

# 2010 Solutions

## (P) Khipu (I/I)

provided by Reed Blaylock

**P1 (6 points).** This khipu has lost one of its strings. Can you figure out what was on it? Draw the missing string where the dotted line is.

missing string is 14,175. The khipu would be formed with one knot in the 10,000's place, 4 in the 1000's place, 1 in the 100's place, 7 in the 10's place, and 5 in the 1's place.

**P2 (4 points).** Explain your answer.

Every knot represents the number 1. Knots in different places represent different values, on a logarithmic scale. That is, knots at the top of the rope correspond to the 1's place, while knots below are grouped into 10's, 100's, 1000's, and 10,000's respectively. When the knots are added together, they determine a single larger number. The leftmost string always represents the largest number. The sum of all the strings on the right adds up to the number on the most left string.

In the khipu (set of strings) with the missing rope, the total number is 41,723. The other ropes, from left to right, are: 20,231, 40, ???, 6,671, and 606. The mysterious string should be 14,175. The khipu would be formed with one knot in the 10,000's place, 4 in the 1000's place, 1 in the 100's place, 7 in the 10's place, and 5 in the 1's place.

