GRADE 10 GEOMETRY THROUGH PAPER FOLDING

Micky Lavery and Jackie Scheiber

RADMASTE Centre, Wits University

TARGET AUDIENCE: FET Band.

DURATION: 2-hour workshop

MAXIMUM NO. OF PARTICIPANTS: 30 participants

MOTIVATION

Many learners and teachers find geometry daunting. The use of rulers, protractors or set squares often makes learners anxious. With 4 sheets of A4 paper and a pen or pencil Grade 9 and 10 Geometry facts can be discovered hands on without using measuring instruments and accurate drawings. The shapes can be kept by learners to remember facts needed for proofs and calculations.

CONTENT

Properties of a rectangle, square, parallelogram, trapezium, rhombus and kite will be discovered using paper folding and tearing. Some of these shapes will also be used to revise facts about isosceles triangles, intersecting lines, parallel lines and transversals from earlier grades. The midpoint theorem will also be investigated through paper folding.

The need for logical reasoning will be indicated and some of the conjectures made through paper folding will be proved.

Time will be broken up as follows. Each time allocation allows for discussion.

Activity	Time
Overview of the shapes that will be created.	10 min
Worksheet page 1.	
Folding an A4 page in various ways and using the measuring instrument to discover the properties of a rectangle. Worksheet page 2.	15 min
Finding properties of an isosceles triangle and properties of a square. Worksheet page 2.	15 min
Using a rectangle to investigate intersecting lines, parallel lines and transversals. Discovering the need for logical reasoning. Worksheet page 3.	20 min
Making a parallelogram, discovering the properties of a parallelogram and formally proving a property of a parallelogram. Worksheet pages 4 and 5.	20 min
Making various trapeziums and finding their properties. Worksheet page 5.	10 min

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Making a rhombus and investigating its properties. Worksheet pages 5 and 6.	10 min
Investigating the midpoint theorem through paper folding and measuring. Worksheet page 6.	10 min
Making a kite and investigating its properties. Worksheet page 7.	10 min

ABSTRACT

This workshop covers some of the Euclidean geometry specified in CAPS Grade 10. Geometry learnt in earlier grades is revised, the properties of the sides, angles and diagonals of quadrilaterals are investigated and conjectures are made about the properties. Proofs of conjectures are dealt with and the line segment joining the midpoints of two sides of a triangle (the midpoint theorem) is investigated.
Revision and investigations are done through paper folding and cutting (or tearing). The need for logical reasoning is discussed and practiced and some conjectures that were made through paper folding are proved.
Participants will use a sheet of A4 paper as a measuring instrument, and fold and cut A4 pages in order to discover properties of lines, angles and shapes. Each participant will make paper cut-outs of a rectangle, square, parallelogram, trapezium, rhombus and kite as well as a triangle showing the midpoint theorem. These cut outs can be used as reminders of the properties and facts learnt.
Participants will receive instructions on how to fold and tear (or cut), as well as examples and practice questions on logical proofs.

REFERENCES

CAPS Grade 10

http://www.transum.org/software/Fun_Maths/kite/

http://mathforum.org