Test 01 MAY 2026

MATH STARS 2 MAMS

Problem 1

In the expression $\left[\sqrt{2008 + \sqrt{2008 + \sqrt{2008 + \ldots + \sqrt{2008}}}}\right]$, the number 2008 appears 2008 times, and $[x]$ stands for the greatest integer not exceeding x.

What is the value of this expression?

Problem 2

The positive integer $a - 2$ is a divisor of $3a^2 - 2a + 10$.

What is the sum of all possible values of a?

Problem 3

Let a, b and c be real numbers such that $a + b + c = 11$ and $\frac{1}{a+b} + \frac{1}{b+c} + \frac{1}{c+a} = \frac{13}{17}$.

What is the value of $\frac{a}{b+c} + \frac{b}{c+a} + \frac{c}{a+b}$?

Problem 4

Consider all $a \times b \times c$ boxes where a, b and c are integers such that $1 \leq a \leq b \leq c \leq 5$.
An $a_1 \times b_1 \times c_1$ box fits inside an $a_2 \times b_2 \times c_2$ box if and only if $a_1 \leq a_2$, $b_1 \leq b_2$ and $c_1 \leq c_2$.

Determine the largest number of the boxes under consideration such that none of them fits inside another.

Problem 5

Determine all positive integers m and n such that :

$m^2 + 1$ is a prime number and $10(m^2 + 1) = n^2 + 1$.

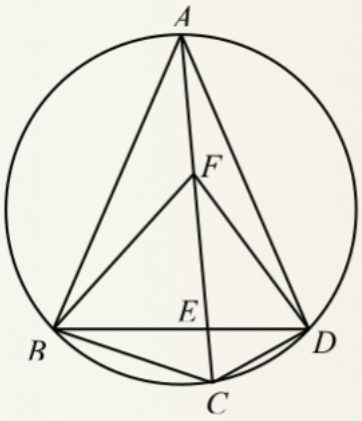
Problem 6

How many ten-digit numbers are there in which every digit is 2 or 3, and no two 3s are adjacent?

Problem 7

$ABCD$ is a quadrilateral inscribed in a circle, with $AB = AD$. The diagonals intersect at E. F is a point on AC such that $\angle BFC = \angle BAD$.

If $\angle BAD = 2\angle DFC$, determine $\frac{BE}{DE}$.



Problem 8

In triangle ABC, D is a point on the extension of BC, and F is a point on the extension of AB. The bisector of $\angle ACD$ meets the extension of BA at E, and the bisector of $\angle FBC$ meets the extension of AC at G, as shown in the diagram below.

If $CE = BC = BG$, what is the measure of $\angle ABC$?