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PROVINSIALE VOORBEREIDENDE EKSAMEN/ PROVINCIAL PREPARATORY EXAMINATION

GRAAD/GRADE 12

WISKUNDIGE GELETTERDHEID/ MATHEMATICAL LITERACY

VRAESTEL/PAPER 2

SEPTEMBER 2024

PUNTE/MARKS: 150

TYD/TIME: 3 uur/hours

Hierdie vraestel bestaan uit 12 bladsye en 'n addendum van 5 bladsye.
This question paper consists of 12 pages and an addendum of 5 pages.

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 1.2
ANNEXURE B for QUESTION 2.1
ANNEXURE C for QUESTION 2.2
ANNEXURE D for QUESTION 4

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 drawn to scale, unless stated otherwise.

10.   Write neatly and legibly.

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QUESTION 1

1.1

> In TABLE 1 below is a list of explanations and definitions of concepts used in Mathematical Literacy.
>
> **TABLE 1: EXPLANATIONS AND DEFINITIONS OF CONCEPTS**
>
> | A | The volume is equal to meter times 3. |
> |---|---|
> | B | A map of a section of a travelling route showing distances between towns as traight lines |
> | C | A Rectangular prism is a 2-dimensional shape of which 2 lenghts are similar to each other. |
> | D | A unit of volume measurement that's 1 metre wide, 1 metre in height, and 1 metre in depth. |
> | E | A map that is always drawn to scale. |
> | F | A prism that is named after the 3-dimensional shape that has rectangles as its faces or base. |

Use the information above to write down the letter of the explanation or definition (A–F) of EACH of the following concepts.

1.1.1	Strip map	(2)
1.1.2	Rectangular prism	(2)
1.1.3	m^3	(2)

1.2

> James makes small wooden chairs. The chair is made from wooden rails and side supports called props.
>
> ANNEXURE A shows a diagram of the parts, assembled chair and TABLE 2 with cutting list (in mm).

Use ANNEXURE A to answer the questions that follow.

| 1.2.1	Write down the length of the props.	(2)
1.2.2	Convert the thickness of the wooden material to cm.	(2)
1.2.3	Calculate the simplified ratio of the length of the rails to the length of the props.	(3)
1.2.4	Determine the number of rails needed to construct the back piece.	(2)
1.2.5	Write down the probability, that the length of some of the props might differ.	(2)
1.2.6	Show that the space between each rail on the top part of the seat is 10 mm.	(3)

1.3   Marius travels regular. He uses the strip map below.

STRIP MAP BETWEEN CAPE TOWN AND PORT ELIZABETH
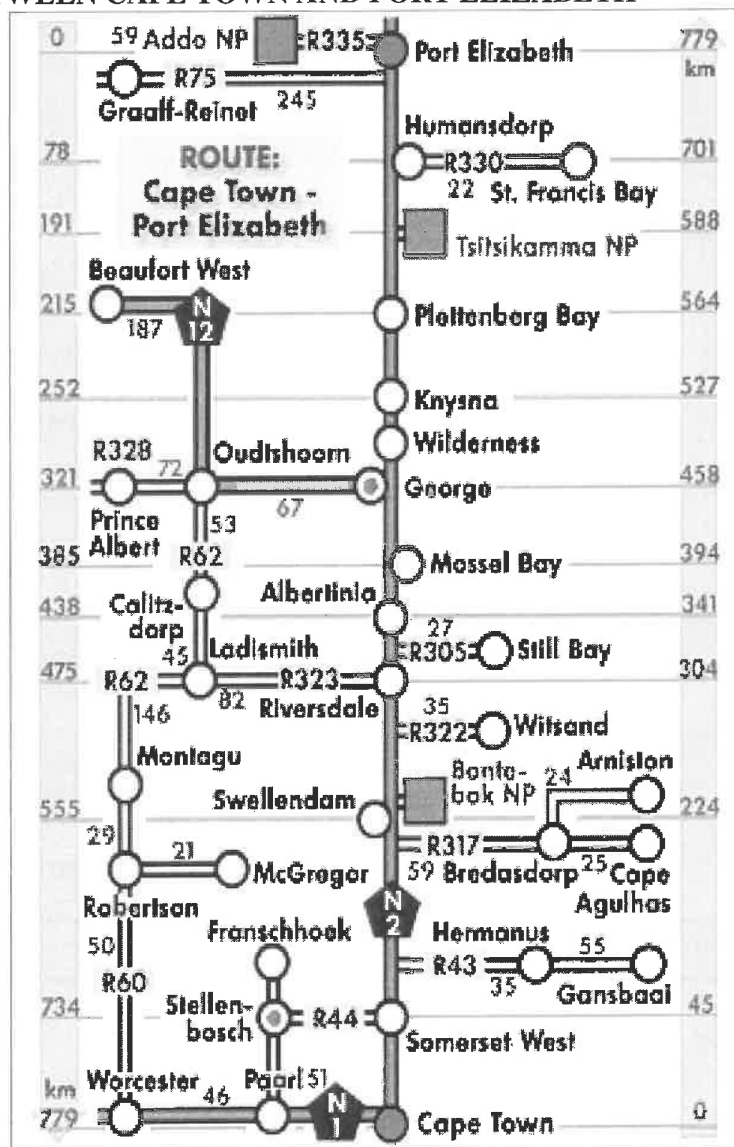
[Adapted from Pinterest.suedafrika.net]

Use the strip map to answer the questions that follow.

1.3.1   Write down the distance between Cape Town and Port Elizabeth.   (2)

1.3.2   Name the two national roads linking Beaufort West to Mossel Bay.   (3)

1.3.3   Calculate the distance between Somerset West and Plettenberg Bay.   (2)

[27]

QUESTION 2

2.1 | Sally works at a restaurant near her home. The restaurant can accommodate a maximum of 68 customers. Every Friday night they are normally fully booked. The special on a Friday is sushi.

ANNEXURE B shows the floorplan of a restaurant. |

Use ANNEXURE B to answer the questions that follow.

2.1.1   Write down the maximum number of people that can dine outside.   (2)

2.1.2   Explain the meaning of the term *floorplan*.   (2)

2.1.3   State the general direction from the office to the sushi bar.   (2)

2.1.4   Write down the number of exterior doors situated on the southern side of the restaurant.   (2)

2.1.5   Calculate (rounded to the nearest 5 meters) the inside length of the outside dining area.   (5)

2.1.6   One Friday a tour group consisting of 17 people visited the restaurant. They all ordered pizza.

        The manager told the chef that there is a probability that 76% of all their customers will order the special on that Friday.

        Verify by means of calculations whether he is correct.   (5)

2.2 | ANNEXURE C shows the street map location of Sally's home and where the restaurant is located. |

Use ANNEXURE C to answer the questions that follow.

2.2.1   Write down the name of the road where the restaurant is situated.   (2)

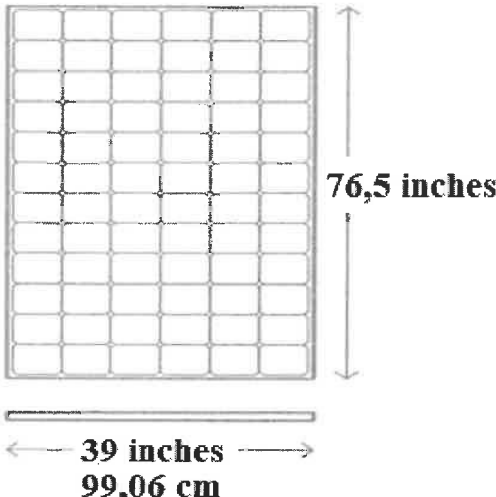2.2.2   Name the building on the corner of Church Street and Temple Street.   (2)

2.2.3   Describe, using compass direction, the shortest driving route from Sally's house to the restaurant.   (5)

                                                   [27]

QUESTION 3

3.1   Mr Adams installed 72-cell solar panels on the roof of his home. Given below is a sketch of ONE solar panel and some information regarding the solar panel.

SKETCH OF ONE SOLAR PANEL	INFORMATION FOR ONE SOLAR PANEL
72-cell solar panel **76,5 inches** - - **39 inches** - - - > **99,06 cm**	Length = 76,5 inches Width = 39 inches = 99,06 cm Energy output 1,5 kWh per day

The battery connected to the solar panels has a maximum capacity of 24 kWh.
The Adams household daily electricity use is 10 kWh per day.
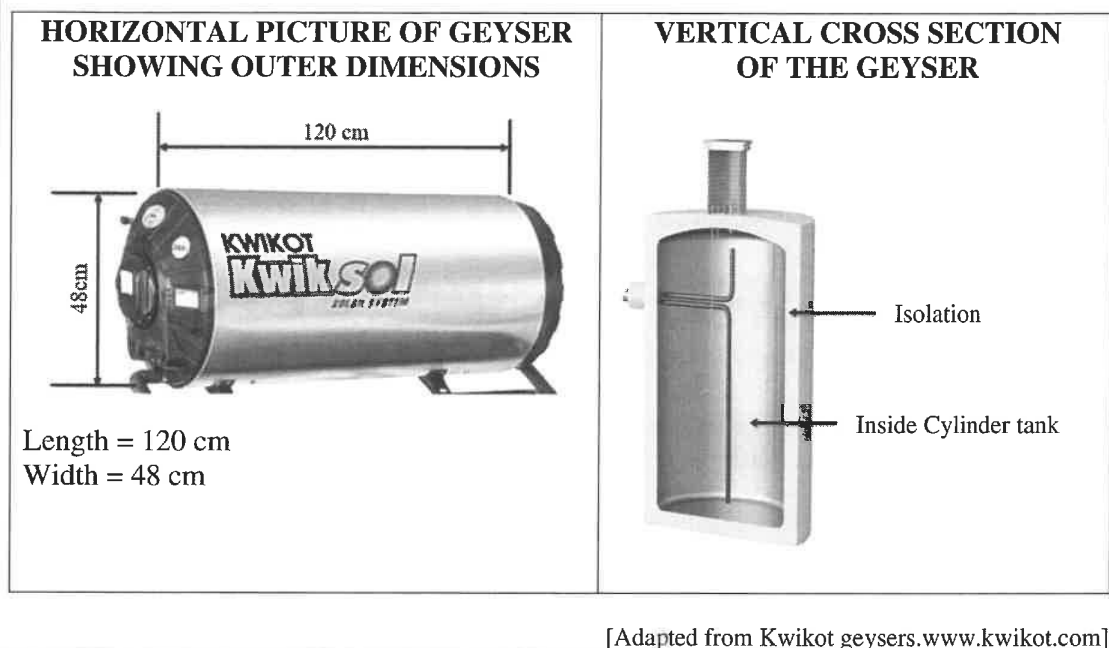**NOTE:** kWh = kilowatt-hours

[Adapted from Mercury inverters.com]

Use the information above to answer the questions that follow.

3.1.1   Calculate how long it will take 8 solar panels to charge the battery to maximum capacity.   (3)

3.1.2   The maximum temperature solar panels can be exposed to. is 150 °F.
Convert 150 °F to Celsius.

You may use the formula: **°C = (°F – 32°) ÷ 1,8**   (2)

3.1.3   Determine (in cm) the perimeter of ONE solar panel.

You may use the formula:

Perimeter of a rectangle = 2 × (length + width)   (6)

3.1.4   State ONE reason why Mr Adams installed solar panels.   (2)

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3.2   Kwikot is a geyser company that sell hot water cylinders (geysers). The geyser consists of a cylinder isolated with foam rubber all around to maintain the desired temperature of the water in the cylinder. The inner height and diameter of the inside cylinder tank are 4 cm shorter than the outer height and diameter of the geyser.

The weight of an empty geyser is 14 kg.

Below is a diagram showing the outer dimensions as well as the cross section of the geyser.

HORIZONTAL PICTURE OF GEYSER SHOWING OUTER DIMENSIONS	VERTICAL CROSS SECTION OF THE GEYSER
120 cm 48 cm Length = 120 cm Width = 48 cm	Isolation Inside Cylinder tank

[Adapted from Kwikot geysers.www.kwikot.com]

Use the information above to answer the questions that follow.

3.2.1   Determine the outer radius of the geyser.   (2)

3.2.2   Calculate the inner height (length) of the inside cylinder tank.   (2)

3.2.3   Calculate, rounded to the nearest 10 litres, how much hot water the inner cylinder can accommodate.

You may use the formula: **Volume = 3,142 × raduis² × height**

NOTE: 1 m³ = 1 000 litre   (6)

3.2.4   Use your answer in QUESTION 3.2.3 and determine what the weight of one water filled geyser is if 1 litre = 1 kg.   (3)

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QUESTION 4

4.1

> Mr Masigo bought a house.
>
> ANNEXURE D shows the floorplan of the house.

Use ANNEXURE D to answer the questions that follow.

4.1.1   Write down the ratio of the toilets to the basins in its simplest form.   (3)

4.1.2   Calculate, as a percentage, how much smaller the kitchen is compared to any bedroom.   (3)

4.1.3   Write down, the side (north, south, east or west) of the house that has no windows.   (2)

4.1.4   State, with a reason, whether the bedrooms of this house receive morning or afternoon sun.   (3)

4.1.5   The actual length of the eastern side (veranda excluded) of the house is 12 m.

Determine the scale rounded to a whole number that was used to draw the plan.   (5)

4.1.6   The inside length of the dining room is 6,1 m.

The builder stated that the inside width of the dining room will be more than 4 m.

Verify by showing all calculations whether his statement is correct.

You may use the formula:

Area of a rectangle = length × width   (6)

4.2   Mr Masigo intends tiling the living room.
The length of one square tile is 304 mm. The tiles are sold per box. There are six tiles in each box.
Tile cement is sold in 20 kg bags. One bag of tile cement covers an area of 6 m².

Below is the diagram of one tile, picture of one box of tiles, and a picture of one bag of tile cement.

A DIAGRAM OF ONE SQUARE TILE	A BOX OF TILES	A BAG OF TILE CEMENT
Side length = 304 mm	A box of 6 tiles	Cost R89,90 excluding VAT

Use the information above and ANNEXURE D to answer the questions that follow.

4.2.1   Calculate the area of one tile in m² rounded to 4 decimal places.

You may use the following formula:

Area of a square = side²   (3)

4.2.2   5% extra tiles must be purchased to cover for cutting and breakages.

Calculate how many boxes of tiles will be needed to cover the area of the living room.   (6)

4.2.3   VAT in South Africa is 15%. Tile cement cost R89,90 excluding VAT.
The owner of the house budgeted R500,00 for the tile cement.

Verify showing all calculations whether his budget for the tile cement is enough.   (6)

[37]

QUESTION 5

5.1   Sello is a truck driver for a company that transport goods by road from Walvis Bay to Windhoek.

Two the map below shows the route Sello travels between the Walvis Bay and Windhoek. The one-way distance from Walvis Bay to Windhoek is 396 km.

Map data ©2024 Google
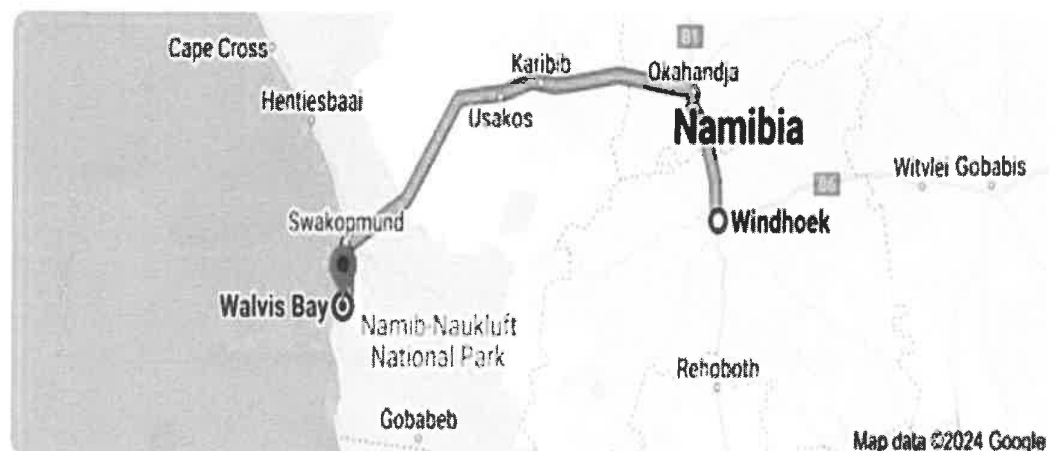
Use the information above to answer the questions that follow.

5.1.1   State the name of the national park near Walvis Bay.   (2)

5.1.2   Sello drove from Walvis Bay to Windhoek.

Write down the last town he passes before he reaches Windhoek.   (2)

5.1.3   The average diesel consumption for Sello's truck is 55 ℓ per 100 km.

Calculate how many litres of diesel Sello will need for one journey.   (3)

5.1.4   Sello, driving the truck, left the shipping yard in Walvis Bay at 8:30 am. He stopped for 15 minutes at Usakos. He drove at an average speed of 72 km/h.

     (a)   State ONE valid reason why he stopped at Usakos.   (2)

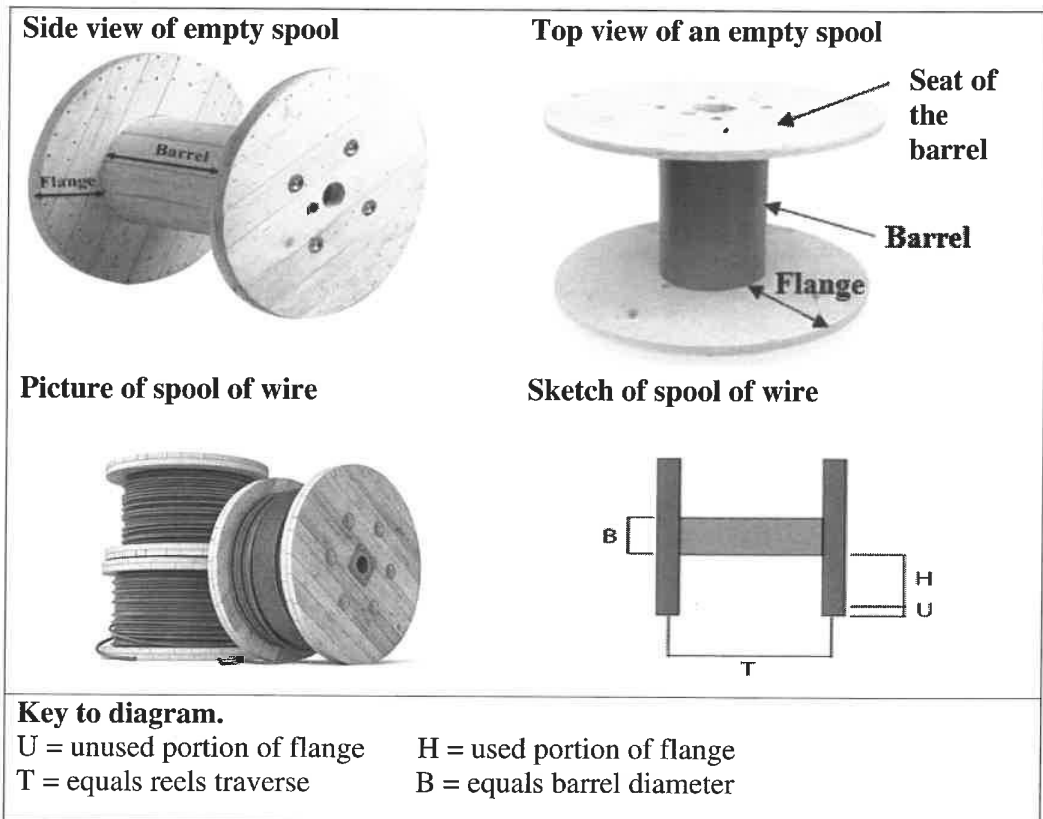   (b)   Sello stated that he arrived at his destination in Windhoek at 13:30.

Verify, showing all calculations, whether Sello's statement is valid.

You may use the formula: **Distance = speed × time**   (6)

5.2 | One of the items that Sello transports is copper cables. The copper cable is wound on plywood reels called spools. A spool consists of a barrel between two circular-shaped seats.
The section between the barrel and the end of the seat is called the flange. Reels come in different sizes.

Side view of empty spool

Top view of an empty spool

Seat of the barrel

Barrel

Flange

Picture of spool of wire

Sketch of spool of wire

Key to diagram.
U = unused portion of flange   H = used portion of flange
T = equals reels traverse   B = equals barrel diameter

Use the information above to answer the questions that follow.

5.2.1   Calculate the circumference, in metres, of the seat of a barrel with a radius of 70 cm.
You may use the formula: **Circumference of a circle = diameter × 3,142**   (3)

5.2.2   The diameter of the cable of a plywood 14 reel is 0,6 inches.

Sello stated that the length of the copper cable spooled around this reel is more than 65 metres if the reel factor is 75,60.

Verify showing all calculations if he is correct.
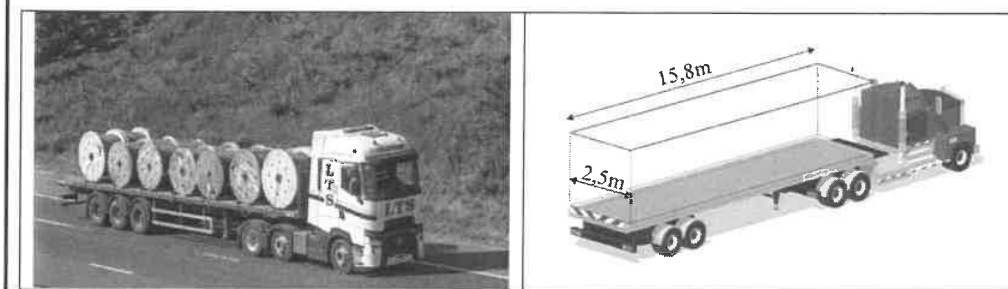
You may use the formula:

Length of cable (in feet) = reel factor ÷ (cable diameter in inch)²

NOTE: 1 foot = 0,3048 metres   (5)

5.2.3   State ONE reason why cable companies do not wire the whole wooden reel with copper cable, but instead leave a little space (U) on the flange.   (2)

5.3   The trailer dimension of Sello's truck is 2,5 m by 15,8 m, as illustrated below.

TRAILER DIMENSIONS OF A TRUCK

Use the information above to answer the questions that follow.

5.3.1   The height of an average cable reel is 1,15 m and the diameter is 1,5 m.

Calculate the maximum number of spools the truck can carry if they are not stacked on top of each other.   (5)

5.3.2   The maximum number of reels, packed next to each other, are loaded on the trailer.

Calculate the space, on the length of the trailer, that is free.   (3)
[33]

TOTAL: 150