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TOTAL MARKS

NATIONAL SENIOR CERTIFICATE EXAMINATION
MAY 2023

MATHEMATICAL LITERACY: PAPER II

EXAMINATION NUMBER

Time: 3 hours 150 marks

PLEASE READ THE FOLLOWING INSTRUCTIONS CAREFULLY

1. This question paper consists of:
   - 28 pages which includes 2 additional pages at the end for rough work and calculations if necessary.
   - 5 questions.
2. Please check that your question paper is complete.
3. **Answer ALL the questions on the question paper and hand this in at the end of the examination. Remember to write your examination number in the space provided.**
4. It is strongly recommended that all working details be clearly shown where necessary.
5. An approved non-programmable calculator may be used where necessary.
6. It is in your own interest to write legibly and to present your work neatly.
7. Maps and diagrams are not necessarily drawn to scale, unless otherwise stated.
8. TWO blank pages (page 27 and 28) are included at the end of the question paper. If you run out of space for a question, use these pages. Clearly indicate the question number of your answer should you use this extra space.

Question	1		2		3		4		5		Total	
	Marker	Mod	Marker	Mod	Marker	Mod	Marker	Mod	Marker	Mod	Marker	Mod
Mark												
Signature												
Total	30		30		31		31		28		150	

QUESTION 1

Bobotie has been recognised as South Africa's national dish. The ingredients to make bobotie are listed below.

Ingredients

- 2 tablespoons butter
- 2 medium onions, finely chopped
- 3 cloves garlic
- 1 teaspoon grated ginger
- 1 teaspoon curry powder
- 3 cloves
- 2 tablespoons chutney, such as Mrs. Ball's Chutney
- 600 grams minced beef
- 1 tablespoon vinegar
- 1 tablespoon Worcestershire sauce
- 1 beef stock cube
- 2 slices white bread, crusts removed, soaked in milk
- 1 large egg
- Half a cup milk
- 1 teaspoon turmeric
- 2 tablespoons double cream
- Salt, to taste
- Freshly ground black pepper
- Handful bay leaves

[Source: <https://www.thespruceeats.com/beef-bobotie-recipe-39440>]

1.1 Use the above information to answer the questions that follow.

1.1.1 Determine how many different ingredients are needed for this recipe.

_____

_____

(2)

1.1.2 If 1 tablespoon = 14,7868 ml, determine how many millilitres of butter is needed.

_____

_____

(2)

1.1.3 Convert 600 grams to kilograms.

(2)

1.1.4 One cup is equivalent to 250 ml. Indicate on the measuring jug, with a line, how much milk is required.

(3)

1.2 Study the additional information given about the recipe:

Preparation time: 10 minutes
Cooking time: 65 minutes
Total time: 75 minutes

Servings: 4

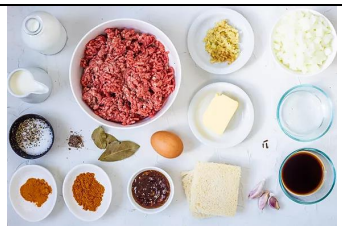
1.2.1 How long, in hours and minutes, does it take to prepare and cook bobotie?

(2)

1.2.2 Determine how many eggs are required to prepare the recipe for 12 people.

(2)

1.3 The step-by-step preparation and cooking instructions for the bobotie are given in column 2 below. Match the written instructions in columns 2 with the relevant image given in column one. Write the suitable letter of the image in column three.

STEP-BY-STEP INSTRUCTIONS	WRITTEN INSTRUCTIONS NOT IN ORDER	INSERT THE LETTER OF THE IMAGE MATCHING THE GIVEN INSTRUCTION
A. 	In a large pan, fry the onions, garlic and ginger in butter until soft and golden brown.	
B. 	Meanwhile, beat the egg, milk and turmeric to make the savoury custard mix. Add cream for an extra rich custard topping.	
C. 	To the onion mix, add the spices, chutney, minced beef, vinegar, Worcestershire sauce and stock cube.	
D. 	Transfer the mixture to the baking dish and bake, covered in the oven for 40 minutes.	
E. 	Remove the mince mixture from the oven, uncover, then pour the egg mixture over.	
F. 	Arrange the bay leaves on top then return to the oven for a further 15 minutes.	
G. 	Gather the ingredients and preheat the oven to 340 ºF/170ºC.	

(7)

1.4 Cape Town is a melting pot of culture, and one of the most important groups to shape the city's history is commonly referred to as the 'Cape Malay'.

[Source: <www.capetown.travel/exploring-cape-malay-culture/>]

Note: The term 'Cape Malay' is a contentious term as it originated as a term used to racially classify people according to race under the oppressive apartheid regime. We use it here as it is a term used in context.

A map of Cape Town is given on the following page. Study this map and answer the questions that follow:

1.4.1 Name the type of scale shown on the map.

_____

_____

(2)

1.4.2 In which general direction does Cape Town International Airport lie from Kommetjie?

_____

(2)

1.4.3 Along which highway would one travel from Cape Town International Airport to Cape Town City Centre?

_____

(2)

1.4.4 The scale on the map is given as 20 mm = x km. Find the value of x.

_____

_____

(2)

1.4.5 Using the scale from **Question 1.4.4**, determine which of the following statements can be used to convert an actual distance of 50 km to a distance on the map in mm. Circle the correct letter.

A 50 km × x km ÷ 20 mm

B 50 km ÷ x km × 20 mm

C 50 km × x km × 20 mm

D 50 km ÷ x km ÷ 20 mm (2)

[30]

Map of Cape Town

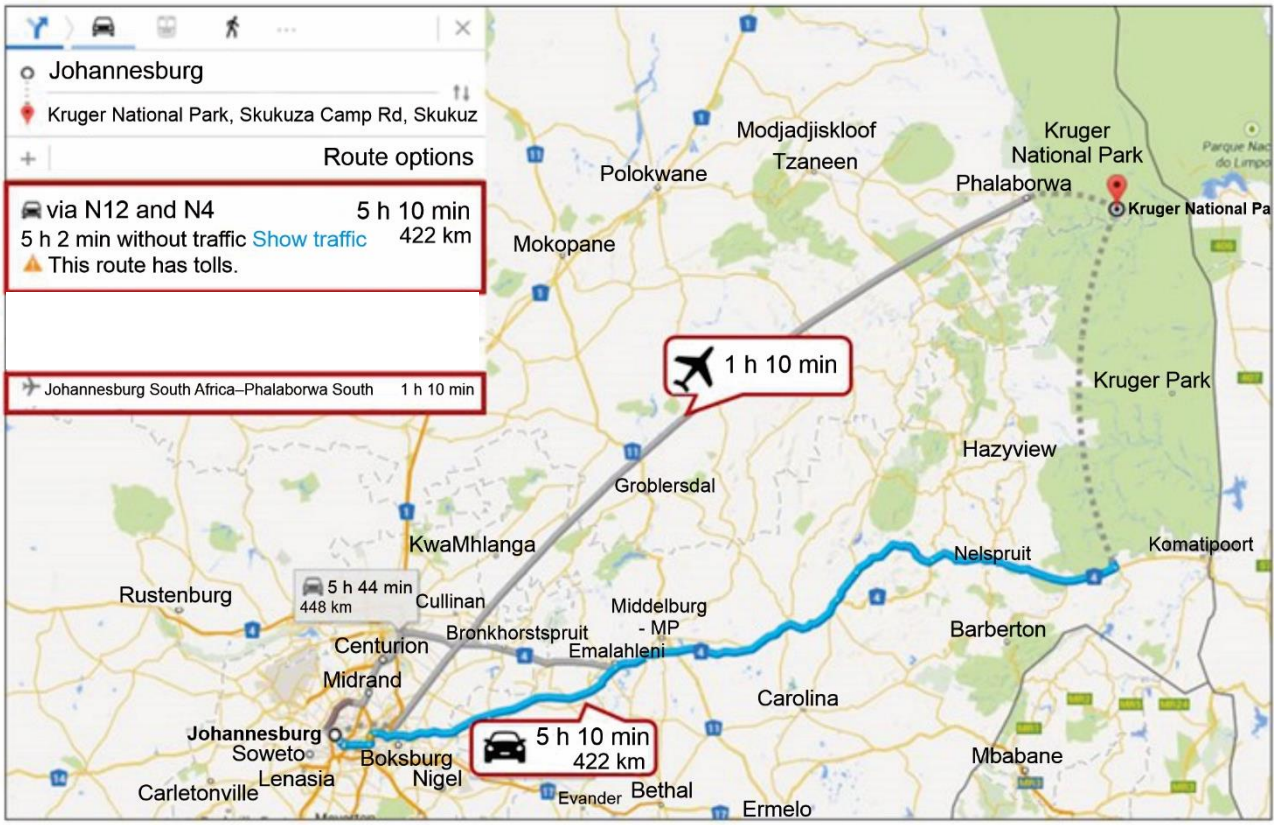
Directions from the airport to Camps Bay:
From the Cape Town international airport take the N2 to CAPE TOWN, and as you approach the city, follow the signs to Sea Point. At the first set of traffic lights, at the end of the highway, with the Waterfront on your right and the Cullinan Hotel on your left, ignore the signs to Sea Point and remain in the middle lane travelling on the M62.

Travel straight on the M62, (up Buitengracht Street which becomes Kloofnek Road) towards the TABLE MOUNTAIN CABLEWAY/CAMPS BAY.

At the top of Kloofnek Road, ignore the left turn to the Cableway and the right turn to Signal Hill, and continue on the M62 downhill into CAMPS BAY.
Distance = approximately 25 km; allow 30 minutes.

QUESTION 2

The Kruger National Park is a popular holiday destination for animal lovers. Below is a map depicting different ways to get to the Kruger National Park, either by airplane or by car.



Use the above map to answer the questions that follow.

Note: Speed = Distance ÷ Time

2.1 Calculate the speed of a car travelling from Johannesburg to Kruger National Park via the N4 (thick blue line on the map) using the information given.

(3)

2.2 State which town, closest to the Kruger National Park, has an airport.

(2)

2.3 The table below shows distances between Kruger National Park rest camps and gates. When travelling between camps and gates, the speed limit of 40 km/h on dirt roads and 50 km/h on tar roads within the park is recommended.

Gates and Camps Distances	Berg-en-dal	Crocodile Bridge	Letaba	Lower Sabi	Malelane	Mopani	Numbi Gate	N'wanetsi	Olifants	Orpen	Pafuri Gate	Paul Kruger Gate	Phalaborwa Gate	Pretoriuskop	Punda Maria	Satara	Shingwedsi	Skukuza
Berg-en-dal	-	149	234	113	12	281	97	180	219	213	453	83	285	92	415	165	344	172
Crocodile Bridge	149	-	196	34	141	243	130	142	181	175	415	88	246	125	377	127	306	77
Letaba	234	196	-	162	226	47	216	94	32	117	218	173	51	211	176	69	109	162
Lower Sabi	113	34	162	-	105	209	95	108	147	141	380	53	213	90	342	93	271	43
Malelane	12	141	226	105	-	272	94	170	210	204	444	74	277	85	408	156	333	64
Mopani	281	234	47	209	272	-	263	141	86	164	172	220	74	258	130	116	63	209
Numbi Gate	97	130	216	95	94	263	-	162	201	195	434	65	267	9	396	147	325	54
N'wanetsi	180	142	94	108	170	141	162	-	79	63	312	119	145	156	274	25	203	108
Olifants	219	181	32	147	210	86	201	79	-	102	250	158	83	195	212	54	141	147
Orpen	213	175	117	141	204	164	195	63	102	-	335	152	167	184	297	48	226	137
Pafuri Gate	453	415	218	380	444	172	434	312	250	335	-	392	246	438	76	287	109	380
Paul Kruger Gate	83	88	173	53	74	220	65	119	158	152	392	-	224	60	354	104	283	12
Phalaborwa Gate	285	246	51	213	277	74	267	145	83	167	246	224	-	261	201	119	137	213
Pretoriuskop	92	125	21	90	85	258	9	156	195	184	438	60	261	-	389	140	318	49
Punda Maria	415	377	176	342	408	130	396	274	212	297	76	354	201	389	-	254	71	342
Satara	165	127	69	93	156	116	147	25	54	48	287	104	119	140	245	-	178	93
Shingwedsi	344	306	109	27	333	63	325	203	141	226	109	283	137	318	71	178	-	271
Skukuza	72	77	162	43	64	209	54	108	147	137	380	12	213	49	342	93	271	-

[Source: <https://www.krugerpark.co.za/Maps_of_Kruger_Park-travel/>]

Use the above information and table to answer the questions that follow.

2.3.1 Give the distance between Pretoriuskop and Satara.

_____

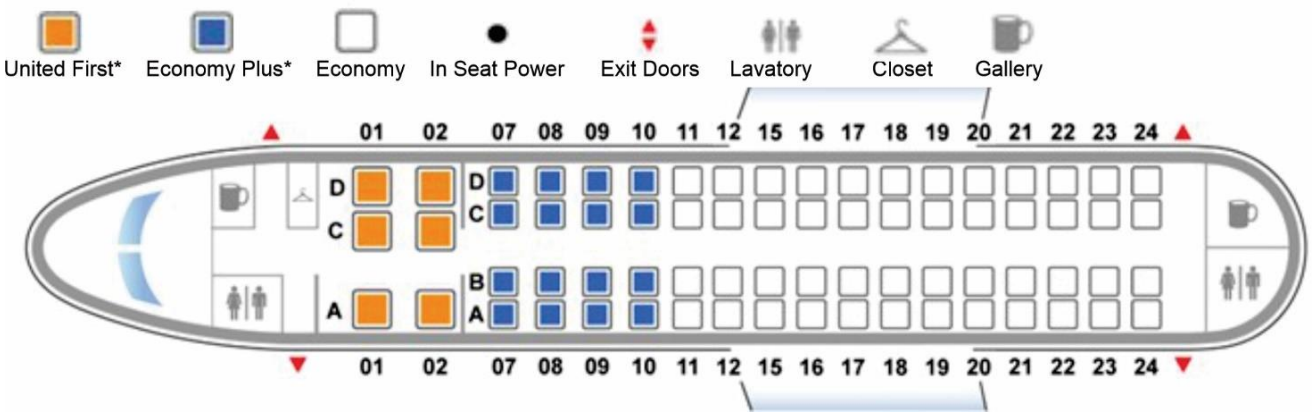
_____

(2)

2.3.2 Calculate how long (in hours and minutes) the trip between N'wanetsi to Berg-en-dal (180 km) will take if a $\frac{1}{3}$ of the distance is dirt road, while the rest is tarred.

(6)

2.4 The layout plan of a small airplane that flies to Phalaborwa is shown below.



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

2.4.1 Determine the total number of passenger seats in this airplane.

(2)

2.4.2 Each passenger is allowed a maximum of 7 kg of hand luggage. Show that the Economy Class and Economy Plus Seats on the right-hand side of the airplane can hold a maximum capacity of 0,224 tonnes.

(4)

2.4.3 Using an **X**, indicate seat number C21 on the layout plan above.

(2)

2.5 A snack and a fruit juice is given to passengers on the flight. A typical juice carton is shown below.

[Resource: <http://eisforexplore.blogspot.com/2013/01/juice-box-project.html>]

Use the above information to answer the questions that follow.

2.5.1 The attached ruler illustrates two lengths: centimetres on one side and inches on the other. Using the ruler, give the length in inches.

(2)

2.5.2 The length of the box is 4,4962 cm. Show that the volume of this juice container is 6,75 fluid ounces.

Note: 1 cm^3 = 1 ml and 1 fluid ounce = 29,574 ml.

(5)

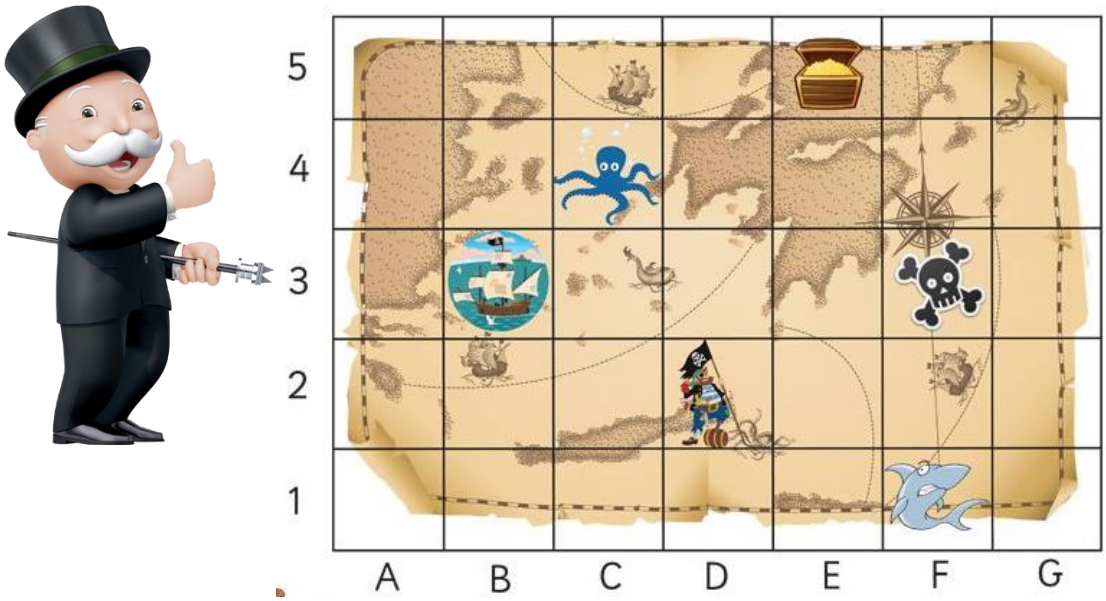
2.5.3 The following sandwich snacks are available on the airplane: Cheese, Chicken or Beef. Similarly, the following drinks are available: Juice, Water or Cool drink.

Determine the total number of options available to a passenger if a passenger selects a snack and a drink.

(2)
[30]

QUESTION 3

On rainy days it is difficult to keep children busy. Board games and fantasy play can ensure much fun. Below is a key and a treasure map showing where the following are hidden: pirate, treasure chest, pirate ship, octopus, shark, danger sign.



3.1 Use the above information to answer the questions that follow:

3.1.1 Give the grid reference for the octopus.

_____

_____

(2)

3.1.2 Underline the correct answer in the following statement:

The pirate/treasure chest lies in E5. (2)

3.1.3 If the scale on the treasure map is 1 : 1 000; calculate, in km^2, the area of one of the rectangles on the pirate map, rounded to 5 decimal places.

_____

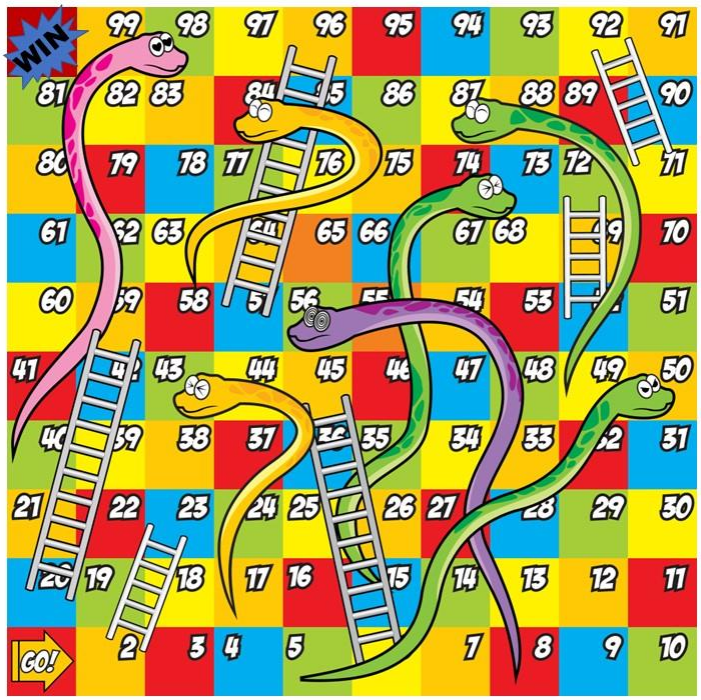
_____

_____

_____

(4)

3.2 'Snakes and Ladders' is another popular board game many families play. Shown below is a picture of the board, a die and the rules of a Snake and Ladder board game.



How to play:

- Each player places their counter on the space that says 'GO'.
- Take it in turns to roll the die. Move your counter forward the number of spaces shown on the dice. Note that if you roll a 3 on the die, you count block 'GO' as your first block and will end on block 3.
- If your counter lands at the bottom of a ladder, you can move up to the top of the ladder.
- If your counter lands on the head of a snake, you must slide down to the bottom of the snake.

The first player to get to the space that says 'WIN' is the winner!

[Resource: <www.twinkl.co.za/teaching-wiki/snakes-and-ladders>]

Use the above picture and information to answer the questions that follow.

3.2.1 State the total number of blocks found on this board game.

_____

(2)

3.2.2 Determine the probability of a player landing on the head of a snake.

_____

(2)

3.2.3 Each player must roll a die at the beginning of each turn. Select the correct letter from the alternatives given to complete the following statements.
A die is an example of a _____. This die has ____ faces, 8 vertices and 12 edges.

A Rectangular Prism
B Cube
C Cylinder
D Triangular Prism
E 4
F 6
G 8
H 10 (4)

3.2.4 A player lands on block 43 in her current turn. Where would this player be if she rolls a 4 on the die in the next turn?

_____

_____
(2)

3.2.5 Another player rolls the following numbers in his first 4 turns: 3; 3; 5; 2. On which block would he be at, at the end of the 4^{th} roll?

_____

_____
(2)

3.2.6 Calculate the total surface area of the die if the length of one side of the die is 1,3 cm.

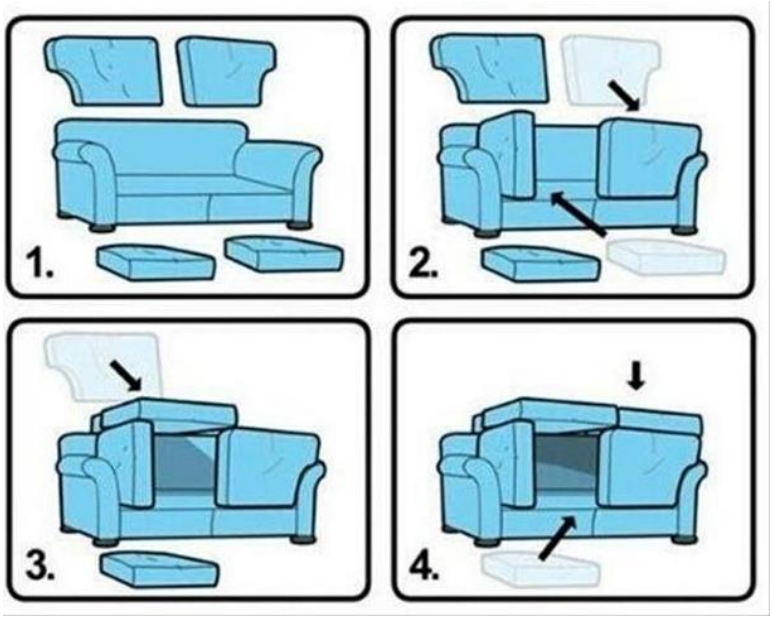
You may use the following formula:

Total surface **area = 6 × Area of one face**.

_____

_____
(3)

3.3 Below are visual instructions on how to build a couch fort (a hideout for kids made with detachable couch cushions). The first instruction is given below the diagram.



Instruction One: Remove the base and back cushions from the couch.

Use the above images to answer the question that follows.

Give a written instruction for image 4 which shows the completed fort.

_____

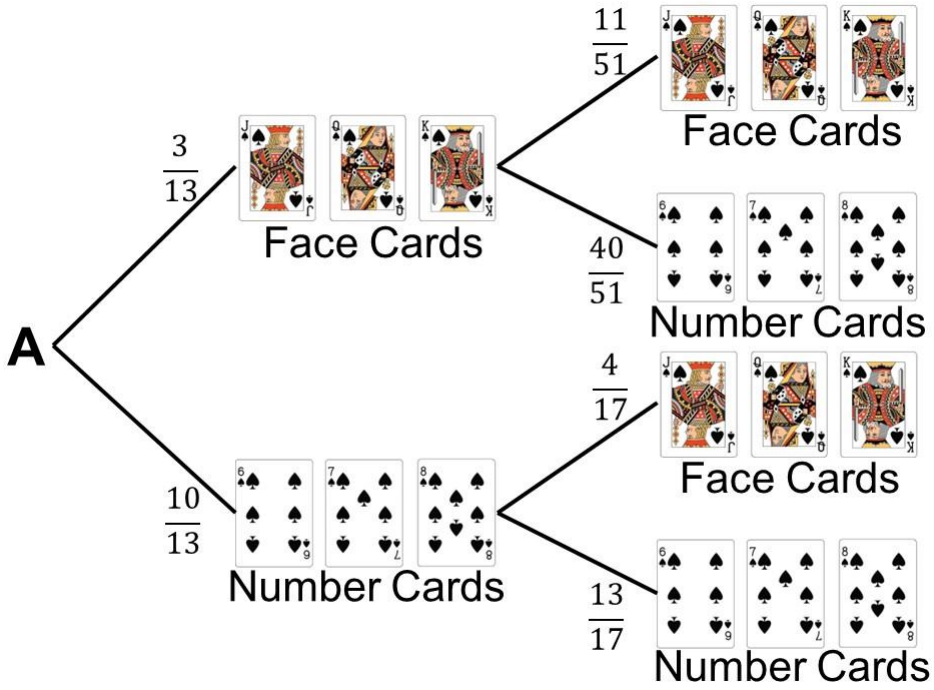
_____

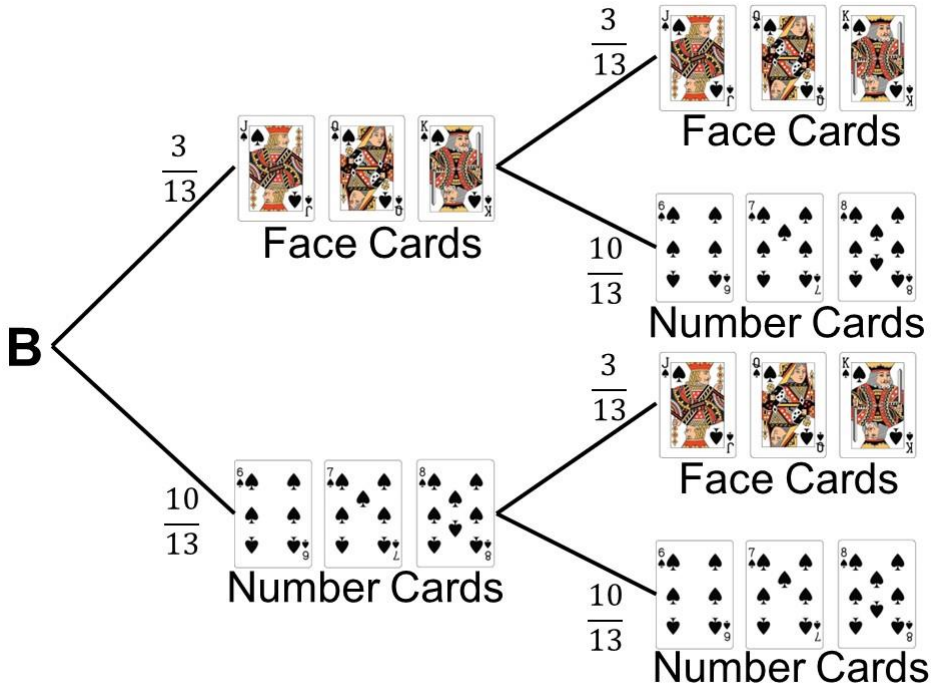
_____

(2)

3.4 A card chosen at random from a standard deck of 52 playing cards is recorded regardless of whether the first card drawn is one of the 12 face cards (king, queen or jack) or just an ordinary number card. The second card, without placing the first card back in the deck is then drawn.

Two tree diagrams (A and B) below show these two successive events, however **only one of the tree diagrams is correct.**





Use the above information and tree diagrams to answer the questions that follow:

3.4.1 Calculate the missing numerator in the following equivalent fractions:

$$\frac{3}{13} = \frac{\quad}{52}$$

(2)

3.4.2 Study tree **Diagram A**. If there are 52 cards in a standard deck of cards, why is the denominator for the second card drawn 51?

_____

_____

(2)

3.4.3 Which tree diagram (**A or B**) best represents the two successive events described in the context?

_____

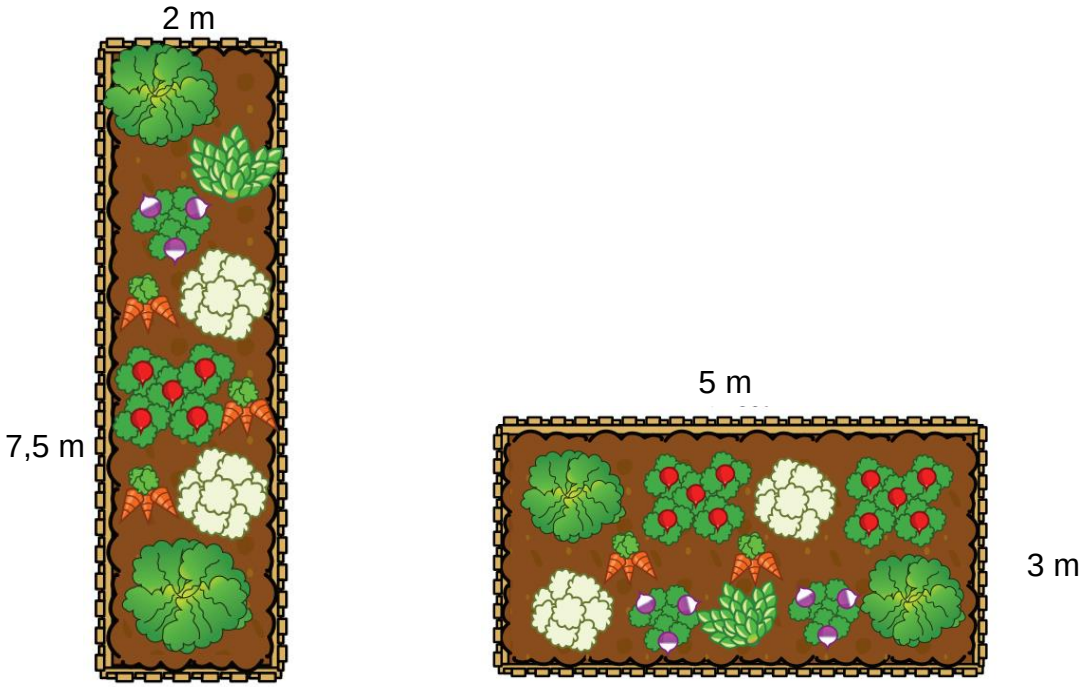
_____

(2)
[31]

QUESTION 4

Buhle plans on starting a vegetable garden. She has to decide between two different rectangular shaped garden sizes.

Below are two garden layout plans (Garden Plan A and Garden Plan B) she can choose from to start her vegetable garden.



GARDEN PLAN **A** GARDEN PLAN **B**

4.1 Use the above garden plans to answer the question that follow.

Buhle only has 21 m of fencing to enclose the vegetable garden.

Determine, with calculations, which one of the garden plans above will give Buhle the maximum ground cover while using the minimum amount of fencing.

You may use the following formulae: Perimeter of rectangle = 2 (Length + Width)
Area of rectangle = Length × Width

(5)

4.2 Buhle decides to build an A-frame 'greenhouse' (see image and diagram below) to protect her vegetable garden from extreme weather. The greenhouse is made up of two rectangular side faces, with a rectangular base, and two triangular faces with all sides equal in each triangle.

Picture of an A-frame greenhouse

DIAGRAM **A**

Sketch of the A-frame greenhouse

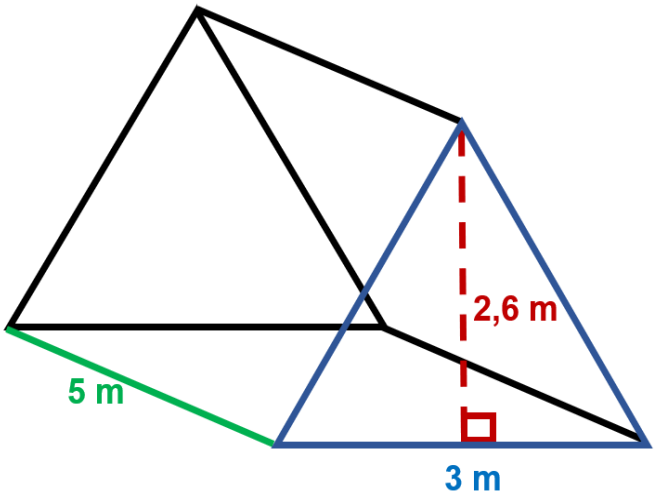


DIAGRAM **B**

The dimensions of the A-frame greenhouse are as follows:

Length of each side of the triangular face = 3 m
Length of the rectangle = 5 m
Perpendicular Height = 2,6 m

Use the above information to answer the questions that follow.

4.2.1 Calculate the total length of wood needed to build ONE of the triangular faces of this greenhouse. Give your answer to the nearest metre.

_____

_____

(2)

4.2.2 If it takes 2 people 1 hour and 15 minutes to build one of these greenhouses, how long will it take 3 people, in hours and minutes to build the same greenhouse?

_____

_____

_____

_____

(3)

4.2.3 Determine the minimum amount of plastic required to cover the greenhouse as illustrated in **Diagram A** (no plastic is needed on the base of the greenhouse and you may ignore any overlaps).

You may use the following formulae: Area of rectangle = Length × Width

Area of triangle = $\frac{1}{2}$ × base × ⊥ height

(4)

4.2.4 Buhle will need to spread compost with a uniform thickness of 5 cm over the base of the enclosed garden. Calculate the volume, in m³, of the compost required.

You may use the following formula: Volume = Length × Width × Height

(3)

4.3 Buhle will have a large cylindrical JoJo water tank to store water for the vegetable garden.

The water tank has the following dimensions:

Outer diameter = 1 500 mm

Outer height = 1 820 mm

Use: Volume = 3,142 x radius x radius x height

Conversion: 1 cm³ = 0,001 litres

Use the above information to answer the questions that follow:

4.3.1 Write down, in cm, the outer radius of the water tank.

(2)

4.3.2 Buhle realised that the maximum capacity of the water tank is 3 000 litres. She claimed that the actual volume of the water tank using the dimensions given results in a higher capacity of water. Using calculations, verify Buhle's claim, giving a possible reason for the difference in capacity.

(4)

4.4 Buhle researches how to grow broccoli and finds two interesting facts online. Study these facts and answer the questions that follow:

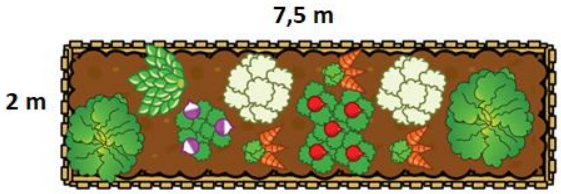
- Broccoli seeds are capable of germinating in soil temperatures as low as 40°F
- Broccoli seedlings need to be planted 60 cm apart.

4.4.1 Convert into ºC the lowest soil temperature which allows the broccoli plant to germinate.

You may use the following formula: ºC = (ºF – 32º) ÷ 1,8

(2)

4.4.2 Determine the maximum number of broccoli seedlings that can be planted in Garden Plan **A** shown below.

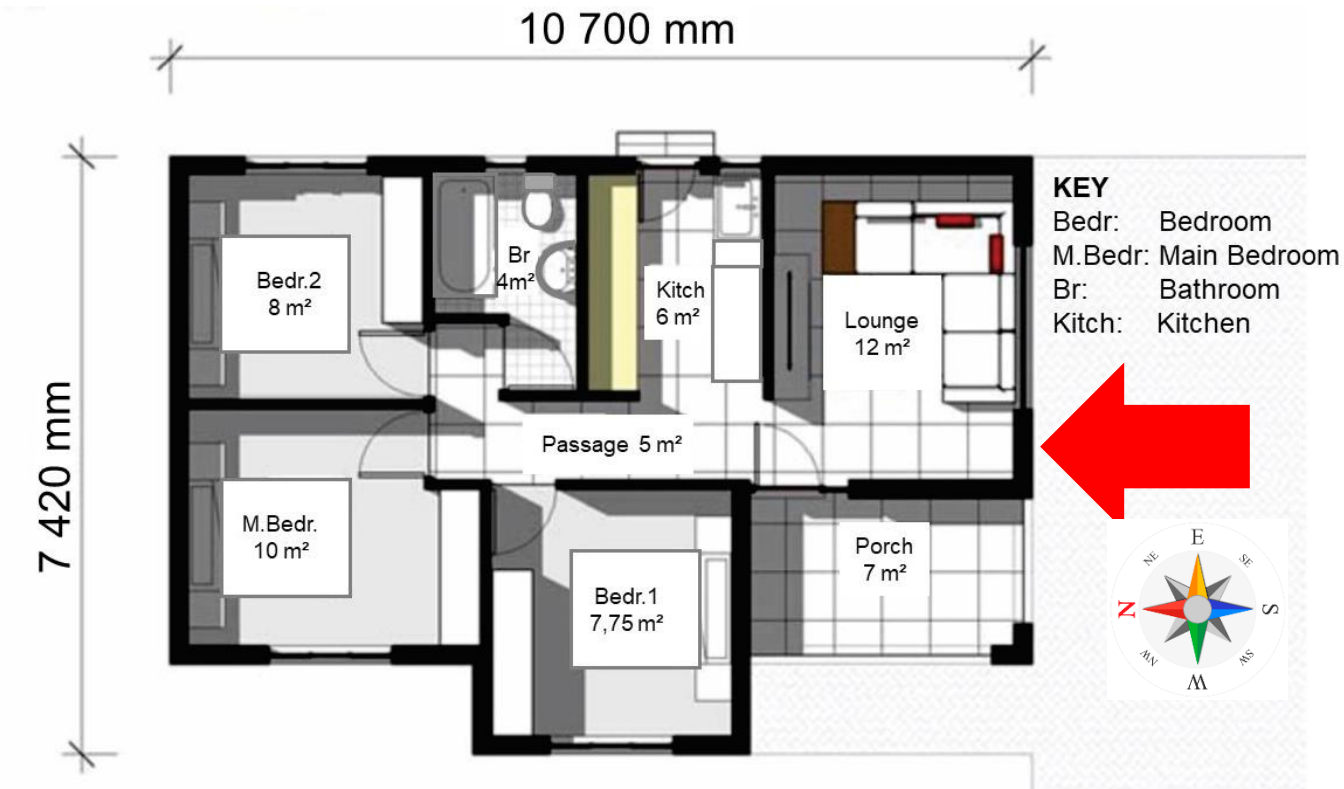


(6)

[31]

QUESTION 5

Candice is an artist who lives in a small house shown below. A floor plan of the house is also shown below the picture of the house.



5.1 Use the above images to answer the questions that follow.

5.1.1 Write down the total number of bedrooms in this house.

(2)

5.1.2 Give the compass direction of the main bedroom window.

(2)

5.1.3 The dimensions in the floor plan are given in millimetres. If the length of the house is 110 mm on the floor plan, determine the scale of the floor plan in unit form, rounded to the nearest hundred.

(3)

5.1.4 Using the scale calculated in **Question 5.1.3**, show with calculations, how the area of Bedroom 1 was calculated as 7,75 m^2 on the floor plan.

(4)

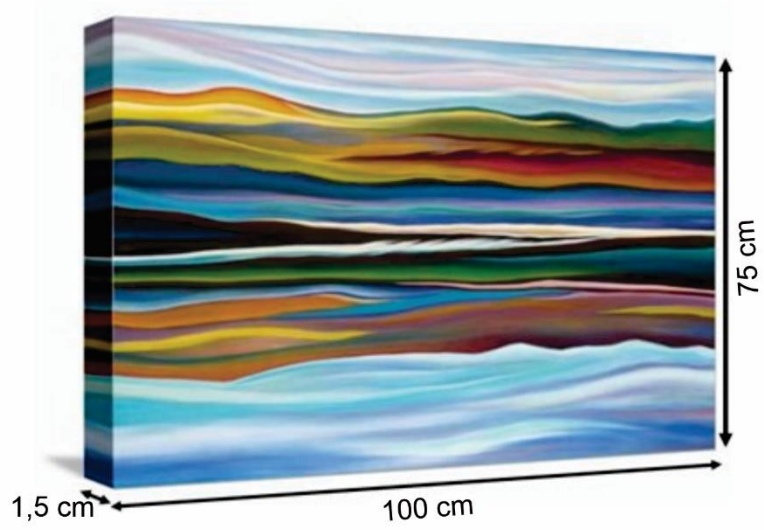
5.1.5 State which elevation of the house is indicated by the red arrow.

(2)

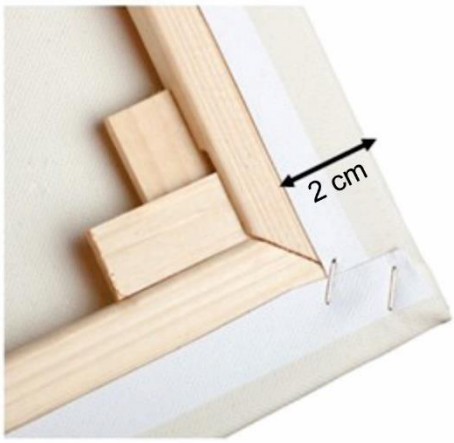
5.2 Candice paints a picture on a stretched canvas. The canvass is generally stapled behind a timber frame.

Note: Stretched canvas is a canvas print or blank canvas that has been stretched over a timber frame and is ready to hang straight on the wall.

PICTURE OF THE STRETCHED CANVAS PAINTING STAPLED ON A TIMBER FRAME



BACK OF THE TIMBER FRAME HOLDING THE PAINTING WITH A 2 cm OVERLAP ALL ROUND



Use the above images to answer the questions that follow.

5.2.1 Give the original dimensions (length and width) of the canvas before it was stretched and stapled onto the timber frame.

_____

_____

_____

_____

(4)

5.2.2 The timber frame is rectangular and supported by additional timber down the centre of both the length and width of the frame so that it is divided into smaller rectangles as illustrated below. The timber frame is divided into four equal and smaller rectangles as illustrated in the diagram below.

Calculate the total length of timber needed to build the frame if you ignore the thickness of the wood as well as the overlaps of the joints.

(4)

5.3 Candice mixes blue, green and white paint to make a teal (a bluish green) colour. She mixes the colours in order in the ratio of 2 : 1 : 4.

Shown alongside is a standard tube of paint.

5.3.1 If Candice uses 15 ml of green paint, determine how much blue paint she needs for the mixture.

(2)

5.3.2 If Candice uses a quarter of the tube of white paint shown above, calculate how much blue and green paint she will need to mix teal paint.

(5)
[28]

Total: 150 marks

ADDITIONAL SPACE (ALL QUESTIONS)

REMEMBER TO CLEARLY INDICATE AT THE QUESTION THAT YOU USED THE ADDITIONAL SPACE TO ENSURE THAT ALL ANSWERS ARE MARKED.

