7-9: REMOTE MATHS

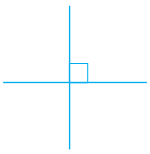
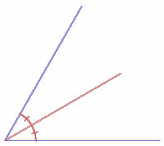
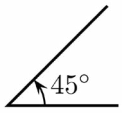
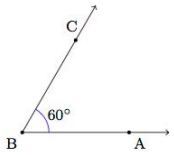
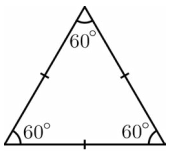
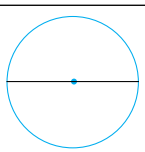
EDITION 8

GEOMETRY

Mathematical language: Möbius strip, line segment, bisector, right angle, parallel, diameter, equilateral triangle.

TASK 1: GEOMETRIC CONSTRUCTIONS

Construct the following using only a compass, ruler, pencil, eraser and paper.

Line segment bisector and right angle		How can you be sure that your lines are perpendicular? Convince someone you are correct.
Angle bisector		How can you be sure that your angles have been divided into two equally sized angles? Convince someone you are correct.
Parallel line (you may not use the ruler for measurement)		How can you be sure that your lines are parallel? Convince someone you are correct.
45° angle		How can you be sure that your angle is exactly 45°? Convince someone you are correct. **Optional:** check your angle with a protractor.
60° angle		How can you be sure that your angle is exactly 60°? Convince someone you are correct. **Optional:** check your angle with a protractor.
Equilateral triangle (you may not use the ruler for measurement)		How can you be sure that your triangle is equilateral? Convince someone you are correct. **Optional:** check the angles are 60° and the side lengths are the same.
Circle with centre and diameter shown		How can you be sure that you have a point in the exact centre of the circle? How can you be sure your line is the diameter? Convince someone you are correct.

TASK 2: MÖBIUS STRIP

- For this task you will require three strips of paper, some sticky tape and a pencil.
- Watch the first 7 minutes of the video http://monash.edu/science-education/2016/resources/remstep-maths-video-3-knots/
- Make your own Möbius Strip
- Now take a pencil and trace a line around the inside (in the middle) of the strip. What do you notice?
- Take a pair of scissors and cut it along the central line you have drawn. What do you get?
- Make up another Möbius strip and draw a line about one third in from the side so that you have to go around twice. Now cut at the line. What do you get this time?

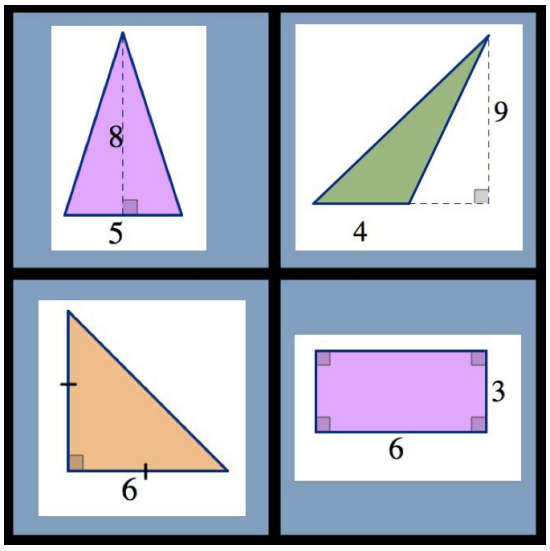
Extending prompt:

- Try a double. Take two strips and placing one on top of the other, give them a half twist and glue the top strips together and the bottom strips together. Be careful not to glue the four together. Now try tracing a line around the inside centre of the bottom one - don't let them come apart. What happens?

When you have finished, hold onto one strip and give it a good shake. What happens?

TASK 3: WHICH ONE DOESN'TBELONG?

Which one doesn't belong and why?



Here's a secret: Each one doesn't belong in their own unique way. Find a reason why each shape may not belong to the other three.

MEASUREMENT

Mathematical language: Rectangle, perimeter, area, volume, prism.

TASK 1: RECTANGLES

- Draw or make on a geo board, (or graph paper) a rectangle with a perimeter of 18 units.
- Draw and make another rectangle with a perimeter of 18 units.
- Find a third rectangle.
  - How did you find these rectangles?
  - How many rectangles with perimeter 18 can you make?
  - How do you know you have found all possible solutions?

Extending prompt: Generalise this by writing a rule to find the dimensions of a rectangle with a given perimeter.

TASK 2: MAP OF AUSTRALIA

Let Victoria's area be size 1.

- **Estimate 1** –In the table below, in column 1 write down how many Victorias' you think will fit inside each other state/territory? Have other members of your family complete the task individually too.
- **Estimate 2** – As a family, discuss each person's estimation. As a group come to a consensus and record this answer in column 2 of the table.
- **Estimate 3** –As a family group use a map (e.g. Google maps) to revise, if necessary, your responses in column 3 of the table.
- **Actual answers** – Using the areas of each state https://www.ga.gov.au/scientific-topics/national-location-information/dimensions/area-of-australia-states-and-territories calculate the actual answer of the number of Victorias that fit into each state. As a family, discuss how accurate your estimates were.

State/Territory	Mental Image 1 (individual)	Mental Image 2 (family group)	Revised estimate (with map)	Actual
Victoria	1	1	1	1
New South Wales				
Tasmania				
Queensland				
South Australia				
Northern Territory				
Western Australia				

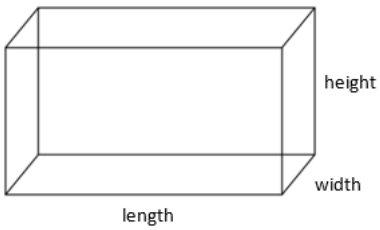
EDITION 8: MEASUREMENT (CONT.)

TASK 3: RECTANGULAR PRISM

The volume of a rectangular prism is 32 cubic units. What could be the dimensions of this prism?

- Draw all the possible prisms.
- Summarise your findings in a table.
- How do you know if you've found all possible prisms?

Extending prompt: create an Excel spreadsheet to assist you if finding all possible prisms of volume 32 cubic units.



MAV would love your feedback on these resources. Click on the link or scan the QR code.

https://www.surveymonkey.com/r/MAHhomelearning

MATHS APP OF THE WEEK: EUCLIDEA

Euclidea is all about building geometric constructions using straightedge and compass. About doing it the fun way. With Euclidea you don't need to think about cleanness or accuracy of your drawing — Euclidea will do it for you. But it's also a game. A game that values simplicity and mathematical beauty. Find the most elegant solution — the one, which is built in the least possible moves, — and you'll get the highest score.

Google Play

https://play.google.com/store/apps/details?id=com.hil_hk.euclidea

iOS

https://apps.apple.com/app/id927914361

Look out for more tasks next week!