Rockhurst University Mathematics Problem of the Month

Congratulations to Peter Simone, winner of March's contest. He wins a prize from the Problem of the Month collection. Honorable mention goes to Lee Haworth. The contest is open to any currently enrolled Rockhurst student. The winner will be chosen according to who has the best solution (not just answer) to the problem. Ties will be resolved by considering the order in which the solutions were received.

Solutions should be submitted to Keith Brandt (Richardson 120) by the end of the month. The winners will receive wonderful prizes, so give these problems some thought!

Problems For April 2004:

1. Every year the dukes in a kingdom bring bags of gold bars as a tribute to their king. The king learns that some of the dukes are cheating by putting gold painted bars in the bag instead of solid gold. Bars are supposed to weigh 10 gm each, but the fake bars weigh 1 gm less than the real ones. Any or all of the dukes could be dishonest. Assuming there are 8 dukes and 150 bars in each bag, describe how to use just one weighing on a regular scale (not a balance) to decide which dukes are cheating.

2. According to a corollary of the fundamental theorem of algebra, the polynomial x^4+1 can be factored into a product of two quadratic polynomials with <u>real</u> coefficients. Show how to do this (without the help of a computer).