Part 1 Up to 1400 CE
We have surveyed all mathematics around the world for which there are records. The primary cultures that developed mathematics for which we have enough records to study were the Egyptian, Babylonian, Greek, Chinese, Indian, Islamic, European. This part of the course was studied by culture (in chronological order).

Part 2 After 1400 CE
Early modern and modern mathematics (until 1900) developed almost entirely in Europe and there is far too much and it is too deep even to survey everything. We studied this part of mathematical history by mathematical topic, chronologically within each topic. The topics on which we focused include:

Solving polynomial equations
Beginning of probability
Development of Analytic Geometry
Influence of Astronomy, physics and computational needs on development of mathematics
Development of Calculus
Development of rigor in analysis
Fermat’s Last Theorem (history)
Beginning of Abstract Algebra (history)
Non-Euclidean geometry (spherical and history)
Foundations (Dedekind cuts, infinite cardinals, history of set theory and incompleteness)

This is a summary and covers most of the material; hence most of the questions will be drawn from this material. You are also responsible for the material covered by the panel discussions. There will be one question that requires you to summarize one of several panel presentations other than your own.

Additional Essay Questions
1. Comment on the influence of notation (number system, rhetorical versus symbolic) on mathematical development and methods. Give specific examples from at least 3 time periods or cultures.
2. Summarize the history of irrational numbers. Your answer should include a discussion of the following: Incommensurable, Eudoxus’ theory of proportion, Transcendental, Dedekind cut.
3. Summarize the history of attempts to solve polynomial equations, including quadratic, cubic, quartic and quintic.
4. Summarize the history of Euclid’s parallel postulate, giving several equivalent forms and their history, and attempts to prove the 5th postulate.
5. State two alternatives to Euclid’s 5th postulate that result in two geometries (different from each other and each different from Euclid’s). For each alternative you have started, discuss any necessary reinterpretation of Euclid’s other four postulates. Reinterpretation means an interpretation different from Euclid’s but still a possible interpretation of the postulate as stated.
6. State Russell’s set paradox and describe how it was resolved.
7. State Cauchy’s criterion for the convergence of power series. Thinking of the partial sums as a sequence, state the criterion for convergence of a sequence. State the $\varepsilon$–$\delta$ definition for the limit of a sequence. Compare and contrast the Cauchy criterion and $\varepsilon$–$\delta$ definition for sequences and comment on the need for a rigorous development of real numbers.