

**Instructions:**

- Answer all of the questions below.
  - Part I is due SATURDAY 12 MAY at the start of the in-class portion of the final.
  - You may use your text, your notes, and other written sources. You may not discuss this exam with any other person.
  - Your dates should be as specific as history will allow.
  - Note that answers to the questions below may not be unique. You should give the most complete answer you can IN THE SPACE PROVIDED.
  - Part I is worth 25% of the final exam.
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A. (*3 points each*) For each mathematical term below, state when it was first discovered (or investigated or applied) and also when the formal mathematical definition was established and by whom.

(1) irrational numbers

(2) the probability of an event

(3) infinite series

(4) Pascal's triangle

B.(2 points each) According to modern scholarship, when and where do we first find the use of:

- (1) tally marks
- (2) sophisticated methods of numerical representation including the ability to represent numbers on the order of  $10^6$
- (3) a positional system of numerical representation
- (4) a positional system including a symbol for zero
- (5) a base 10 positional system with zero
- (6) a base 10 positional system in Europe
- (7) rational numbers
- (8) axiomatic systems
- (9) symbolic algebra (as opposed to descriptive algebra)

C. (2 points each) For each of the mathematical ideas below, state when they were developed and by whom.

(1) calculus

(2) the logarithm

(3) the number  $e$

(4) noneuclidean geometry

(5) algebraic solutions to the general cubic and quartic equations

(6) the nonexistence of solutions to the general quintic equation

(7) the existence of an infinite number of primes

(8) the complete characterization of Mersenne primes