Challenge Of the Week

October 6 – October 12, 2010

Problem:

The matheroes is a group of 5 heroes, each having one and only one of the following superpowers: invisibility, wall-crawling, telekinesis, accelerated healing, and time traveling. An old guru will sell them some magical pills. Taking one pill will make the taker also have all the powers of the first matheroe he/she touches. As pills are extremely expensive, what’s the minimum number of pills that need to be used by the group so that each matheroe obtains all 5 superpowers?

Solution:

They need a minimum of 8 pills.

Let $A$ be the first matheroe that gets all 5 powers. Before he/she does that, all the other four matheroes have to be touched, so at least 4 pills are needed to get the first matheroe to have all the powers. At this stage, the remaining matheroes have less than 5 powers each, and so each of them needs to use a pill to get more powers. So at least 8 pills are needed.

To see that 8 pills are sufficient, have invisible man use four pills to get the powers of the other 4 matheores. The invisible men has now all the powers. Finally, have the other 4 matheroes take one pill and touch the invisible men. Then all the matheroes have the 5 powers.