

Name:

Year Level: Date:



GEOMETRY FORM C

Assessment Booklet

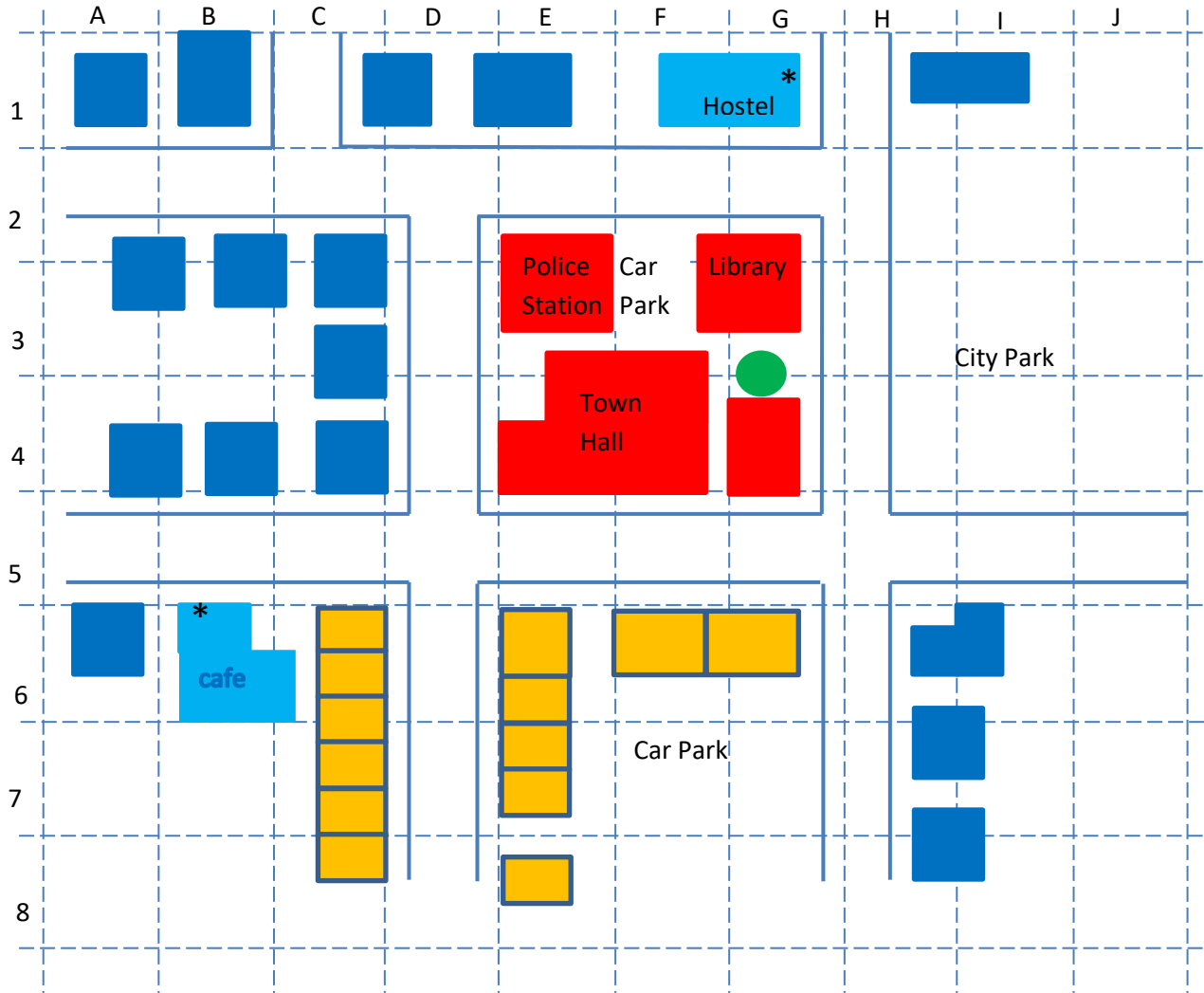
Reframing Mathematical Futures II

*An Australian Mathematics & Science Partnership Project
(2015-2018)*

GEOMETRY FORM C

1. Spy squad 1: Giving directions

You have been invited to join the Spy Squad, a group of young people helping their country. There is a meeting at the café for the squad.



Legend

- house
- shop
- public building

a [GSPSQ1]
 What is the map grid reference for the café? _____

b [GSPSQ2]

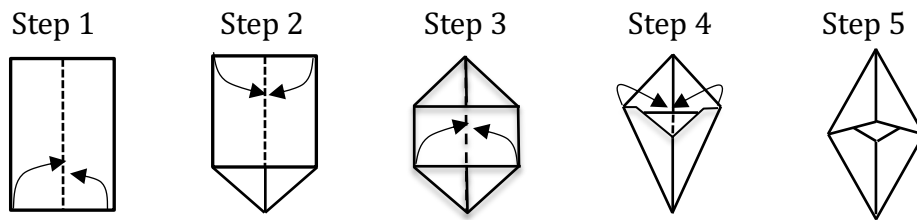
Mara is staying at the hostel. She doesn't know how to find the café and she does not have a map. The doors are marked with *. Give Mara directions so she can find her way.

c [GSPSQ3]

Describe another way Mara could have gone.

2. Angles and Locations

You will need the shape you made in class. The steps and diagrams below show how you made the shape.



Step 1 Fold an A4 paper in half lengthwise to make a crease line in the middle of the page.

Step 2 Fold two corners to the middle at the bottom

Step 3 Fold two corners to middle at the top

Step 4 Fold the new corners on the sides at the bottom to the middle

Step 5 Do the same with the top

a [GANG1]

Phoebe made the same shape that you made using A4 paper. She said her shape is a rhombus.

Do you agree? Explain your reasoning.

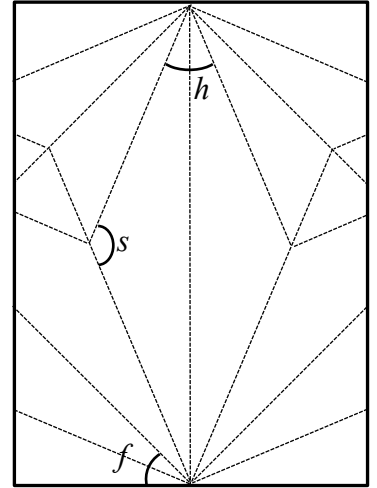
b [GANG2]

When Phoebe unfolds the paper, she found a number of crease lines.

Without using a protractor find the size of the marked angles:

Angle f = _____ Angle h = _____ Angle s = _____

Explain how you work out the angles.



3. Containers

a [GBEV5]

A beverage company is designing a container for their new line of fruit juice products.

The containers will hold 250 millilitres. What might the dimensions be?

Provide two examples and explain your reasoning.

b [GBEV6]

A cylindrical container holds exactly 3 tennis balls.

Which is larger the distance around the container or the height of the container?

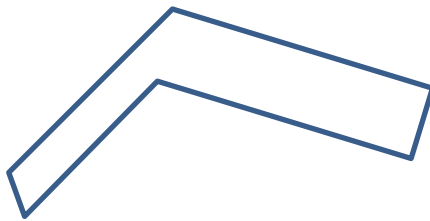
Explain your reasoning.



4. Parallel lines and right angles

a [GPARA1]

How many pairs of parallel lines can you find in the shape below? _____



Explain your reasoning.

- b** [GPARA4]
How many right angles are there in the shape? _____
Explain your reasoning.

5. Working with Solids

- a** [GNET1]
The diagram below shows the net of a 3D object. The triangular flaps are then folded up along the dotted lines to make the 3D object.

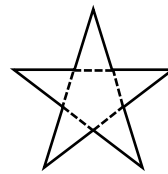
What is the name of this 3D object? _____.

How many faces, edges and vertices does this object have?

Faces: _____

Edges: _____

Vertices: _____



- b** [GNET2]
Draw what this 3D object would look like when viewed from directly above and when viewed from the front at eye level.

View from above

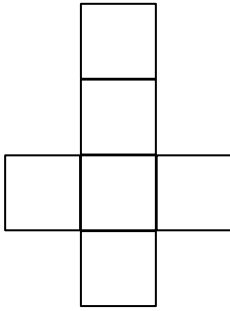
View from the front

c

[GNET3]

The diagram below shows the net of a cube.

Draw a different net for a cube



d

[GNET4]

Sam thinks he has drawn a net of a cube using six squares but it **does not** fold up to make a cube.

What might Sam's drawing look like?

Explain how you know.

GEOMETRY FORM D RUBRIC

1. GSPSQ1

SCORE	DESCRIPTION
0	No response or irrelevant response
1	Incorrect grid reference provided (e.g., C6 or other) or inappropriately referenced (e.g., 6B)
2	Correct (B6)

GSPSQ2

SCORE	DESCRIPTION
0	No response or irrelevant response
1	Incorrect attempt at directions, may use simple directional language but incorrect or insufficient or landmarks but insufficient (e.g., <i>Go to library then to town hall</i>)
2	Uses directions not adjusted for walker, may use <i>left</i> meaning the map's left hand side and <i>up</i> and <i>down</i> for the other dimension or uses these in conjunction with landmarks
3	Clear directions given using appropriate language from the walker's perspective (e.g., turn right on leaving the hostel,...). References to right and left must be from walker's perspective. If using North, East, West etc. then the walker would need to be told where North is first.

GSPSQ3

SCORE	DESCRIPTION
0	No response or irrelevant response
1	Incorrect attempt at directions, may use simple directional language but incorrect or insufficient detail, may use landmarks (e.g., <i>Go to library then to town hall</i>), may not be a different way
2	Describes a different route, uses directions not adjusted for walker, may use <i>left</i> meaning the map's left hand side and <i>up</i> and <i>down</i> for the other dimension or uses these in conjunction with landmarks
3	Clear directions given using appropriate language from the walker's perspective (e.g., turn right on leaving the hostel,...). References to right and left must be from walker's perspective. If using North, East, West etc. then the walker would need to be told where North is first.

2. GANG1

SCORE	DESCRIPTION
0	No response or irrelevant response
1	Disagree it is a rhombus but specify some of its properties correctly
2	Disagree it is a rhombus but claim it is a parallelogram with some properties
3	Agree it is rhombus but insufficient or incorrect properties to define it or claims it is a parallelogram and includes all properties
4	Agree it is rhombus. Explanation needs to include necessary and sufficient properties, that is, it is a parallelogram with one of the following properties <ul style="list-style-type: none"> • 4 equal straight sides • Opposite angles equal, sides equal • Two lines of symmetry

GANG2

SCORE	DESCRIPTION
0	No response or irrelevant response
1	Incorrect angles but some evidence that angle measure are understood, angle measures are roughly accurate (e.g., angle f is larger than angle h but smaller than a right angle)
2	At least 2 angles correct but no reason given
3	Two angles found correctly with sensible reasons or all angles correct with no reasoning
4	All angles correct ($f = 45^\circ$; $h = 45^\circ$; $s = 135^\circ$) with clear reasons given relating to properties (e.g., <i>Folding corner to centre creates half right angle</i> ; <i>All angles around centre of side equal so any 2 make 45°</i> or <i>Four angles of quadrilateral add to 360°</i>)

3. GBEV5

SCORE	DESCRIPTION
0	No response or irrelevant response
1	Partially correct calculation, may not double or only use the two circles
2	Correct calculation of extra aluminium with reasoning based on calculating 2 circumferences plus the height of can and doubling for other side of seam OR adding the perimeter of curved surface to the two circumferences.

GBEV6

SCORE	DESCRIPTION
0	No response or irrelevant response
1	Incorrect (height) but some evidence that diameter and/or π recognised as relevant measures OR correct (distance around) with little or no reasoning
2	Correct with working and/or reasoning to support conclusion based on the use of appropriate values (e.g., circumference is compared to height, where height = $3 \times D$ and circumference = $\pi \times D$)

4. GPARA1

SCORE	DESCRIPTION
0	No response or irrelevant response
1	Incorrect (not 2)
2	Correct (2 or 2 pairs) with little or no reasoning
3	Correct with clear explanation to support response

GPARA4

SCORE	DESCRIPTION
0	No response or irrelevant response
1	Incorrect (anything other than 2 right angles)
2	Correct (2 or 2 right angles) with little or no reasoning
3	Correct with clear explanation to support response

5. GNET1

SCORE	DESCRIPTION
0	No response or irrelevant response
1	At least one of the four responses correct
2	At least 3 of the 4 responses correct
3	All responses correct (pentagonal pyramid, 6 faces, 10 edges, 6 vertices)

GNET2

SCORE	DESCRIPTION
0	No response or irrelevant response
1	Neither drawing satisfies the requirements
2	An attempt at the views with some recognisable components (eg. A triangle and a pentagon drawn)
3	One of the two views correct (see below)
4	Both views correctly drawn (i.e., a pentagon with lines drawn from the vertices to the centre of the pentagon and an irregular pentagon with lines drawn from the apex to the two opposite vertices as shown below)

GNET3

SCORE	DESCRIPTION
0	No response or irrelevant response
1	Incorrect net drawn
2	Correct net drawn but not different to one shown, that is, a rotation of this one
3	Different correct net drawn

GNET4

SCORE	DESCRIPTION
0	No response or irrelevant response
1	Draws a six square arrangement that is a net of a cube
2	Draws a six square arrangement that is not a net of a cube but little/no explanation
3	Draws a six square arrangement that is not a net of a cube with reasonable explanation of why specific arrangement does not work (e.g., draws six squares in a line and states that it could only be folded up to make a 6 sided box with no base and no top)

STUDENT SCORE SHEET GEOMETRY FORM C

Student Name:	Year Level:
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		Score	Comments
1	GSPSQ1		
	GSPSQ2		
	GSPSQ3		
2	GANG1		
	GANG2		
3	GBEV5		
	GBEV6		
4	GPARA1		
	GPARA4		
5	GNET1		
	GNET2		
	GNET3		
	GNET4		
Total Raw Score			

RAW SCORE TRANSLATOR FOR GEOMETRY FORM C

The following table locates students on the **Learning Progression for Geometric Reasoning** based on their total score for Geometry Form C. Total scores are obtained by adding the rubric scores assigned to each item on the form. Where a total score is very close to the beginning or end of a score range, teachers are advised to use their knowledge of the student to make a decision about the most appropriate Zone.

Students need to have had an opportunity to attempt all tasks for this process to be meaningful.

Total Score	Zone	Zone Description
37-39	8	Constructs arguments based on multiple properties of 2D shapes and 3D objects, using the necessary and sufficient conditions to reason about geometric and measurement situations, conjectures and propositions (theorems). Demonstrates an understanding of both reflectional and rotational symmetry.
33-36	7	Works analytically with properties of rectangles. Beginning to recognise necessary and sufficient conditions for square and rectangle. Uses sound reasoning in argument/explanations, though examples are often procedurally based. Able to recognise the relationship between length, area, and volume.
28-32	6	Uses properties accurately when reasoning about spatial situations but lacks knowledge of geometric hierarchy. Understands properties of 2D shapes but not special cases (e.g., regular). Geometric and measurement arguments rely on examples/counter examples. Provides accurate directions from a map using appropriate language and able to describe directions from walker's perspective. Understands the impact of doubling dimensions on volume, is able to visualise volume and calculate when numbers are small. Omits one step when calculating multi-step measurement problems. Is able to make deductions about angle situations with limited explanations. Beginning to reason deductively.
22-27	5	Is able to visualise and represent 3D objects using 2D platforms (Nets) and recognises properties in non-standard orientations. Beginning to use, but not recognise, sufficient conditions. Uses either properties or orientations to reason in geometric situations and accesses relevant geometric language. Demonstrates knowledge of dilation and coordinate systems and recognises some rotational symmetry. Uses landmarks but retains personal orientations when providing direction. Can provide partial solutions and explanations when calculating measurement situations.

14-21	4	Knows some geometric language, can name some 3D objects, and is able to visualise objects from a different perspective but shows incomplete reasoning in geometric and measurement situations. Performs measurement calculations but attends to only one attribute. Gives directions from a map from personal rather than other viewer's perspective.
9-13	3	Uses one or two properties or attributes (insufficient) to explain their reasoning about shapes and measurement but often do not recognise properties in non-standard representations. Demonstrates a beginning understanding of measurement attributes. Able to visualise some objects from different perspectives and to use coordinates.
3-8	2	Identifies simple shapes in situ and on simple solids. Recognises some reflective symmetry, nets of simple solids, and simple shapes and shows emerging representation of 3D objects. Is able to make use of geometric language and understanding of measurement concepts, but does not coordinate information or justify thinking.
1-2	1	Recognises simple shapes by appearance and common orientation. Shows emerging recognition of objects from different perspective, a coordinate system, and reflectional symmetry of objects and shapes. Can name some common 3D objects and identify some standard nets. Is able to identify location using simple referencing systems.