
Problem of the Week
Number Three
September 15, 2014

Here's something interesting:

$$1089 \times 9 = 9801.$$

If you're curious, this is the only four-digit number whose digits reverse upon being multiplied by nine. What if we multiply by something other than nine? That's this week's problem!

Find a four-digit number whose digits reverse upon being multiplied by four.

Looking at numbers both forward and backward makes one think of palindromes, by which I mean words, phrases, or whole sentences that read the same forward and backward. An example with a vaguely mathematical flavor is:

Never odd or even.

For the logicians we have the tautology:

A Toyota's a Toyota.

And just imagine the delight if you ever take a class from

Dr. Awkward.

It is inevitable that palindromic sentences will tend to sound a bit goofy or clumsy, such as:

No sir! Away! A papaya war is on.

Or perhaps:

A nut for a jar of tuna.

This one's an old classic:

A man, a plan, a canal: Panama.

An enhanced version of that one runs:

A man, a plan, a cat, a ham, a yak, a yam, a hat, a canal—Panama!

If a famous person's name can be worked into the sentence, so much the better:

*T. Eliot, top bard, notes putrid tang emanating, is sad.
I'd assign it a name: gnat dirt upset on drab pot-toilet.*

Not quite coherent, but clever! This one's a little better:

No, Mel Gibson is a casino's big lemon.

Or this one:

Ed, I saw Harpo Marx ram Oprah W. aside.

As it happens, many years ago *GAMES Magazine* ran a contest for palindromes involving the names of famous people. The winner was the delightful:

Lisa Bonet ate no basil,

the reference being to an actress of some fame in the 1980s. But my personal favorite, just for sheer audacity, was this one:

*If Arnold Schwarzenegger was bound and gagged,
his muffled cries for help would sound like this: sihtek ildno uosdluow plehr
ofseircd elff umsih deg gagdnab nuobsa wraggen ezr awhcsd lonrafi.*

*Solutions are due to Jason Rosenhouse by 5:00 on Friday, September 19. Either write your answer in the space below, or staple your answer to this sheet. Place your name, e-mail address, and the section numbers and professors of any math courses you are taking, in the **upper right corner** of the front of the page. One weekly winner will receive a five-dollar gift card from Starbucks. Please make sure that the answer to the problem is displayed clearly and prominently, in a box when appropriate. Problems are available at the bulletin board outside Roop 119, and also at the website:*

<http://educ.jmu.edu/~rosenhjd/POTW/Fall14/homepage.html>