discrete mathematics

based on the set N (natural numbers)

0 1 2 3 - - - -

FINITE GAPS

continuous mathematics

based on the set R (real numbers)

0

CONTINUOUS FLOW OF NUMBERS

INFINITESIMAL GAPS BETWEEN NUMBERS

WE HAVE DIFFERENT ? $\longleftrightarrow$ CALCULUS
PROBLEMS AND
DIFFERENT TECHNIQUES
$\downarrow$

MOST IMPORTANT TECHNIQUE:
INDUCTION / RECURSION

why discrete math?

Computers are finite objects

    (1) they have a finite memory
    (2) they can only work for a finite amount of time
    (3) the way computers deal with number is inherently discrete
       (computers work with very few numbers)

DISCRETE PROBABILITY

SETS OF NUMBERS

SETS

NUMBER THEORY

Exploration tools:

(1) Logic $\longrightarrow$ proof techniques

(2) Induction / recursion

RELATIONS $\longrightarrow$ GRAPHS

REPRESENTED BY

MATRICES

CRYPTOGRAPHY

FUNCTIONS

SEQUENCES — SERIES

(3) Principle of counting
- COMBINATIONS
- PERMUTATIONS