

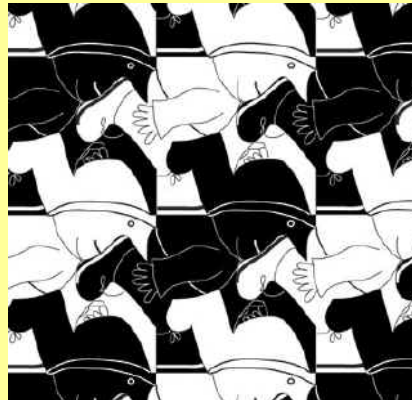


NQF Level: 3 US No: 9013

Assessment Guide

Primary Agriculture

Shape and motion



Assessor:

Workplace / Company:

Commodity: Date:

Before we start...

This assessment guide contains all necessary activities and instructions that will enable the assessor and learner to gather evidence of the learner's competence as required by the unit standard. This guide was designed to be used by a trained and accredited assessor whom is registered to assess this specific unit standard as per the requirements of the AgriSETA ETQA.

Prior to the delivery of the program the facilitator and assessor must familiarise themselves with content of this guide, as well as the content of the relevant Learner Workbook.

The assessor, facilitator and learner must plan the assessment process together, in order to offer the learner the maximum support, and the opportunity to reflect competence.

The policies and procedures that are required during the application of this assessment are available on the website of the AgriSETA and should be strictly adhered to. The assessor must familiarise him/herself with this document before proceeding.

This guide provides step-by-step instructions for the assessment process of:

Title:	Describe, apply, analyse and calculate shape and motion in 2-and 3-dimensional space in different contexts.		
US No:	9013	NQF Level:	3
		Credits:	4

This unit standard is one of the building blocks in the qualification listed below. Please mark the qualification you are currently assessing, because that will be determined by the context of application:

Title	ID Number	NQF Level	Credits	Mark
National Certificate in Animal Production	49048	3	120	<input type="checkbox"/>
National Certificate in Plant Production	49052	3	120	<input type="checkbox"/>

Please mark the learning program you are enrolled in:

Are you enrolled in a:	Y	N
Learnership?	<input type="checkbox"/>	<input type="checkbox"/>
Skills Program?	<input type="checkbox"/>	<input type="checkbox"/>
Short Course?	<input type="checkbox"/>	<input type="checkbox"/>

Note to Assessor:

If you are assessing this module as part of a full qualification or learnership, please ensure that you have familiarized yourself with the content of the qualification.

1

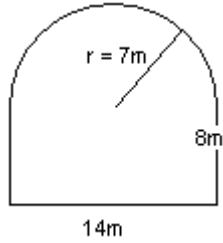
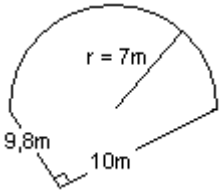
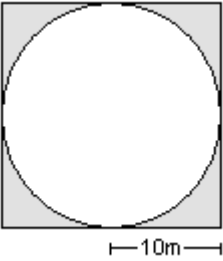
SO 1

Instructions to learner:

Individual assignment

Learner Guide: Page 10 Facilitator Guide: Page 12

Calculate the surface area of each of the following shapes:

<p>1.</p> 	<p>Model Answer(s):</p> <p>1. $Area = Area\ 1 + Area\ 2$ <i>Area 1 is a semi-circle, i.e. half a circle</i> $Area = \frac{1}{2} \times \pi \times radius \times radius + length \times breadth$ $= \frac{1}{2} \times \pi \times 7m \times 7m + 14m \times 8m$ $= 76,97m^2 + 112m^2$ $= 188,97m^2$</p>
<p>2.</p> 	<p>2. $Area = Area\ 1 + Area\ 2$ <i>Area 1 is a semi-circle, i.e. half a circle</i> $Area = \frac{1}{2} \times \pi \times radius \times radius + \frac{1}{2} \times base \times height\ of\ triangle$ $= \frac{1}{2} \times \pi \times 7m \times 7m + \frac{1}{2} \times 9,8m \times 10m$ $= 76,97m^2 + 49m^2$ $= 125,97m^2$</p>
<p>3. Calculate the shaded area</p> 	<p>3. $Shaded\ area = area\ of\ square - area\ of\ circle$ $= 20m \times 20m - \pi \times 10m \times 10m$ $= 400m^2 - 314,16m^2$ $= 85,84m^2$</p>

My Notes ...

.....

.....

.....

.....

.....

.....

.....

2

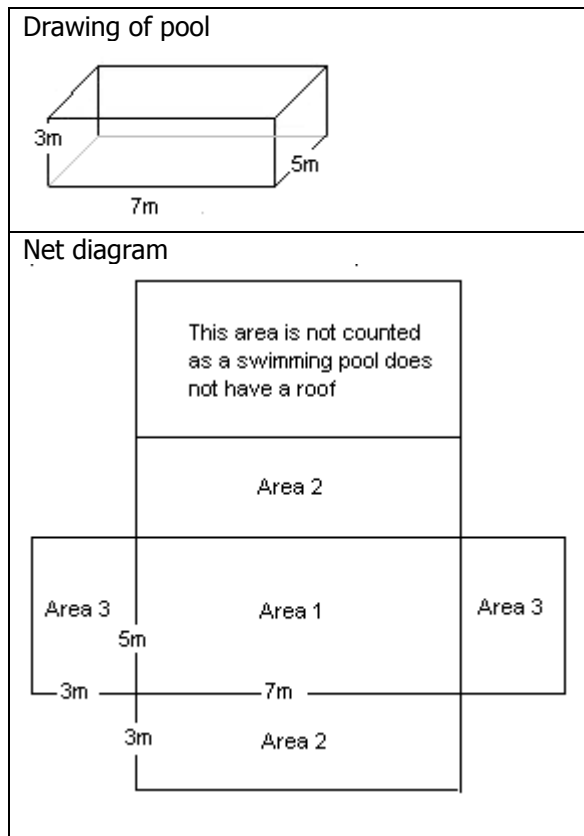
SO 1

Instructions to learner:

Individual assignment

Learner Guide: Page 14 Facilitator Guide: Page 12

1. A swimming pool is 7m long, 5m wide, and 3m deep. It has the same depth everywhere. What is the inside surface of the swimming pool and what is the volume (in m³)?

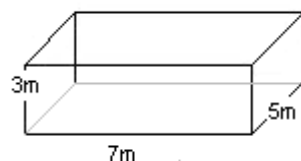


2. Calculate the volume of a cylinder with a radius of 3 metre and a depth of 5 metre. What is the surface area of the wall of the cylinder?
3. A farmer decided to build a dam on this farm. He wanted to have a cylindrical shaped dam. The diameter of the dam was to be 20m and the depth was to be 4m. How many cubic meters of water will the dam hold when it is full?

Model Answer(s):

1.

Drawing of pool



$$\begin{aligned}
 \text{Volume} &= \text{area of base} \times \text{height} \\
 &= 7m \times 5m \times 3m \\
 &= 105m^3
 \end{aligned}$$

<p><i>Net diagram</i></p>	<p><i>Total area = area 1 + 2 x area 2 + 2 x area 3</i></p> $= 5m \times 7m + 2 \times 3m \times 7m + 2 \times 3m \times 5m$ $= 35m^2 + 42m^2 + 30m^2$ $= 107m^2$
<p>2.</p> <p><i>Diagram</i></p>	<p><i>Surface area of wall of cylinder = area 2 = area of rectangle</i></p> <p><i>We need to calculate the length of the top and bottom of the rectangle. This is the same as the circumference of the circle.</i></p> $\text{Circumference} = 2\pi r = 2 \times \pi \times 3 \times 3m = 18,8m$ $\text{Area} = \text{length} \times \text{breadth} = 18,8m \times 5m = 94m^2$ $\text{Volume} = \text{area of base} \times \text{height} = \pi r^2 \times h = \pi \times 3m \times 3m \times 5m = 141,4m^3$
<p>3.</p> <p><i>Diagram</i></p>	<p><i>Volume = area of base x height = area of circle x height</i></p> $= \pi \times 10m \times 10m \times 4m = 1256,6m^3$

3**SO 1
Act 3 a - g****Instructions to learner:**

Individual assignment

Learner Guide: Page 15 Facilitator Guide: Page 12

- a. You have to estimate the length and width and height of the classroom in centimetres as well as metres. Thereafter you have to use a measuring instrument such as a ruler or a measuring tape to obtain a more accurate answer. Write down the method you followed to obtain an estimate as well as the more accurate answer and your answer.
- b. Why is there a difference in your estimated values when compared to the values you obtained from the measuring instrument
- c. Calculate the floor area of your classroom in centimetres².
Area =
- d. Calculate the floor area of your classroom in metres².
Area =
- e. Calculate the volume of your classroom in cm³
Volume =
- f. Calculate the volume of your classroom in m³
Volume =
- g. Calculate the volume of your classroom in litres
Volume =

4

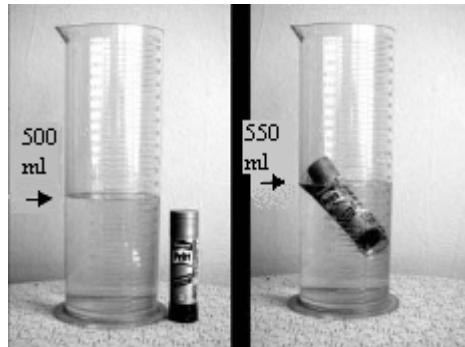
SO 1

Instructions to learner:

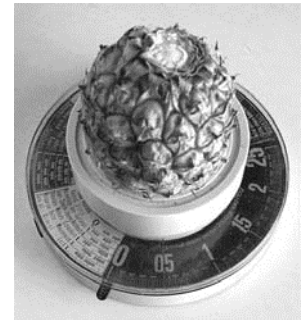
Individual assignment

Learner Guide: Page 18 Facilitator Guide: Page 12

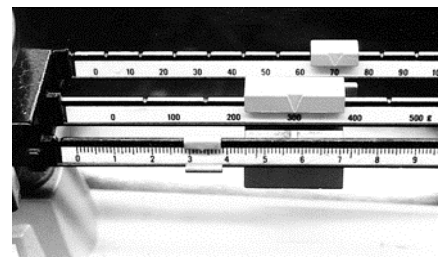
- a. You have to determine the volume of a glue stick. You fill a measuring cylinder with 500 ml of water. Thereafter you add the glue stick into the water. The level of the water rises to 550 ml. What is the volume of the glue stick in ml and in cm^3 ?



- b. What is the mass of the pineapple on the kitchen scale?
c. What is the range that the kitchen scale can measure?



- d. A block is put on a triple-balance beam.
What is the mass of this object?
e. What is the range that this triple balance beam can measure?



Model Answer(s):

- a. $\text{Volume of glue stick} = 550 \text{ ml} - 500 \text{ ml} = 50 \text{ ml}$
 $\text{Volume} = 50 \text{ cm}^3$
b. 500 g or 0.5 kg
c. 0 kg to 2.5 kg
h. 373.4 g
i. 0 to 610 g

6

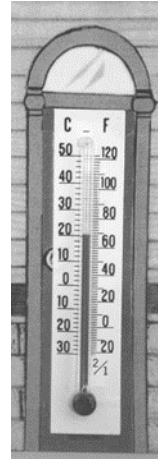
SO 1

Instructions to learner:

Individual assignment

Learner Guide: Page 22 Facilitator Guide: Page 12

- What is the temperature indicated on the thermometer?
- Describe the difference between $^{\circ}\text{C}$ and Kelvin.



- At what temperature does water boil at sea level?
- How would you rate the following summer day temperatures? Mark the appropriate box with an x.

Temperature	Very cold	Cold	Cool	Warm	Hot
8°C					
28°C					
30°C					
22°C					
16°C					
34°C					

Model Answer(s):

- 20°C
- $0\text{K} = -273^{\circ}\text{C}$ or $273\text{K} = 0^{\circ}\text{C}$. Other than this difference, $1\text{K} = 1^{\circ}\text{C}$.
- 100°C
-

Temperature	Very cold	Cold	Cool	Warm	Hot
8°C	x				
28°C				x	
30°C					x
22°C			x		
16°C		x			
34°C					x

Instructions to learner:

Individual assignment

Learner Guide: Page 23 Facilitator Guide: Page 12

1. Calculate the speed of a motor vehicle after it took 3 minutes to travel 1,8 km.
2. What instrument will you use to measure the following quantities?

Quantity	Measuring instrument
Time	
Speed	
Length	
Volume	
Area	
Mass	
Temperature	

Model Answer(s):

1. $Speed = distance/time$
 $= 1.8km/3min$
 $= 1800m/180s$
 $= 10m/s$
- 2.

Quantity	Measuring instrument
<i>Time</i>	<i>Clock, watch, stopwatch</i>
<i>Speed</i>	<i>Ruler or odometer of car AND watch</i>
<i>Length</i>	<i>Ruler, tape measure</i>
<i>Volume</i>	<i>Ruler, tape measure, measuring cylinder</i>
<i>Area</i>	<i>Ruler, tape measure</i>
<i>Mass</i>	<i>Scale</i>
<i>Temperature</i>	<i>thermometer</i>

My Notes ...

.....

.....

.....

.....

8

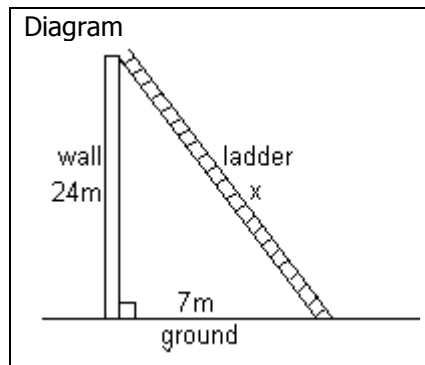
SO 1

Instructions to learner:

Individual assignment

Learner Guide: Page 26 Facilitator Guide: Page 12

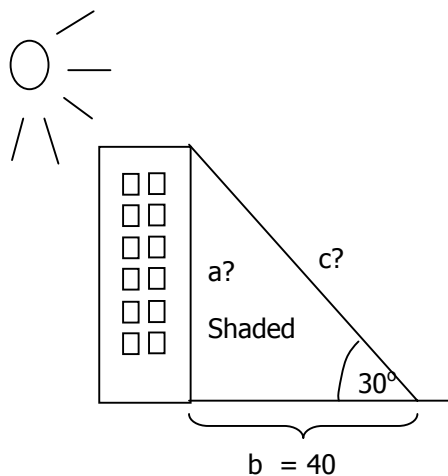
- a. A ladder rests against a wall 24m high. The foot of the ladder is 7m from the foot of the wall. Calculate the length of the ladder.



- b. In the triangle below

	<p>a. Name the hypotenuse b. Name the side opposite θ c. Name the side adjacent to θ d. $\sin \theta =$ e. $\cos \theta =$ f. $\tan \theta =$</p>
--	---

- c. It is 11:00 on a sunny summer day. You are standing next to a block of flats. Calculate the height of the block of flats (y) based on the information in the diagram. Calculate the hypotenuse of the shaded area by using Pythagoras' theorem.



Instructions to learner:

Individual assignment

Learner Guide: Page 34 Facilitator Guide: Page 14

- a. What is a tessellation?
- b. What is the important principle for the interior angle in order for a tessellation to work?
- c. Give examples where you have seen tessellations being used in architecture in buildings or in the home.

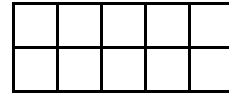
Model Answer(s):

- a. The word "tessellate" means to form or arrange small squares in a checkered or mosaic pattern. The word "tessellate" is derived from the Ionic version of the Greek word "tesseres," which in English means "four." The first tilings were made from square tiles.
- b. The interior angle must be an exact divisor of 360 degrees.
- c. Here are examples of

A tessellation of triangles



A tessellation of squares



A tessellation of hexagons



My Notes ...

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

Instructions to learner:

Individual assignment

Learner Guide: Page 37 Facilitator Guide: Page 14

- a. Classify all the capital letters in English (in their simplest forms) according to their symmetries. For example, "A" has a reflection in a vertical line, and "R" has no symmetry (except rotation by 0 degrees).

Model Answer(s):

<i>Letter</i>	<i>Classification</i>
A	reflection in a vertical line
B	reflection in a horizontal line
C	reflection in a horizontal line
D	reflection in a horizontal line
E	reflection in a horizontal line
F	no symmetry
G	no symmetry
H	reflection in a horizontal and vertical line
I	reflection in a horizontal line
J	no symmetry
K	reflection in a horizontal line
L	no symmetry
M	reflection in a vertical line
N	no symmetry
O	reflection in a horizontal and vertical line
P	no symmetry
Q	no symmetry
R	no symmetry
S	no symmetry
T	reflection in a vertical line
U	reflection in a vertical line
V	reflection in a vertical line
W	reflection in a vertical line
X	reflection in a horizontal and vertical line
Y	reflection in a vertical line
Z	no symmetry

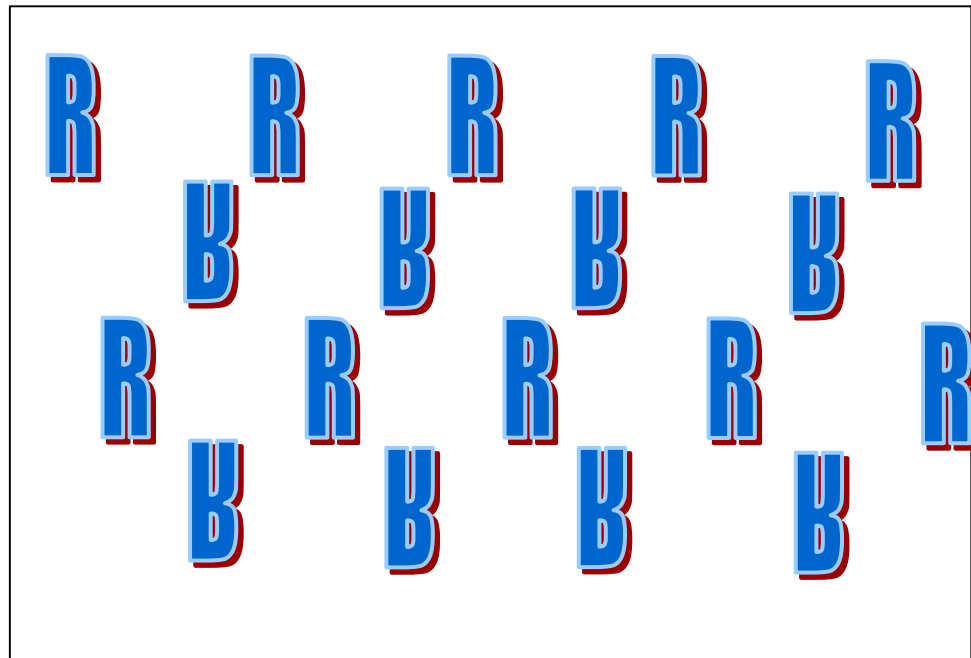
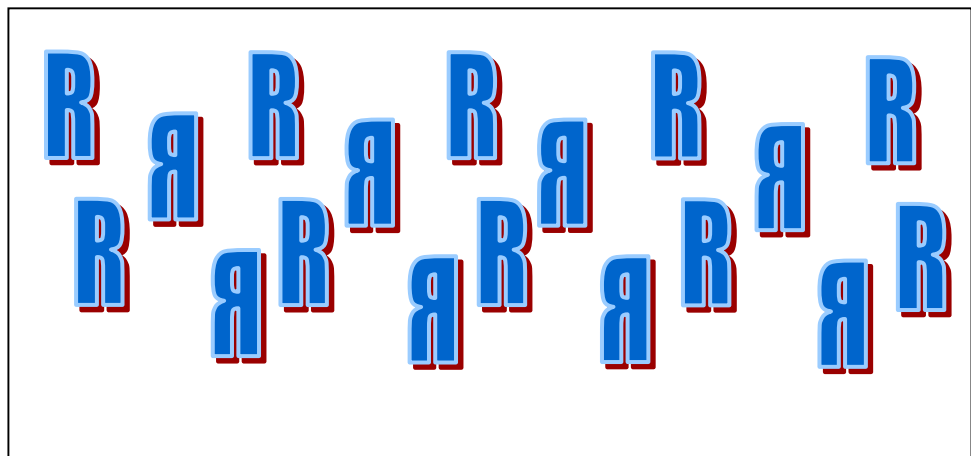
- b. Use the box below to make a symmetric pattern by starting with an asymmetric shape (a letter is fine) and repeating a single translation over and over (also translate it backwards). That is, decide on a direction and distance for your translation (for example, 3 cm to the right). Translate your letter 3 cm to the right, then translate the new letter 3 cm to the right, etc. Also translate the original letter 3 cm. to the left, etc. Did you get any other types of symmetries (reflections, glide reflections, or rotations) in the process?

Model Answer(s):

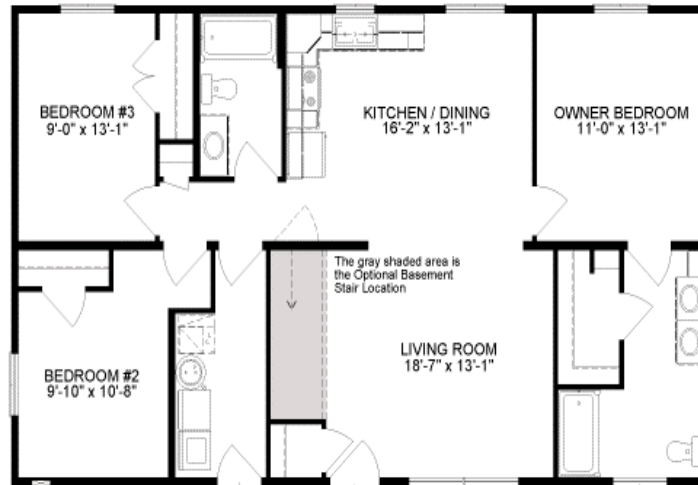
No specific answer.

- c. Make a symmetric pattern by starting with an asymmetric shape and repeating a single glide reflection over and over (also glide it backwards). That is, pick a reflection line and a translation in a direction parallel to the reflection line. Keep applying the same glide reflection to the new shapes that you generate until you run out of paper. Did you get any other types of symmetries (reflections, translations, or rotations) in the process?

Model Answer(s):



d. House plan



1. How many bedrooms does this house have?
2. How many doors does the owner bedroom have?
3. How many bathrooms are there and where are they situated?
4. What does each bathroom contain?
5. How many windows does the kitchen have?
6. What is included in bedroom 2?
7. What is the room next to Bedroom 2?
8. What is the floor space area of the living room?
9. What interesting feature does this house have that we do not always find in a South African house?

Model Answer(s):

1. 3
2. 2
3. 2, one en suite to owner bedroom, the other between bedroom 3 and kitchen
4. Toilet, bath, basin
5. 2
6. Wardrobe, built in
7. Scullery/laundry
8. 24m²
9. Basement

11

SO 2

Instructions to learner:

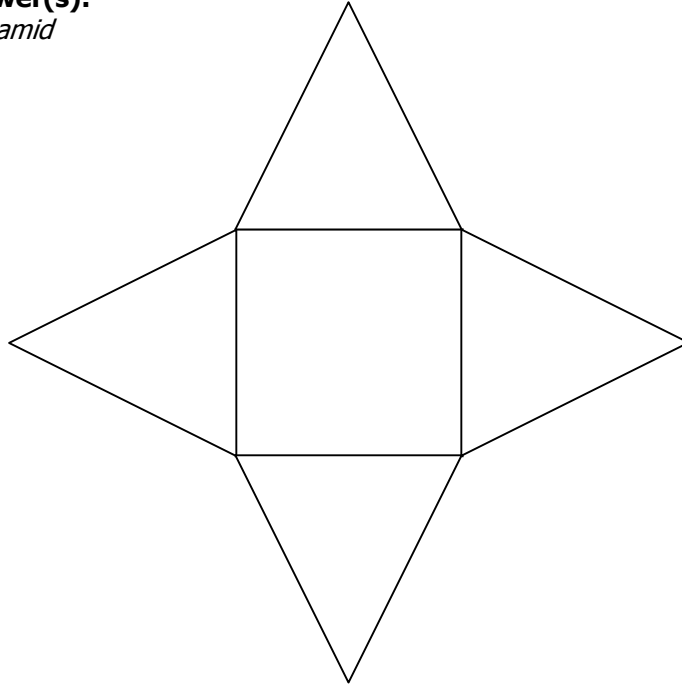
Individual assignment

Learner Guide: Page 40 Facilitator Guide: Page 14

a. Draw the nets of your prism and pyramid.

Model Answer(s):

Net of a pyramid

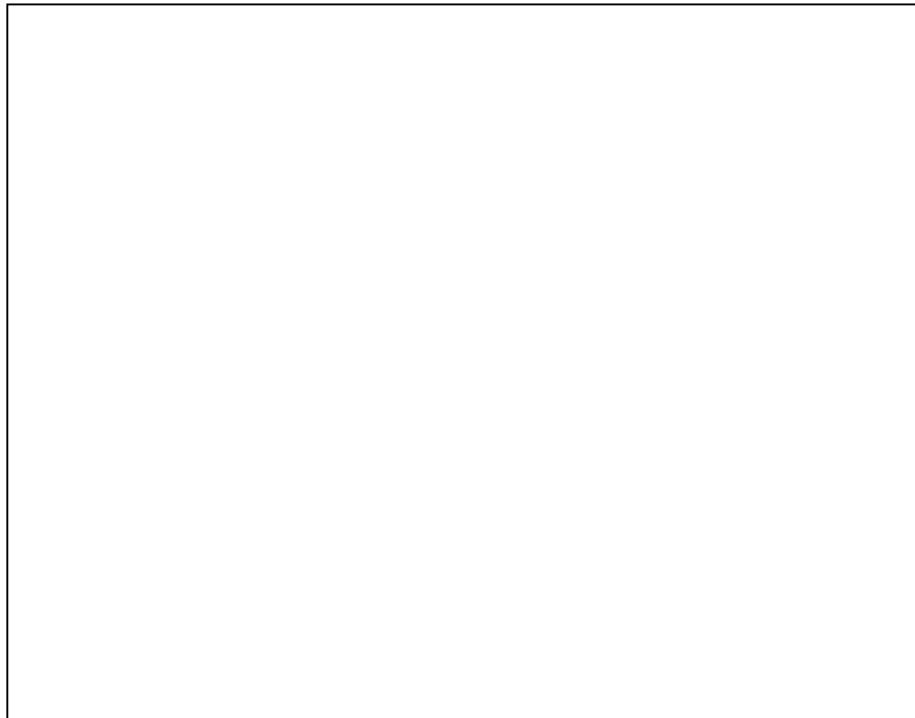


b. Trace the following net on to a separate piece of paper. Cut it out and stick it together with masking tape.

Model Answer(s):



- Draw windows and doors on the net.
- Make a sketch of the house, orienting it so that the front of the house faces north. Label E, W, and S for the three remaining sides of the house.



Model Answer(s):

No specific answer.

- Fold the net to make the house and confirm the 2-D sketch.
- Determine the area of the net in cm^2 by using a cm^2 grid/transparency and use the area information to calculate the cost of painting the outside of the house if it costs R50 to paint one m^2 (note; 1 cm^2 corresponds to 1 m^2 of the actual house).

Model Answer(s):

$$\text{Area of the house} = 2 \times \text{area}(N) + 2 \times \text{area}(W)$$

$$= 2 * 3.81 * 1.88 + 2 * 1.88 * 1.88$$

$$= 14.32 + 6.55$$

$$= 20.87 \text{ cm}^2$$

$$\text{Total area on house to be painted} = 20.87\text{m}^2.$$

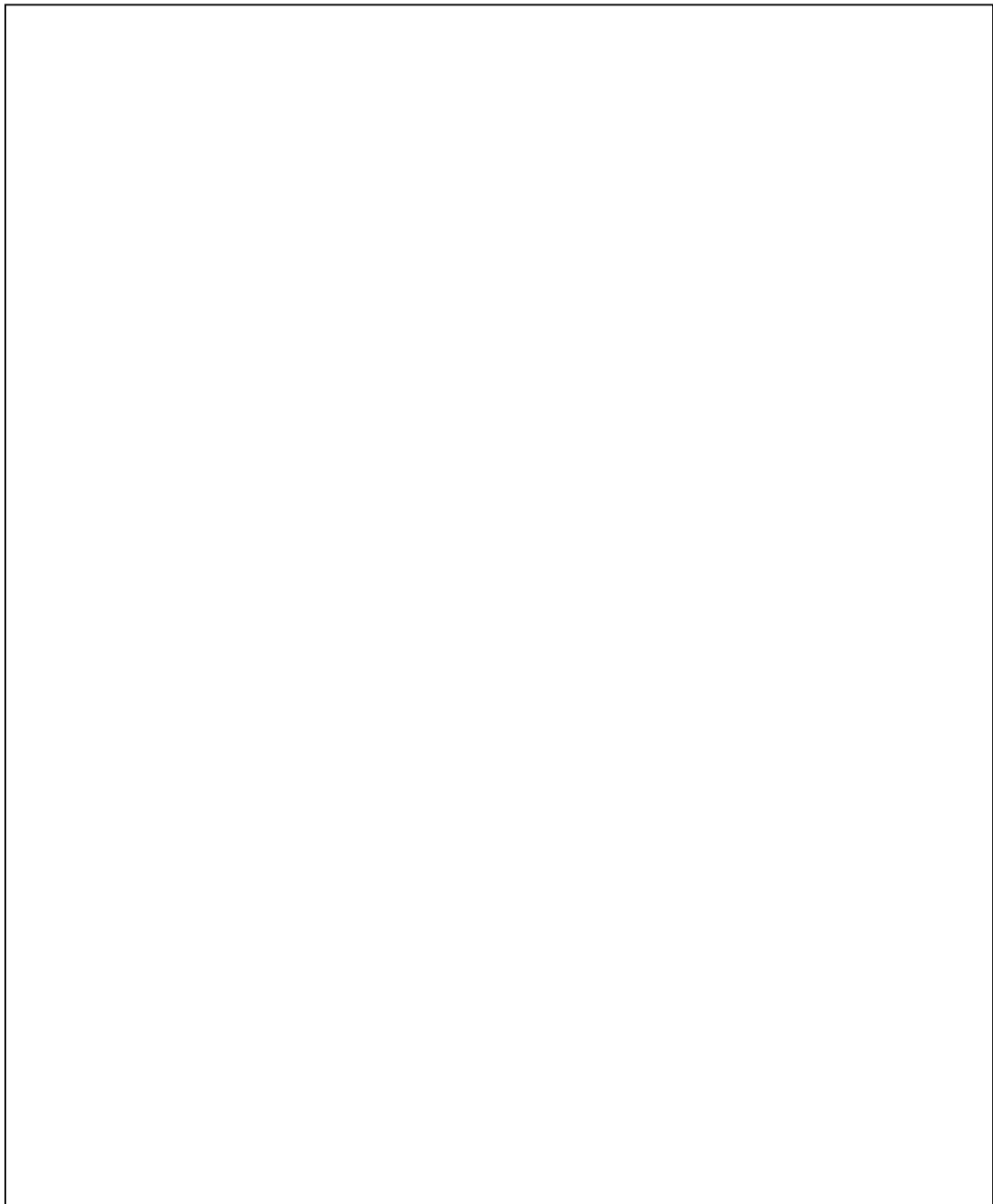
$$\text{Thus painting costs} = R50 * 20.87 = R417.40$$

Instructions to learner:

Individual assignment

Learner Guide: Page 43 Facilitator Guide: Page 14

- a. Study the copy of a map of part of Roodepoort. Answer the following questions on the next page:



1. What important landmark will you find at the Cartesian coordinates – DT 84?
2. Give the Cartesian coordinates of Bennie Reinecke Pleasure Park.
3. What streets border the Vehicle Testing Ground?
4. Name three community services to be found at DQ 84.

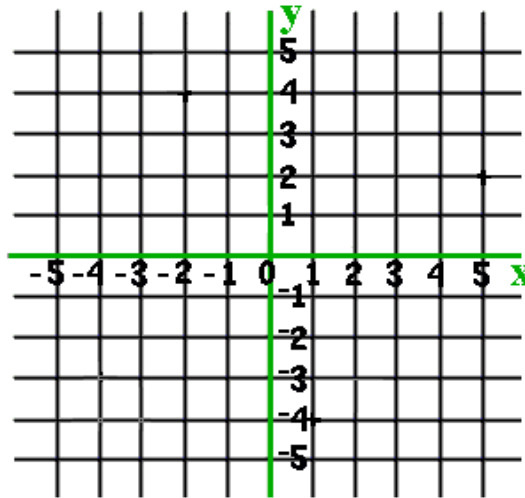
Model Answer(s):

1. Florida Lake
2. DS82
3. Hamberg & Westlake
4. Civic Theatre, Museum, Fire Station

- b. Plot the following values on the Cartesian plane provided below. Label the points that you have plotted.

- (i) (5,2)
- (ii) (-4,-3)
- (iii) (-2,4)
- (iv) (1,-4)

Model Answer(s):



My Notes ...

.....

.....

.....

.....

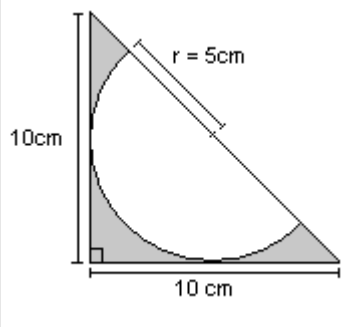
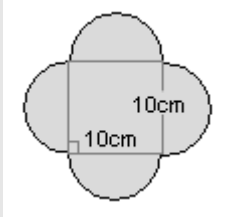
Summative Test and Attitude & Attribute Evaluation

Before the knowledge test is undertaken, the learner must be reminded of what is expected from him / her in terms of summative and reflexive competence. Read and explain to the learner, the **Preparation for Your Final Assessment** section in the learner workbook. Learners and assessor should sign off this section to acknowledge that this step was completed.

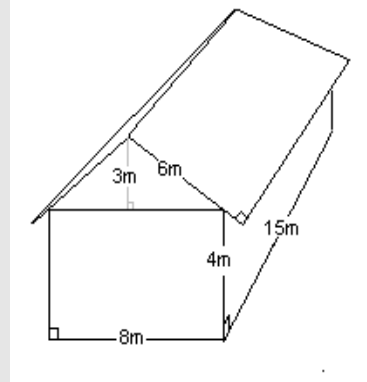
Please set up a knowledge test from the questions given as a guideline to learners and supply each learner with a test sheet.

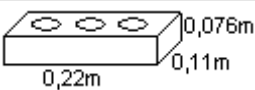
Supply each report with the following heading:

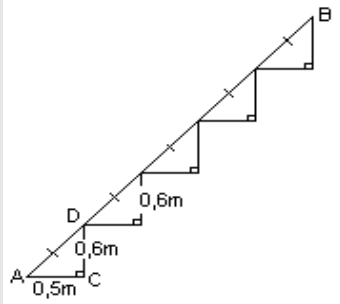
Unit Standard:	9013	NQF Level:	3
Learner Name:			

Questions	Model Answers
<p>1. Calculate the area of the shaded regions</p> <p>a.</p>  <p>b.</p> 	<p>a. <i>Shaded area = area of triangle – area of half-circle</i> <i>Shaded area = $\frac{1}{2} \times 10\text{cm} \times 10\text{cm} - \frac{1}{2} \pi \times 5\text{cm} \times 5\text{cm}$</i> $= 50\text{cm}^2 - 39,3\text{cm}^2$ $= 10,7\text{cm}^2$</p> <p>b. <i>The four semi-circles actually make up 2 complete circles, each with a radius of 5cm.</i> <i>Shaded area = area of square + 2xarea of circle</i> $= 10\text{cm} \times 10\text{cm} + 2 \times \pi \times 5\text{cm} \times 5\text{cm}$ $= 100\text{cm}^2 + 157,1\text{cm}^2$ $= 257,1\text{cm}^2$</p>

2. A farmer wants to build a shed on his farm. He wants to draw it according to the diagram below.



- Calculate how many square meters of roofing he needs to buy.
- If corrugated iron sheeting costs R70 per m^2 , calculate the cost of the roof.
- Each  many one of the side walls.
- Calculate the volume of the rectangular part of the shed (i.e. ignore the triangular part under the roof).
- Calculate area of the floor in m^2
- Inside the shed he wants to place a drum of radius 1m and height 1,5m. Calculate the volume of the drum in m^3 .
- Convert the volume of the drum to litres.
- Inside the shed he also wants to build a loft. To get up to the loft he also needs to build a staircase.
 - What is the distance AD?
 - What is the distance AB?
 - Calculate the size of angle A



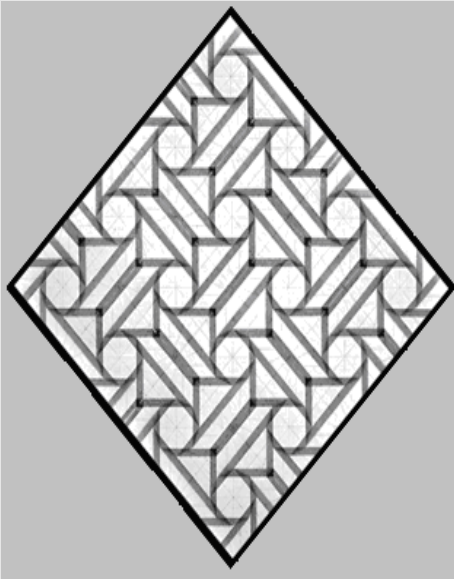
- Area of roof = $2 \times 6m \times 15m = 270m^2$
- Total cost of roof = $270m^2 \times R70 = R18\ 900.00$
- You need only calculate the area of the brick facing you i.e. $0,22m \times 0,076m = 0,0167m^2$. The area of the wall is $4m \times 15m = 60m^2$. The number of bricks if you use a single layer is: $60m^2 \div 0,0167m^2 = 3409,1$ bricks. You cannot buy 0,1 of a brick, so he needs a minimum of 3410 bricks for one layer. He thus needs $3410 \times 2 = 6820$ bricks just for one side wall.
- Volume = area of base \times height
 $= 8m \times 15m \times 4m = 480m^3$
- Area of floor = $8m \times 15m = 120m^2$
- Volume = area of base \times height
 $= \text{area of circle} \times 1,5m$
 $= n \times 1m \times 1m \times 1,5m = 4,75m^3$
- $1m^3 = 1000$ litres
- By Pythagoras: $AD^2 = (0,5)^2 + (0,6)^2$
 - $AD^2 = 0,61$
 $AD = 0,78m$
 - $AB = 5 \times 0,78m = 3,9m$
 - $\tan A = 0,6 \div 0,5 = 1,2$
 $A = 50,2^\circ$

3. The farmer has a tractor that travels 10 km in 50 minutes. Calculate the speed of the tractor in km/hr.

$$50 \text{ min} = 50 \div 60 \text{ hours} = 0,92 \text{ hours}$$

$$\text{Speed} = \text{Distance} \div \text{time} = 10\text{km} \div 0,92 \text{ hours} = 10,9\text{km/hr}$$

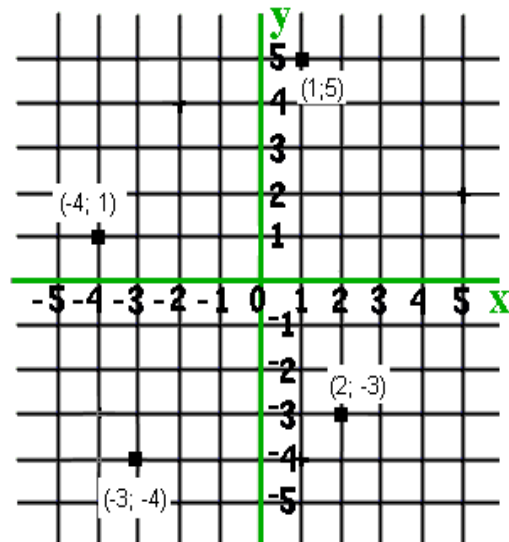
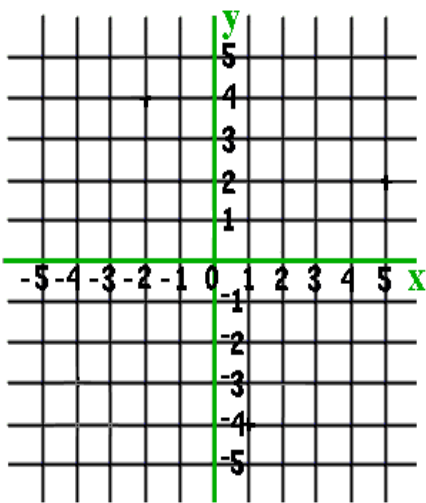
4. Study the picture of the tessellation.
a) Explain, in words, how the tessellation has been achieved.



- a. There are many different ways to explain how this pattern was achieved. The assessor must gauge how well the learner has understood what a tessellation is by the written description. The idea that a tessellation is a repeated pattern must come across. Correct terminology like Symmetry, rotation, translation or reflection must be used.
- b. This pattern could be used in tiles, carpets etc. Any reasonable answer is acceptable.

b. Name an example of where the use of this particular pattern could be suitable.

5. Plot the points (1; 5) (2; -3) (-3; -4) (-4; 1) on the Cartesian plane



Assessment Feedback Form

Comments / Remarks	
Feedback to learner on assessment and / or overall recommendations and action plan for competence:	
Feedback from learner to assessor:	
<p>Assessment Judgement You have been found:</p> <p><input type="radio"/> Competent</p> <p><input type="radio"/> Not yet competent in this unit standard</p>	<p>Actions to follow:</p> <p><input type="radio"/> Assessor report to ETQA</p> <p><input type="radio"/> Learner results and attendance certification issued</p>
Learner's Signature:	Date:
Assessor's Signature:	Date:
Moderator's Signature:	Date: