MATH TREATS BY LUCIANA THE POSSUM

Teachers can photocopy this page to use in class

GEOMETRIC PLAYTIME!

From time immemorial, human beings have been interested in the properties of space and relative position, often for practical reasons such as building and astronomy. These days we have mathematics software which allows us more time for playing and less time worrying about getting our lines and curves right. GeoGebra is a dynamic mathematics software which joins geometry, algebra and calculus. You can download it for free at www.geogebra.org/download.

CONSTRUCTIONS

What is the difference between drawing and constructing? Constructing an object using geometric principles means that if a vertex of the object is dragged then the properties of the shape will be conserved.
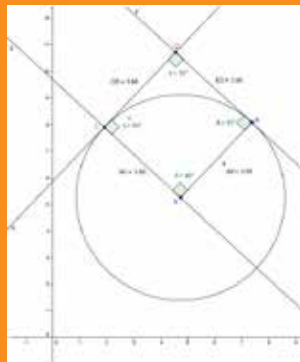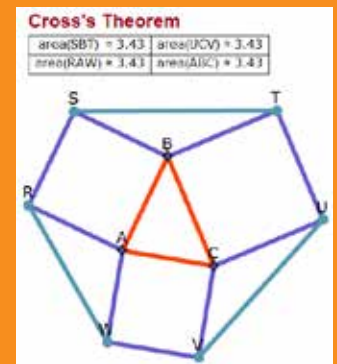
ACTIVITY

Start with a circle and use the properties such as radius, tangents, parallel lines and perpendicular lines to construct a square. Don't forget to label the points where lines and curves intersect. What happens to the square when you drag different points? Try constructing a rectangle, rhombus, trapezium, and kite. What happens with angles, triangles and quadrilaterals constructed inside a circle?

CLASSIC PROOFS

Once the properties of a geometric object are defined, then it can only move in certain ways. Over the last 2000 years there have been many geometric hypotheses and proofs describing the behaviour and patterns of certain geometric objects.

ACTIVITY

Play with the Wolfram demonstrations in high school geometry and try to prove some of them using the geometric properties of line, shape, and area that you already know. Cross' theorem appeared in Passionless Moments, in the last issue of *Vinculum*.

ANIMATION

Stop Motion animation has been used to create fabulous movies. Mathematics movies can be created by animating a point in a geometric construction to illustrate the properties of shapes. wiki.geogebra.org/en/Animation

ACTIVITY

Create a right-angled triangle in the first quadrant of a unit circle centred at (-1,0) and animate the point where the triangle vertex sits on the circle in an anticlockwise direction to create the trigonometric sin θ curve. Can you construct the cos θ and tan θ curves? Can you create an interesting picture, using construction and animation, such as the one here?
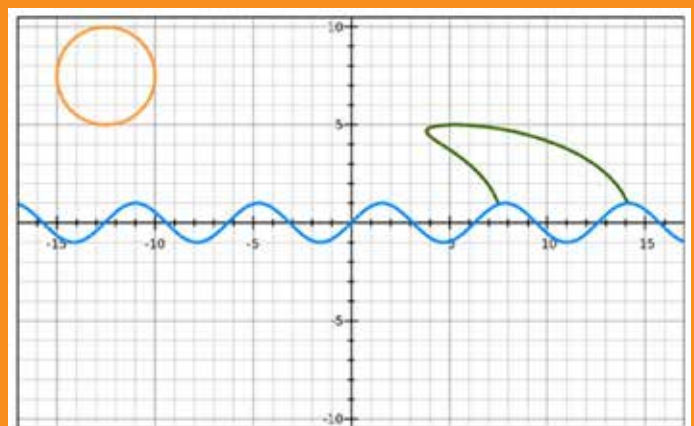
REFERENCES AND FURTHER READING

http://en.wikipedia.org/wiki/Geometry
Evans, M., Greenwood, D., Woolacott B. & Taylor, N. (2003). *Essential Applications of Technology in Mathematics*. Cambridge University Press.
http://mathforum.org/geometry/geometry.software.html

http://demonstrations.wolfram.com/education.html?edutag=High+School+Geometry&limit=20
https://www.geogebra.org/
https://www.youtube.com/user/GeoGebraChannel
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