Prof. S. Brick **Math for Elem Ed I; Exam 1** **Math 201**
Summer '04 **section 501**

Print your name:

Show all of your work. Explain your reasoning. NO CALCULATORS.

1. Give an example of a word problem that uses the missing addend model and requires the computation of $18 - 11$.

2. Explain the humor in the following joke, observed on a T-shirt on campus: there are 10 types of people in the world, those that understand binary numbers and those that don't.

3. In a survey of 126 students, 71 students love math, 58 love computer science, and 12 don't care for either. Draw a Venn diagram and shade in the region that represents those students who love math but do not love computer science. Then find the number of such students.

4. Your class has a balance scale to weigh objects. The scale has two pans, one for the objects to be weighed, the other to place pre-measured weights on. The pre-measured weights consist of two 1-gram weights, two 3-gram weights, two 9-gram weights, and two 27-gram weights. What are the weights of objects that the scale can accurately measure using this collection of weights ? What numeration system does this activity explore ?

5. Working in base 6, use place-value diagrams to represent each addend and to calculate $3024_{\text{six}} + 453_{\text{six}}$.

6. Use a rectangular area model of multiplication to explain the FOIL method for the expansion of a product $(a + b) \cdot (c + d)$.

7. Construct a multiplication table for base four and use it to calculate the product $32_{\text{four}} \cdot 213_{\text{four}}$ using the instructional algorithm from the book (with zeroes for place-value indicators and with formulas explaining the entry in each row).

8. You find a torn page from a math book which reads "*Ralph has 2 pairs of dress pants and 3 dress shirts.....many outfits...*" What is likely to be the actual wording of the problem ? Show how to solve the problem by using an appropriate model. Be explicit about your model.

9. Construct a multiplication table for base five and use it with the scaffold method, to divide 231_{five} by 4_{five}.

10. I am a whole number. When you multiply me by five, subtract eleven and take the square root, you get the number of cubic feet in a cube whose sides have length 24 inches. Showing each of your steps, find me.

SCRATCH PAPER – will not be graded