

Suggestions for information from NCES HSLS:09

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Fall, 2005:

247,000 students entered as full-time, first-year students in four-year undergraduate programs with the intention of majoring in Bio-Sciences (99K), Engineering (108K), Physical Sciences (30K), or Mathematics (10K).

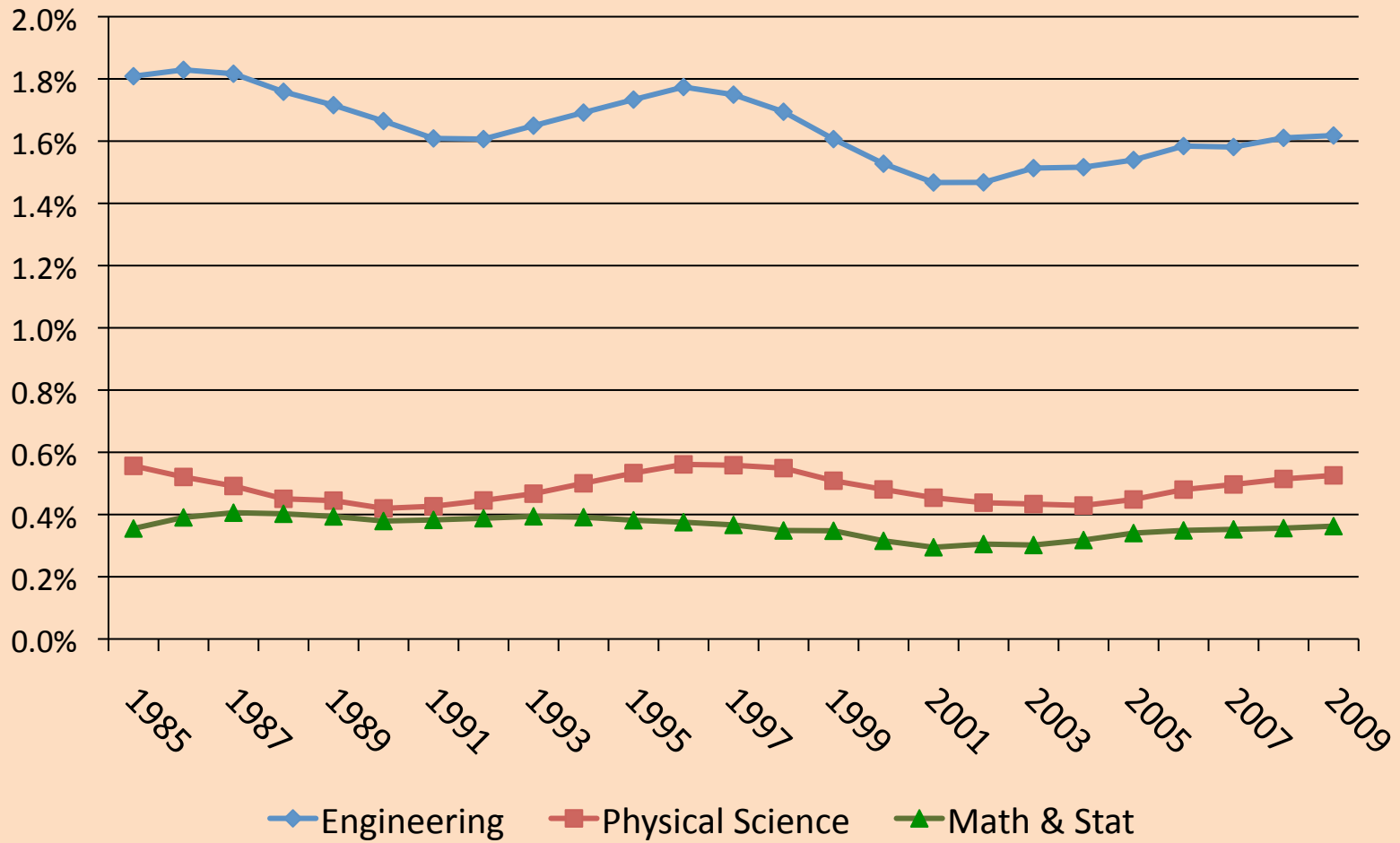
In 2009, 187,000 obtained Bachelor's degrees in one of these fields (75% success rate):

Bio: 81K, Engr: 69K, Phys Sci: 22K, Math: 15K

Fall, 2010, 376,000 intending STEM majors:

Bio: 165K, Engr: 156K, Phys Sci: 41K, Math: 14K

Math-intensive Bachelor's degrees as % of 22 year-olds

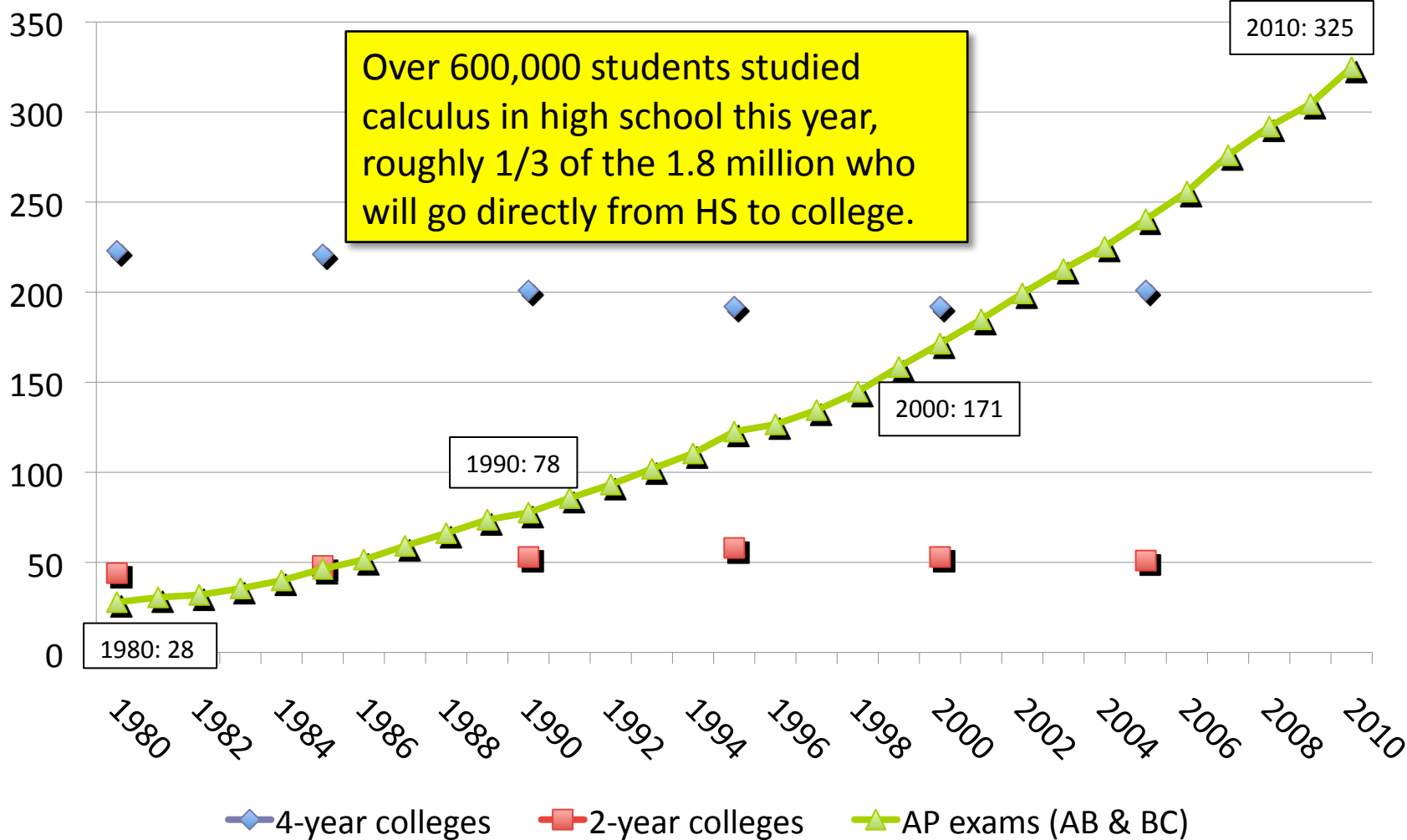


NCES & US Census data

Where do we lose STEM majors?

What is the role of calculus in this loss?

Fall Enrollments in Calculus I versus AP Calculus Exams (thousands)



Roughly 300,000 students studied mainstream Calculus I in college in Fall, 2010.

About 200,000 of them completed a calculus course in high school. About 66,000 of them earned a 3 or higher on AP Calculus exam (22% of total Calculus I enrollment).

Final grades for Calculus I

A: 22%

B: 28%

C: 23%

D, F, W: 27%

1. Roughly 150,000 students are entitled to college credit for calculus studied in high school and do not enroll in Calculus I. How many of them use this credit for advanced placement?
2. That leaves 250,000 students who study calculus in high school and are neither entitled to college credit nor enroll in Calculus I. How many of these students are interested in STEM majors, and what is their trajectory? How many of them are directed to take precalculus or other preparatory course?
3. How does the trajectory of those prospective STEM majors who have studied calculus in HS compare to that of those who have not?

Questions for students (ideally junior or senior year of college):

1. When you arrived at college, which of the following did you intend to major in?
 - a) Engineering
 - b) Biological Science (including pre-Medicine)
 - c) Physical Science (including Physics, Chemistry, or Geology)
 - d) Mathematics (including Statistics)
 - e) None of the above

2. Which of the following are you now majoring in?
 - a) Engineering
 - b) Biological Science (including pre-Medicine)
 - c) Physical Science (including Physics, Chemistry, or Geology)
 - d) Mathematics (including Statistics)
 - e) None of the above

3. What was your first math course in college (whether or not you passed it)?
 - a) A non-credit course (such as Intermediate Algebra)
 - b) Precalculus or College Algebra
 - c) Statistics
 - d) Calculus I
 - e) Calculus II or higher
 - f) Another math course
 - g) Have not yet taken my required math course
 - h) None because I had college credit for mathematics taken in high school
 - i) None because I am not required to take a math course

4. What is the highest math course you have passed in college?
 - a) A non-credit course (such as Intermediate Algebra)
 - b) Precalculus or College Algebra
 - c) Statistics
 - d) Calculus I
 - e) Calculus II, III, or IV
 - f) Differential Equations or Linear Algebra
 - g) A junior-, senior-level, or graduate-level mathematics course
 - h) Another math course
 - i) Have not yet completed a math course

5. Were you entitled to college credit for calculus studied in high school?
 - a) Yes, for my AP Calculus score
 - b) Yes, for my IB score
 - c) Yes, for a course taught in my high school with credit earned from a college or university
 - d) Yes, for another reason
 - e) No

6. If you were entitled to credit for calculus, did you use it?
 - a) Yes, I used it to place into a more advanced course
 - b) Yes, I used it to avoid taking calculus
 - c) No, because I wanted to retake the first course in calculus
 - d) No, for another reason
 - e) I have not yet decided whether or not to use this credit