



MATHS TREATS

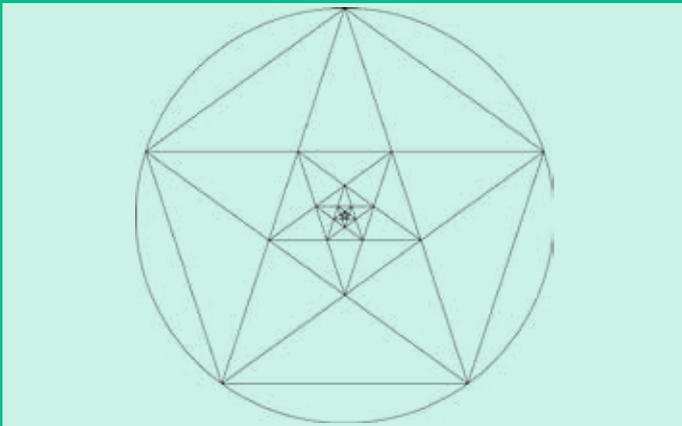
BY LUCIANA
THE POSSUM



VICTORIA CENTRAL: MANDURANG IN THE MIDDLE

Mandurang is 10 km south-south-east (SSE) of Bendigo and is a suburb of the City of Greater Bendigo. It is also acknowledged as the centre of the state of Victoria by several organisations including Geoscience Australia. Many people are familiar with the centre of a circle but calculating the centre of other shapes is an interesting problem.

REGULAR SHAPES



A regular polygon has all sides of equal length and all angles the same size. The centre of a regular polygon is the same distance from each vertex (corner) of the shape and coincides with the centre of the polygon's incircle and circumcircle.

ACTIVITY

Draw some common shapes you have learnt. Make up some other shapes for fun. Which shapes are 'regular'? Which shapes are not regular but have lines of symmetry? Estimate the centre of each shape intuitively. How could you find the centre of each shape visually or graphically? How could you find the centre of each shape numerically? What other methods could you use? What approaches could you use to find the 'centre' of regular three-dimensional shapes?

IRREGULAR SHAPES



There are a number of ways of calculating the 'centre' of an irregularly shaped area: geometrical centre, furthest point from each border, and the median point of the extremes of latitude and longitude. The most common method is the geometrical centre, or centroid, determined by taking the arithmetic mean of all the points of the figure. Assuming uniform density, this will be the centre of gravity, the point at which you could balance the cut-out shape on a pin.

ACTIVITY

Look at the map of Australia. Where is its centre? Can you predict the centre of each state and territory? Cut out the shapes and test your prediction by balancing. Look at the irregular two-dimensional shapes around you and estimate their geometrical centre and centre of gravity. Can you predict when these will align? How would you verify your predictions?

REFERENCES AND FURTHER READING

Centre of Australia States and Territories www.ga.gov.au/scientific-topics/national-location-information/dimensions/centre-of-australia-states-territories

Bendigo www.bendigotourism.com

Bendigo (Wikipedia) <https://en.wikipedia.org/wiki/Bendigo>

Polygon <https://en.wikipedia.org/wiki/Polygon>

Regular polygon https://en.wikipedia.org/wiki/Regular_polygon

Centre of regular polygons www.mathopenref.com/polygoncenter.html

Circumcircle and incircle of a triangle <http://demonstrations.wolfram.com/CircumcircleAndIncircleOfATriangle>

Centroid (Wikipedia) <https://en.wikipedia.org/wiki/Centroid>

Centroids of common two-dimensional shapes https://en.wikipedia.org/wiki/List_of_centroids

IMAGES

Leadbeater possum - Steve Kuitert

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Model and photograph by Dr Christopher Lenard, La Trobe University, Bendigo