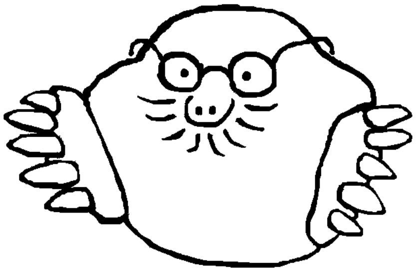

Math Mole

June 23, 2009 *The Day After* Volume 3, No. 2

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- Today's Editor: Pranav
- Wednesday: Shashank

Quotes:

Mathematics is like checkers in being suitable for the young, not too difficult, amusing, and without peril to the state.
– Plato

One geometry cannot be more true than another; it can only be more convenient.
– Poincare

Mathematician of the Day

Srinivasa Ramanujan – 22 December 1887-26 April 1920, India

- Born and raised in Erode, Tamil Nadu, India, Ramanujan first encountered formal mathematics at age 10. He demonstrated a natural ability, mastering books on advanced trigonometry by age 13, and even discovered theorems of his own. By 17, Ramanujan conducted his own mathematical research on Bernoulli numbers and the Euler-Mascheroni constant.
- He received a scholarship to study at Government College in Kumbakonam, but lost it when he failed his non-mathematical coursework. He joined another college to pursue independent mathematical research, working as a clerk in the Accountant-General's office at the Madras Port Trust Office to support himself. In 1912-1913, he sent samples of his theorems to three academics at the University of Cambridge.
- During his short lifetime, Ramanujan independently compiled nearly 3900 results (mostly identities and equations). Although a small number of these results were actually false and some were already known, most of his claims have now been proven correct.
- He stated results that were both original and highly unconventional, such as the Ramanujan prime and the Ramanujan theta function, and these have inspired a vast amount of further research. However, some of his major discoveries have been rather slow to enter the mathematical mainstream. Recently, Ramanujan's formulae have found applications in crystallography and string theory.

Info From: ???

Puzzles:

Weighing Marbles: While walking down the dark, dreary forest path one late winter night, you come across an old man in a black cloak. He blocks your only path forwards and will not move unless you solve his riddle. He hands you exactly 12 identical looking wooden spheres and a weighing scale. The weighing scale consists of a pan to place weights on each end. Upon placing weight on the pans, an arrow in the middle of the scale points directly towards whichever side is heavier or points directly in the middle of the two if each side weighs exactly the same. For example, if you place something that is 2 pounds on the left and something that is 1 pound on the right, the arrow on the scale will point directly to the left. Exactly eleven of the twelve identical looking wooden spheres weigh exactly the same, and the one wooden sphere left over weighs is either slightly heavier or slightly lighter than the rest. More specifically, the odd sphere weighs somewhere between half the weight and twice the weight of one of the other 11 identical spheres. However, you do not know whether the odd sphere weighs slightly more or slightly less than the others. The creepy old man challenges you to determine which is the odd sphere of the 12. However, you are only allowed to use the weighing scale three times. For example, putting any amount of weight on either the left side, the right side, or both sides of the weighing scale counts as using the scale once. Thus, explain how you would find the odd sphere among the twelve identical looking spheres by using the scale exactly 3 times and by using only the 12 spheres and the weighing scale that the old man gave you. Note that you must assume the worst possible scenario and leave nothing to chance. For example, if you place 5 spheres on either side of the weighing scale, you cannot assume that all 10 of the spheres you picked weigh the same.

Weighing Marbles (kiddy version): The same exact conditions apply as in the true Weighing Marbles riddle. However, this time you are given that the odd sphere is slightly heavier than the other 11 identically weighing spheres. The goal is again to find a process such that you can determine for sure which of the twelve spheres is the odd one out without assuming anything other than the information already given.