

# INTERNET TRICKS

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With the invasion of cyberspace and use of the internet...we all get e-mails with math magic tricks. Sometimes were asked to explain how it's done.

Here are two I think were especially good.

## 1) SYMBOLS problem

You're asked to follow these steps:

- (1) Pick any two digit base ten number.
- (2) Add together the two digits comprising the numbers.
- (3) Subtract this sum from the original number you chose, and remember this result.
- (4) Look at the table above, and find the symbol corresponding to your final result.

For this set of symbols your result is a particular symbol from the chart. When you try it again on the internet with a new two digit number, a new set of symbols is presented.

Once again it guesses the right symbol.

In fact, every time you try, the computer gets the right symbol. WHY?

**The result is a multiple of nine.**

Step (1): Suppose you chose any two digit number. Call it  $ab$ .  $a$  is any digit greater than 0, and  $b$  is any digit less than or equal to 9. Since  $a$  is in the tens place and  $b$  is in the ones place, the value of number  $ab$  is  $10a + b$ .

Step (2): The sum of the number's digits is:  $a + b$ .

Step (3): Now we are asked to subtract this sum from the original number. So we get:  $10a + b - (a + b)$  which equals  $9a$ . This means the final result is always a multiple of 9.

The largest two digit number you can get is 81, assuming you picked 99 in the beginning.

**Note:** The solution can wait for another time until students have a chance to think about the problem.