

Mayhem Problems

To be eligible for this month's MAYHEM TAUNT, solutions must be post-marked *before* February 1, 2003, and attached to each solution of each problem must be a completed student information sheet.

M57. Proposed by J. Walter Lynch, Athens, GA, USA.

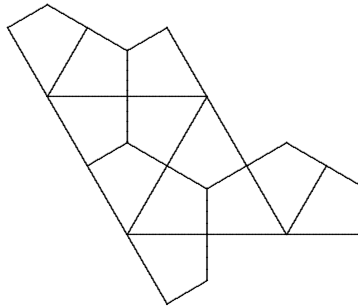
Four points are equally spaced around a circle with radius r . This divides the circle into 4 equal arcs. Flip over each arc, leaving the endpoints in place. Find the area enclosed by the figure thus obtained.

M58. Proposed by the Mayhem Staff.

Find all positive integers x and y which satisfy the equation $x^y = y^x$.

M59. Proposed by Izidor Hafner, Tržaška 25, Ljubljana, Slovenia.

The diagram below represents the net of a polyhedron in which the faces of the solid are divided into smaller polygons. The task is to colour the polygons (or number them), so that each face of the original solid is a different colour.



M60. Proposed by Mihály Bencze, Brasov, Romania

Determine all positive integers for which $\left\lfloor \sum_{k=1}^n \sqrt{k} \right\rfloor = n$, where $\lfloor x \rfloor$ is the greatest integer less than or equal to x .

M61. Proposed by the Mayhem Staff.

You are given 54 weights which weigh $1^2, 2^2, 3^2, \dots, 54^2$. Group these into three sets of equal weight.

M62. Proposed by Richard Hoshino, Dalhousie University, Halifax, Nova Scotia.

Let $ABCD$ be a trapezoid where sides AB and CD are parallel and the diagonals AC and BD intersect at point P . Suppose $AB = 50$, $CD = 160$, and the area of triangle PAD is 2000. Determine the area of the trapezoid.