

The Eighteenth Annual Green Chicken Contest  
October 28, 1995

1. What is  $\sum_{n=1}^{\infty} \frac{1}{1+2+\dots+n}$  ? (Christiaan Huygens gave this problem to the young

G.W. Leibniz to see if Leibniz had any aptitude in mathematics.)

2. You have a job promising a bar of gold for 7 days' work. However, you may elect to stop working at the end of any one of the 7 days. Can the bar be sliced at the beginning of the week with just two slices to guarantee that you can be paid the appropriate amount owed you?

3. Show that  $\frac{1}{1995} + \frac{1}{1996} + \frac{1}{1997} + \dots + \frac{1}{19952} > 1$ .

4. Show that it is impossible to weight two coins so that the probabilities of getting 0, 1, or 2 heads after flipping both coins are all the same.

5. Given any  $n \geq 1$ , slice up the plane with with  $n$  straight lines and color the resulting regions. What is the minimum number of colors required so that adjoining regions are of different colors? Regions are adjoining if they share a common side.

6. Let  $A$  be a  $4 \times 4$  matrix with all entries either 1 or -1. Show that the determinant of  $A$  is a multiple of 8.