Addressing the Transition to College Mathematics

David Bressoud
Macalester College, St. Paul, MN

PowerPoint available at www.macalester.edu/~bressoud/talks

Joint Math Meetings
Boston, MA
January 6, 2012
August 2011, Intel CEO Paul Otellini:

“Looking forward, this nation is at risk of a significant shortfall of qualified experts in science and math to meet the country’s needs.”
Bachelors Degrees, math-intensive majors

- Engineering
- Physical Science
- Math & Stat

NCES data
Math-intensive Bachelor's degrees relative to number of 22 year-olds (degrees ÷ # of 22-year olds)
Math & Stats Majors by Gender

NCES data
There were 1,089 Bachelors in Math or Stat earned by African-Americans in 1997. By 2009, that number was down to 876.
210,000 students per year enter four-year undergraduate programs intending to major in engineering, a physical science, mathematics, or statistics.

An additional 300,000 are enrolled in one of these programs in a two-year college.

We graduate 107,000 with a Bachelor’s degree in one of these disciplines.
Students in college or university Calculus I:

mean score on SAT Math: 652, SD: 76
75% earned 610 or higher (top 23%)

mean score on ACT Math: 28.5, SD: 4.3
75% earned 26 or higher (top 16%)

MAA survey of 700 instructors, over 14,000 students, all types of colleges and universities across US, Fall, 2010
Students in college or university Calculus I:

61% studied calculus in high school
69% of them studied AP Calculus
60% of them took the AP Calculus exam and earned 3 or higher
(20% of all students in college Calculus I)

MAA survey of 700 instructors, over 14,000 students, all types of colleges and universities across US, Fall, 2010
Grade for college Calculus I:

- 22% A
- 28% B
- 23% C
- 27% D, F, or Withdrew
About 620,000 students are studying calculus in high school this year, over 1/3 of the 1.8 million who will go directly from HS to college.
Of the high school students who graduated in 1992 and earned credit for “calculus” while in high school, 31% took *precalculus* in college, and a further 32% took *no calculus* in college.

Of the high school students who graduated in 2004 and earned credit for “calculus” while in high school, 17% took *remedial mathematics* in college.

NCES, NELS:88 and ELS:2002/06 data.
Students who enroll in a calculus course in secondary school should have demonstrated mastery of algebra, geometry, trigonometry, and coordinate geometry.

The calculus course offered in secondary school should be treated as a college-level course.

The college curriculum should acknowledge the ubiquity of calculus in secondary school and offer entering students courses that are fresh and engaging.

PowerPoint available at www.macalester.edu/~bressoud/talks