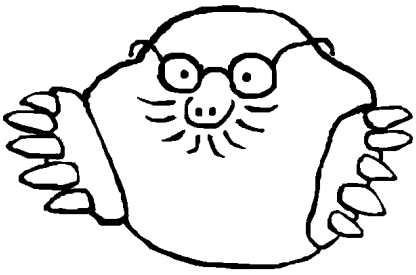


Math Mole

June 25, 2009 *On the downhill side* Volume 3, No. 4

This issue

Quotes:

However vast a man's spiritual resources, he is capable of but one great passion. – Pascal, Blaise (1623-1662)

Abstractness, sometimes hurled as a reproach at mathematics, is its chief glory and its surest title to practical usefulness. It is also the source of such beauty as may spring from mathematics. – Bell, Eric Temple (1883-1960)

Puzzles:

Pennies: How can I arrange 10 pennies in 5 rows of 4 pennies each?

Boatage: You have a boat and need to take a fox, a chicken and some corn across a river.

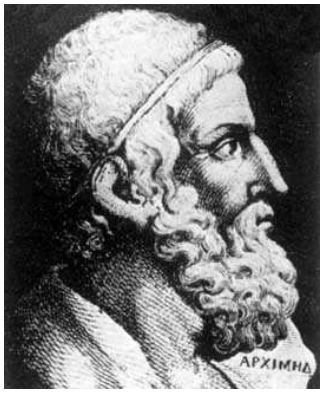
The boat will only hold you and one other thing.

If you leave the chicken alone with the corn, the chicken will eat the corn.

If you leave the fox alone with the chicken, the chicken's in big trouble.

How can you get them all across in the least amount of trips possible?

Mathematician of the Day



Archimedes (287 BC – 212 BC)

- Archimedes died during the Siege of Syracuse when he was killed by a Roman soldier despite orders that he should not be harmed. Apocryphally, he told the soldier not to kill him until he had finished his problem (the soldier did not listen).
- The Claw of Archimedes is a weapon that he is said to have designed in order to defend the city of Syracuse. Also known as "the ship shaker," the claw consisted of a crane-like arm from which a large metal grappling hook was suspended. When the claw was dropped onto an attacking ship the arm would swing upwards, lifting the ship out of the water and possibly sinking it. There have been modern experiments to test the feasibility of the claw, and in 2005 a television documentary entitled Superweapons of the Ancient World built a version of the claw and concluded that it was a workable device.
- Archimedes famously determined that his king's crown was not made of pure gold when he utilized the principle of bouyancy and found that ablock of gold of the same weight was not equally dense as the crown. the unscrupulous crown-maker was killed.
- Archimedes was able to use infinitesimals in a way that is similar to modern integral calculus. Through proof by contradiction (reductio ad absurdum), he could give answers to problems to an arbitrary degree of accuracy, while specifying the limits within which the answer lay. This technique is known as the method of exhaustion, and he employed it to approximate the value of ÏĂ (pi).
- In The Sand Reckoner, Archimedes set out to calculate the number of grains of sand that the universe could contain. In doing so, he challenged the notion that the number of grains of sand was too large to be counted. He wrote: "There are some, King Gelo (Gelo II, son of Hiero II), who think that the number of the sand is infinite in multitude; and I mean by the sand not only that which exists about Syracuse and the rest of Sicily but also that which is found in every region whether inhabited or uninhabited." To solve the problem, Archimedes devised a system of counting based on the myriad. The word is from the Greek ÎijÏĚĬĄÎźÎňÏĆ murias, for the number 10,000. He proposed a number system using powers of a myriad of myriads (100 million) and concluded that the number of grains of sand required to fill the universe would be 8 vigintillion, or 8 ÃŮ 1063.[38]
- The Fields Medal for outstanding achievement in mathematics carries a portrait of Archimedes, along with his proof concerning the sphere and the cylinder. The inscription around the head of Archimedes is a quote attributed to him which reads in Latin: "Transire suum pectus mundoque potiri" (Rise above oneself and grasp the world).[56]

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