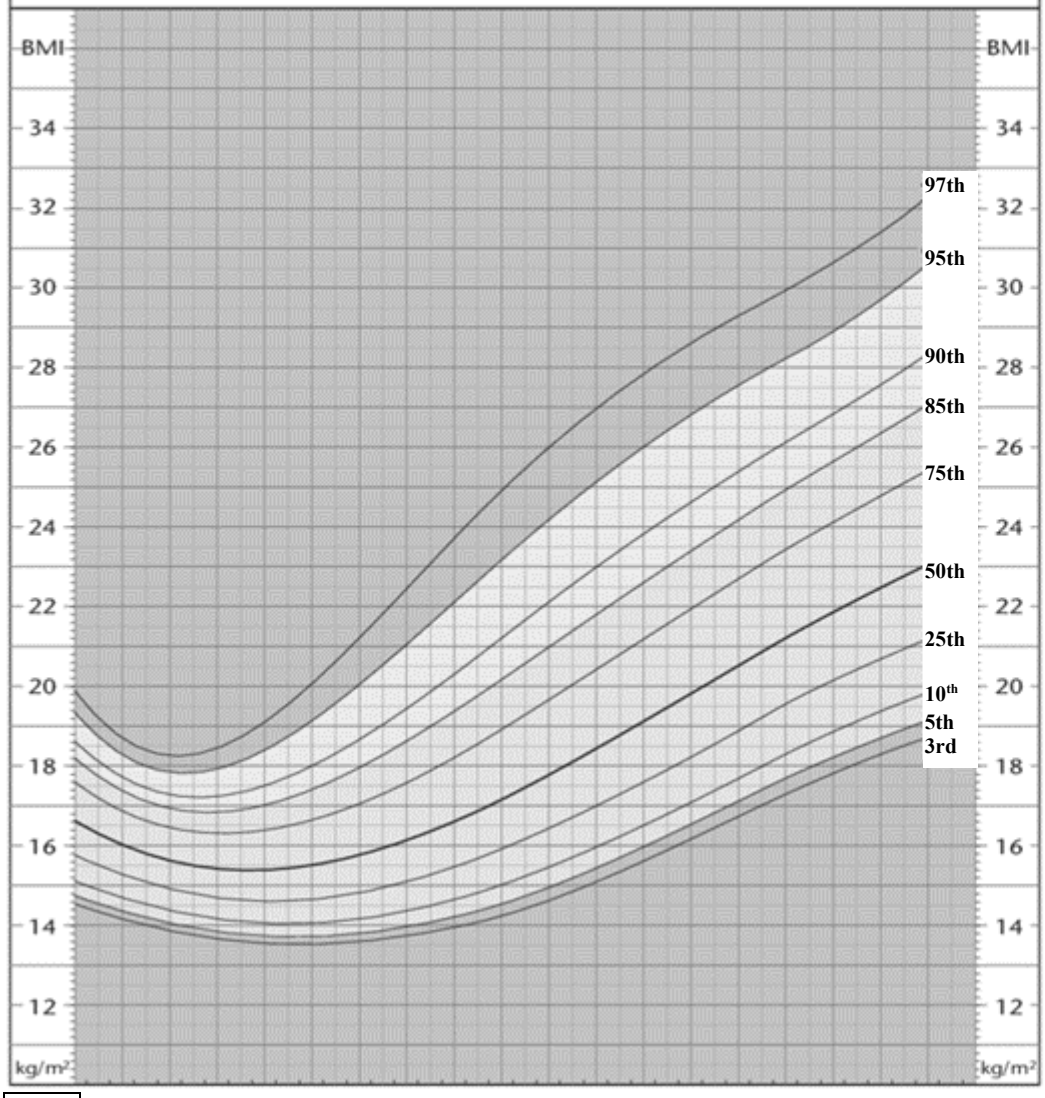
ANNEXURE C: QUESTION 5.1

BMI

2 to 20 years

BOYS

Patient Identifier _____



Age in years	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

[Color coding of the 2 000 CDC BMI charts by UNC's Department of Pediatrics and Center for Health Promotion and Disease Prevention (CDC Cooperative agreement U48-DP-000059) for

To calculate BMI:

Kilograms and metres
weight (kg)/ height (m)^2

Pounds and inches:
weight (lb)/
height (in)^2 x 703

BOYS:

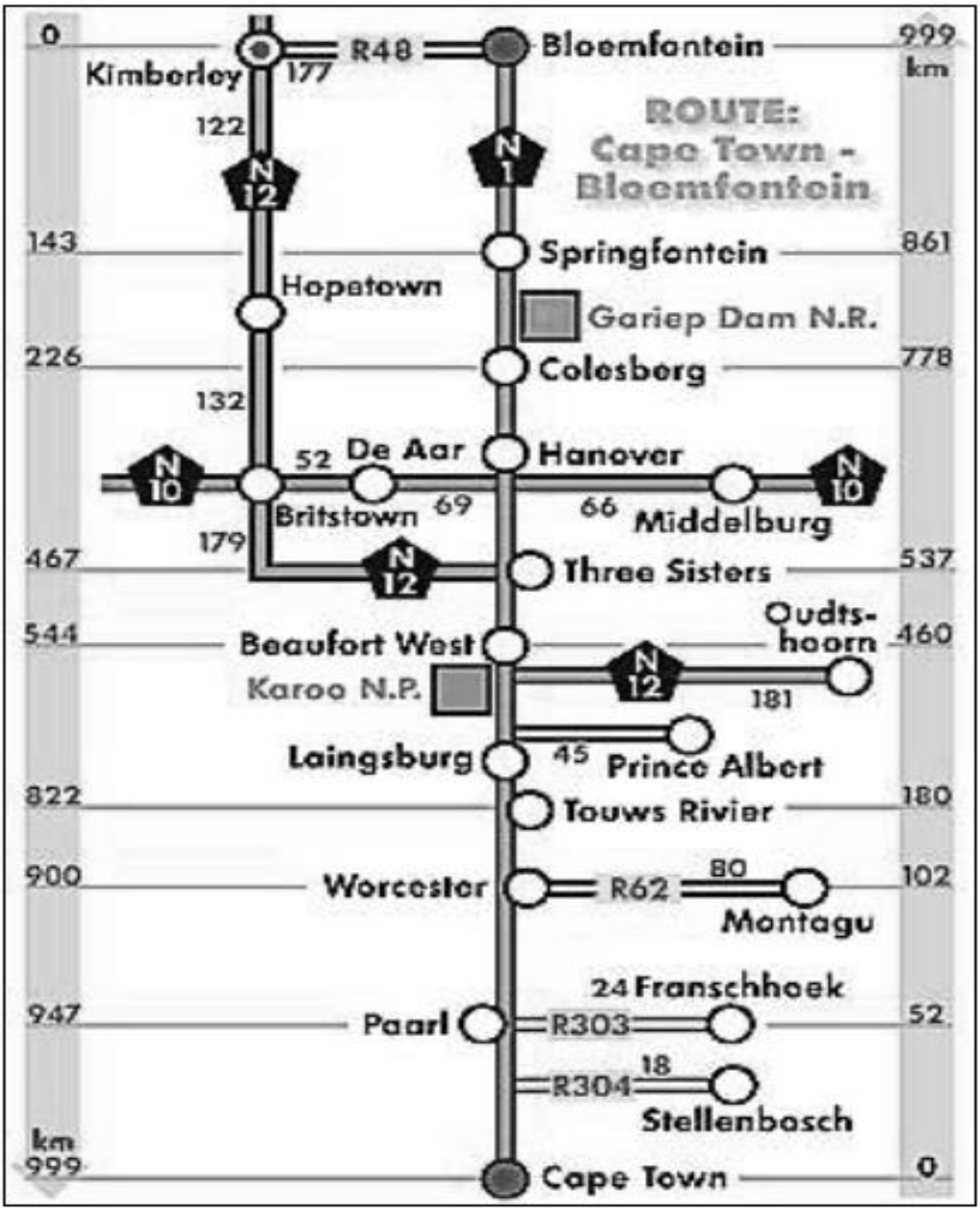
99th percentile cut-points

AGE	BMI
5	20,1
6	21,6
7	23,6
8	25,6
9	27,6
10	29,3
11	30,7
12	31,8
13	32,6
14	33,2
15	33,6
16	33,9
17	34,4

From National Initiative for Children's Healthcare Quality (www.richq.org)

ANNEXURE D: QUESTION 5.2

STRIP CHART FROM CAPE TOWN TO BLOEMFONTEIN



END

3.4 Choose the correct letter that will make the following statement TRUE.

The formula to calculate the volume of pool B is:

A $\pi \times 5 \times$ height
B $\pi \times 2{,}5^2 \times$ height
C $\pi \times 5^2 \times$ height (2)

3.5 Pool B is estimated to hold 65 000 litres of water. Determine the depth of pool B and round-off your answer to two decimal places. (5)

3.6 Pool B is filled with water at a rate of 1,5 m^3 per minute, hence Mrs Phalatsi claims that it can be filled to 92% of its capacity by 8:00 if the filling process starts at 7:30. Verify whether Mrs Phalatsi's claim is correct. (5)

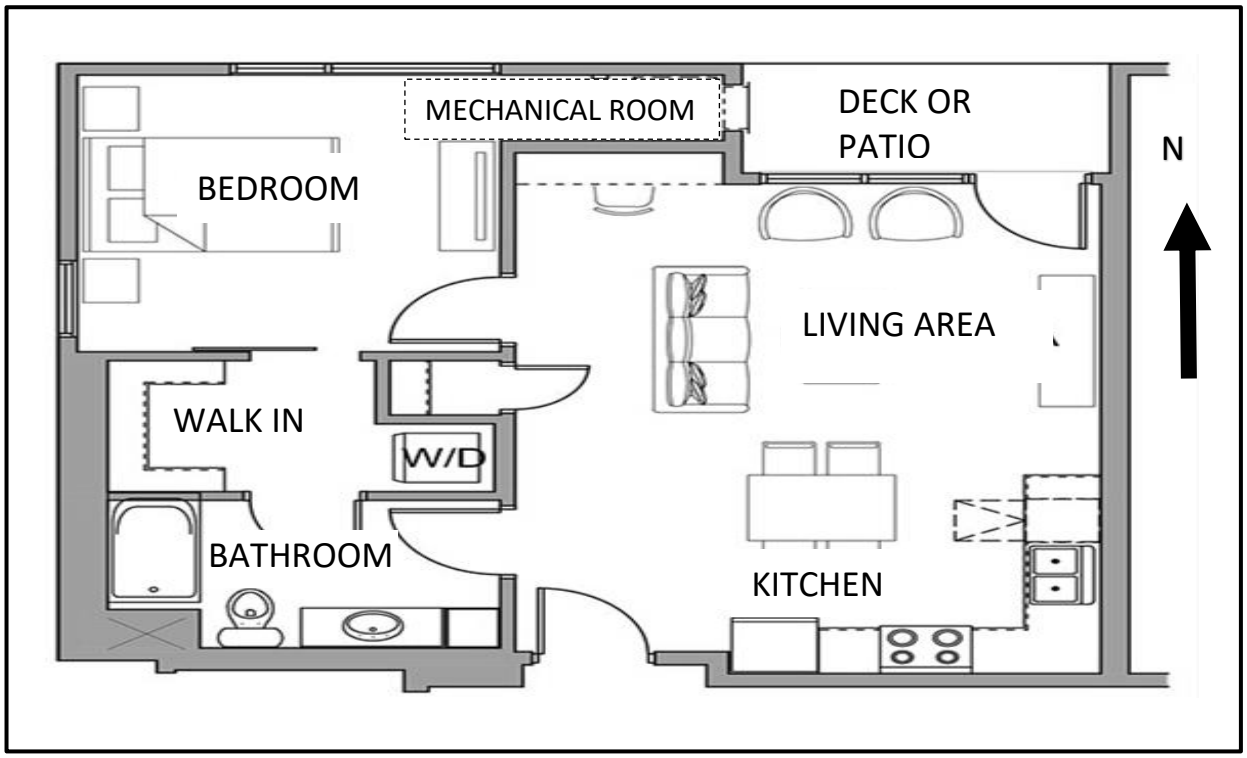
3.7 Mrs Phalatsi chose pool A. Give ONE possible reason why she opted for pool A, even though pool A uses more water than pool B. (2)

3.8 When Mrs Phalatsi wanted to swim in her new pool, the temperature of the water was 19 °C and she said she would only swim if the temperature of the water was 25 °C. The temperature must increase by 6 °C.
Calculate what the temperature change would be in °F.
You may use the following formula: **(°F − 32) ÷ 1,8 = °C** (5)
[31]

QUESTION 4

4.1 Sakhile has enrolled at the University of Johannesburg and is renting a bachelor flat in Johannesburg. Use the floor plan of Sakhile's flat below and answer the questions that follow.

FLOOR PLAN OF SAKHILE'S BACHELOR FLAT



Scale 1:100 **[Adapted from www.pinterest.com]**

NOTE:
Area of bachelor flat = 322,36 square feet (ft²)
100 cm² = 0,107639 square feet (ft²)

4.1.1 Write down the number of doors which open into the living area and kitchen. (2)

4.1.2 Use the given scale to calculate the actual length of the bedroom, including the mechanical room. (5)

4.1.3 Convert the area of the bachelor flat to m². (4)

4.1.4 Sakhile states that he likes an open plan flat. Does this bachelor flat qualify as an open plan flat? Give a reason for your answer. (2)

4.2 Mr Botha, the owner of the flat where Sakhile stays, wants to build a fire pit in the back yard. He searched on the internet and got the idea as indicated in ANNEXURE B. Use ANNEXURE B to answer the questions that follow.

The hole for the fire pit must be 4 feet wide and 12 inches deep.

NOTE:
1 foot = 30,48 cm
1 inch = 2,54 cm
1 gallon = 3,7854 ℓ

4.2.1 Determine the radius of the fire pit in centimetres. (4)

4.2.2 Determine the volume of the fire pit in cm^3.

You may use the following formula:
Volume of cylinder = $\pi \times$ radius$^2 \times$ height; using $\pi = 3,142$ (4)

4.2.3 What is the formula used to calculate the boundary around the circle? Choose the correct answer from the options given below. Write only the correct letter (A – D) next to the question number.

A Circumference of a circle = $\pi \times$ diameter
B Circumference of a circle = $\pi \times$ radius
C Area of a circle = $\pi \times$ radius^2
D Volume of a cylinder = $\pi \times$ radius$^2 \times$ height (2)

4.2.4 Hence, calculate the circumference of the hole for the fire pit. Round-off your answer to three decimal places. (3)

4.2.5 A layer of three 5 gallon buckets of lava rocks must be placed in the hole. Mr Botha said that two and three quarters of a 20 ℓ bucket is equal to three 5 gallon buckets.

Verify his statement, and state whether there will be a surplus or shortage of lava rocks. (5)
[31]

QUESTION 5

5.1 Study the percentile chart in ANNEXURE C and answer the questions that follow.

Coach Maxwell, the trainer at a local athletics club uses percentile charts to determine the health status of athletes who are joining the club in order to determine the best exercise for them. Coach Maxwell allows athletes whose BMIs are between the 5^{th} and the 85^{th} percentile to join the club.

5.1.1 What does the abbreviation BMI represent? (2)

5.1.2 Determine the maximum BMI that a boy should have to be able to join the club. (2)

5.1.3 Hence, determine the maximum weight of a boy who is 1,8 m tall and whose BMI is considered healthy for a boy athlete.

You may use the following formula:

$$\textbf{BMI} = \frac{\textbf{weight (kg)}}{\textbf{height(m)}^2}$$ (4)

5.1.4 A 14-year-old boy who weighs 48 kg and whose height is 1,3 m, claims that he qualifies to be admitted to the club. Calculate the BMI of the boy. (2)

5.2 Use ANNEXURE D to answer the following questions.

Coach Maxwell is travelling from Cape Town to Bloemfontein.

5.2.1 Determine the distance from Colesberg to Beaufort West. (2)

5.2.2 Determine the probability of driving through or past a town starting with the letter T, along the N1 from Cape Town to Bloemfontein. (2)

5.2.3 On his way from Cape Town to Bloemfontein, coach Maxwell stopped at Laingsburg for 45 minutes to have lunch. His next stop was Beaufort West for 15 minutes and then later he stopped for 15 minutes in Colesberg. The trip from Cape Town to Bloemfontein took him 9 hours and 15 minutes in total.

Calculate the average speed (to the nearest km/h) at which coach Maxwell travelled from Cape Town to Bloemfontein.

Justify, by calculation, whether he kept to the maximum speed limit of 120 km/h on national roads.

You may use the following formula:

$$\textbf{Average Speed} = \frac{\textbf{Distance}}{\textbf{Time}}$$ (6)

5.2.4 The fuel consumption of coach Maxwell's car is 5,9 ℓ/100 km and the fuel tank capacity is 45 ℓ. Verify whether it was necessary for coach Maxwell to refuel at any of the stops he made on his way to Bloemfontein. Show ALL calculations. (6)

[26]

TOTAL: 150

END