

Write the number 2009 as difference of two squares.

Deadline for solution: 10/5/09. Send solution at gprajitu@brockport.edu or drop hard copy in Dr. Prajitura's mail box.

Last week's problem:

In a pond there are 128 amphibians, either tadpole or frog. Tadpoles have a tail, while frogs don't. All frogs have four legs, while tadpoles, according to how old they are, can have four legs, two legs, or none.

In the pond there are 264 legs and 113 tails and one kind of tadpole is twice as numerous as another.

How many two - legged tadpoles are there in the pond?

It is easy to find the number of frogs. After that, considering all possible cases for which type of tadpole is twice another, we find the answer. The trick is that there are two solutions, one with 62 two - legged and one with 80. There is a moral here, if you find one solution don't stop, there may be another one.

The problem was solved by Peter Kosek, Joshua Swanson, Elizabeth Miller, and Sonja Larson but everyone got only one of the cases.

Problem for graduate students:

Find all natural numbers that can be represented as difference of two squares.

Last week's problem:

Prove or find a counterexample: If (a_n) is a sequence such that for every $k \geq 2$, $\lim_n a_{kn}$ exists (and is the same for each k) then $\lim_n a_n$ exists.

It is not true. A counterexample is the sequence $a_n = 1$ if n is prime and $a_n = 0$ otherwise.

The problem was solved by Douglas Bunker.