

MT00702/SL26601
Ideas in Mathematics: The Grammar of Numbers
Quiz: April 17, 1998

Name _____

You have 20 minutes to do this quiz. You must be explicit in discussing how you arrived at your solutions. Little or no credit will be given for solutions without explanation.

Cheating will be severely punished.

1. (*30 points*) Convert 1101101_2 to base 8. Convert 1001_{10} to base 8.

2. (*30 points*) Answer one of the following two questions:

2a. What is the connection between the date of Easter and the full moon?

2b. Considering the various systems used for writing Chinese numerals as presented by Menninger, why is the official financial numeral system more ornate than the everyday one?

3. (40 points) Comment on the following reasoning:

The ratio of an equal-tempered (*i.e.*, geometric) semi-tone is $\sqrt[12]{2}$, which is approximately 1.0595. The interval of a fifth consists of 7 semi-tones. Therefore, in equal temperament, a fifth is approximately $7 * 1.0595$ or 7.4165. In natural tuning, on the other hand, a fifth has the ratio of 3 : 2, which is 1.5. Therefore, in equal-tempered tuning, a fifth is 5.9165 times larger than in natural tuning.