

2021 Academic Super Bowl

Senior Math

Final Study Guide

The American Woman:
A Century of Progress, 1920–2020



“YOU DON’T MAKE PROGRESS BY STANDING ON THE SIDELINES... YOU MAKE PROGRESS BY IMPLEMENTING IDEAS.”

SHIRLEY CHISHOLM
FIRST AFRICAN AMERICAN WOMAN ELECTED TO CONGRESS

- I. Algebra - 20%
 - A. Powers and Roots
 - 1. Properties of exponents and radicals
 - 2. Solving Radical Equations
 - B. Absolute Value Equations

- II. Analytic Geometry - 24%
 - A. Non-degenerative conics: circle, ellipse, parabola, hyperbola
 - 1. General Form and Standard Form (Note $B = 0$, no xy term. No rotations of the coordinate system)
 - 2. Identify vertices, foci, center, directrix, transverse axis, major axis, minor axis, latus rectum, asymptotes, and eccentricity
 - B. Applications

- III. Probability - 32%
 - A. Definitions and Compound Events
 - B. Counting Principles
 - 1. Fundamental Principle of Counting
 - 2. Combinations & Permutations
 - C. Conditional Probabilities and Baye’s Theorem
 - D. Bernoulli Trials

- IV. Programming - 16%
 - A. BASIC - includes Working Through Short Programs
Use www.dartmouth.edu/basicfifty/basic.html. Download First BASIC Instruction Manual
 - B. FORTRAN
Use www.softwarepreservation.org/projects/FORTRAN. Then go to the documentation section, the 5th major bullet (Grace Mitchell), Section 1 March 20, 1957, 1-37 pages as a resource for FORTRAN commands to be used. Also do basic research on the history of the first FORTRAN developed, why and by whom.

- V. Mathematicians - 8%
 - A. Julia Robinson
 - B. The NASA 3 - Dorothy Vaughan, Katherine Johnson, Mary Jackson
 - C. Grace Hopper
 - D. Elizebeth Friedman

2021 Outlines were developed by coaches who chose to share ideas at the 2019 Academic Coaches Conference, and through email, and further developed by question writers.

Only the TI-30XA and TI-30XIIS may be used during competitions.