

Mathematics 110 – Calculus of one variable

Trent University 2001-2002

BONUS ASSIGNMENT

Due: Friday, 5 April, 2002

This assignment is optional. It can be used as *one* of the following:

- i.* An extra assignment, so the best 8 of 11 (instead of 10) assignments count.
- ii.* An extra quiz, so the best 16 of 22 (instead of 21) quizzes count.
- iii.* A make-up adding up to 22% on one test. (This option is only available if you failed a test.)

THE UNEXPECTED TEST[†]

In a certain mathematics class Professor B, who always tells the truth and is never mistaken, explains the marking scheme for the course to the students.

“This course meets once each week. There will be only one test, which will be written in class in one of the twelve weeks of the next term. However you will not know which week it is until the class in which the test is given.”

Problem: Is there any way to determine in which week the test is given? Why or why not? If so, in which week will the test be written?

A Joke

Some academics relaxing in a common room are asked whether all odd numbers greater than one are prime.

The physicist proceeds to experiment — 3 is prime, 5 is prime, 7 is prime, 9 doesn't seem to be prime, but that might be an experimental error, 11 is prime, 13 is prime — and concludes that the experimental evidence tends to support the hypothesis that all odd numbers are prime.

The engineer, not to be outdone by a physicist, also proceeds by experiment — 3 is prime, 5 is prime, 7 is prime, 9 is prime, 11 is prime, 13 is prime, 15 is prime — and concludes that all odd numbers must be prime.

The statistician checks a randomly chosen sample of odd numbers — 17 is prime, 29 is prime, 41 is prime, 101 is prime, 269 is prime — and concludes that it is probably true that all odd numbers are prime.

The physicist observes that other experiments have confirmed his conclusion, but the mathematician sneers at “mere examples”; and posts the following: *3 is prime. By an easy argument which is left to the reader, it follows that all odd numbers greater than one are prime.*

The chemist observes that the periodic table gives the answer: 3 is lithium, 5 is boron, 7 is nitrogen, 9 is fluorine, 11 is sodium, ... Since elements are indivisible — nuclear fission being uncommon in chemistry labs — these are all prime. (And the same is true for even numbers!)

The economist notes that 3 is prime, 5 is prime, 7 is prime, but 9 isn't prime, and exclaims, “Look! The prime rate is dropping!”

The computer scientist goes off to write a program to check all the odd numbers. Its output reads:

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3 is prime.  
3 is prime.  
3 is prime.  
:  
:
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The sociologist objects that one shouldn't refer to numbers as odd because they might be offended or as prime because the term implies favouritism, and the theologian concurs since all numbers must be equal before God.

[†] No one expects the mathematical inquisition!