



Some numbers can be expressed as an alternating sum of an increasing sequence of distinct powers of 2. To form such a sum, choose a subset of the sequence 1, 2, 4, 8, 16, 32, ... (the powers of 2). List the numbers in that subset in increasing order and combine them with alternating plus and minus signs.

For example:

$$1 = -1 + 2$$

$$2 = -2 + 4$$

$$3 = 1 - 2 + 4$$

$$4 = -4 + 8$$

$$5 = 1 - 4 + 8$$

$$6 = -2 + 8$$

etc.

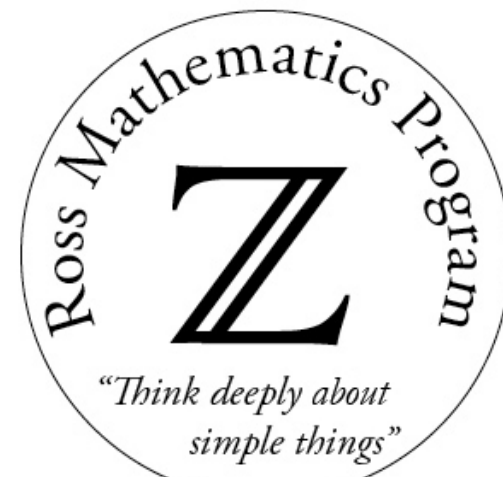
Is every positive integer expressible as such a sum? In how many ways?

WHO WE ARE

The Ross Mathematics Program at The Ohio State University is an intensive eight week summer course in mathematics for pre-college students talented in math. A nationally recognized effort started by Professor Arnold Ross in 1957, the Ross Program has had a positive influence on generations of bright young students who have pursued careers in many different fields of mathematics and science.

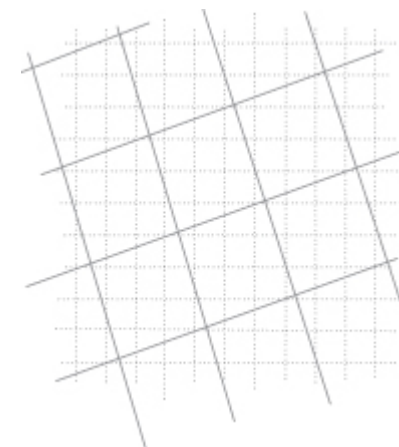
For six weeks, participants:

- explore concepts in number theory, becoming immersed in a world of mathematical discovery
- work with mathematical ideas built from concrete observations, and resulting in proofs of general patterns and abstract properties; and
- assimilate habits of mind that will prove useful in their later scientific endeavors.



ROSS MATHEMATICS PROGRAM

JUNE 18 - JULY 27, 2012



THE OHIO STATE UNIVERSITY
DEPARTMENT OF MATHEMATICS
614-292-5101

ROSS MATHEMATICS PROGRAM

How We Work

- Weekday mornings, participants attend a number theory lecture and receive a set of problems that lead them to explore ideas discussed in class.
- Students are involved in problem seminars led by experienced faculty members.
- They have ample time to explore the challenging ideas, look for patterns, make conjectures, test their ideas, and construct convincing proofs.
- All participants live in dormitories with counselors who are available to discuss the mathematical problems, give advice on techniques of proof, and provide quick feedback on written work.

Applications

Application forms and additional information are available online at:

www.math.ohio-state.edu/ross

For further information:

Email: ross@math.osu.edu
Phone: 614-292-5101
Or write to: Ross Mathematics Program
Dept. of Mathematics
The Ohio State University
231 West 18th Ave.

Eligibility

The Ross Program is open to ambitious pre-college students who want to pursue mathematical knowledge more deeply. The main prerequisite is “mathematical maturity” as measured by responses to the questions and math problems on the application.

After a lot of hard work, participants become comfortable dealing with new mathematical ideas and gain an appreciation for the Ross Program motto:

*“Think deeply
about simple things.”*



Admission

Admission decisions are based on several criteria, including:

- Responses to essay questions and math problems posed on the application form
- High school transcripts and teacher recommendation letters

The Ross Program has a rolling admissions policy, with a May 1 deadline. However, spaces do fill up, so it's best to apply early.

Finances

The fee of \$2,200 covers the full cost of six weeks of room and board, and all instructional fees. Scholarship funds are available: No qualified student will be turned away for purely financial reasons.

The Ross Program runs in partnership with The Ohio State University and the Clay Mathematics Institute. Scholarship support is provided by the “Epsilon Fund” of the American Mathematical Society.