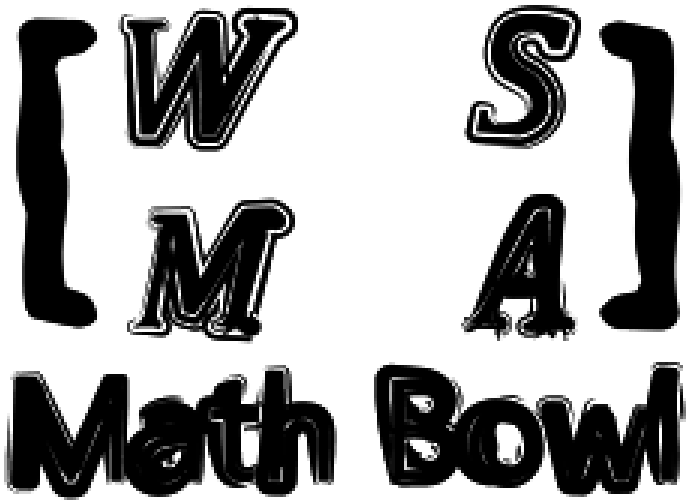


Preliminary Round 3

1st Annual WSMA Math Bowl

May 27, 2011

Problem 1

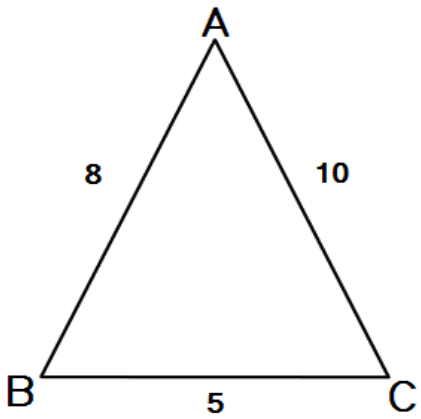
Evaluate $(i + 1)^6$.

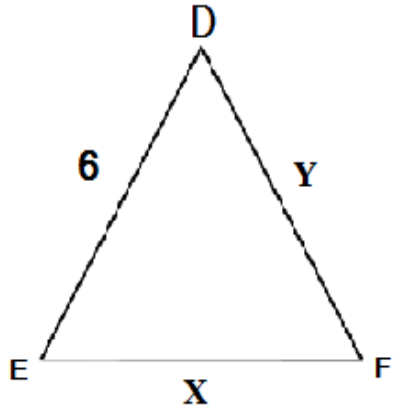
Problem 2

How many integers x satisfy $\sqrt{13} < x^2 < \sqrt{300}$?

Problem 3

Given that triangles ABC and DEF are similar, find the product of the lengths





Problem 4

If x and y are integers such that $25 = y^2 - x^2$, what is the least possible value of $x + y$?

Problem 5

If $f(x) = 1 + x + x^2$, what is $f(2) \cdot f\left(-\frac{1}{2}\right)$?

Problem 6

If 7 two-sided coins are flipped, what is the probability that at least 4 are heads?

Problem 7

If $\frac{ab}{c} = \frac{bc}{a} = \frac{ac}{b} = 1$, what is $a^2 + b^2 + c^2$?

Problem 8

Compute the largest possible n such that 10^n divides 200!

Problem 9

What is $101011_2 + 10101_2 + 10101_4$ in base four?

Problem 10

What is the sum of the squares of the roots of the equation $y = x^3 - 7x^2 - 4x + 11$?

Extra Problem
(only if needed)

When $-90 \leq x \leq 720$ and x is in degrees, how many times does the line $y = \frac{x}{810}$ intersect $y = \sin x$?