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- AUTOS
- REAL ESTATE
- RENTALS

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newspaper ads
coupons

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- Gilbert
- Glendale
- Mesa
- Peoria
- Pinal County
- Phoenix
- Scottsdale
- Sun Cities
- SW Valley
- Tempe
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- Arizona
- Legislature

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- Amber Alerts
- Crime reports
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- Benson Cartoons
- Columnists
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Math mavens, get ready: It's prime time

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The Arizona Republic

Today's question:

There was an article in the newspaper about researchers who had discovered the largest prime number. It's 9.1 million digits long. I'm sure there is a wonderful scientific reason to discover this. I just can't figure out what it is. Why is it important to know this?

Let's back up a bit and fill in the details.

In December, researchers at Central Missouri State University announced that they had discovered the biggest prime number ever, and it includes 9.1 million digits. It took about nine years using a network of about 700 computers around campus to do this.

Now, as you no doubt recall from math class, a prime number is any positive number other than 1 that can be divided only by 1 and itself. For starters, 2, 3, 5 and 7 are prime numbers.

Personally, I can take prime numbers or leave them alone. But if you are of a certain mathematical bent, prime numbers are pretty hot stuff, and people have been studying them since the time of Euclid and assorted other ancient Greeks.

Anyway, why did they go to all that time and effort to find a prime with 9.1 million digits? There are a few reasons.

I found this quote from Steven Boone, one of the researchers involved, in an article from the *Guardian:* "People ask why we do this. It's like going on a quest. We're looking for something incredibly rare."

In other words, they kind of did it for the hell of it.

Second, there is money involved. An outfit called the Electronic Frontier Foundation has offered a $100,000 prize for finding a 10 million-digit prime number.

And prime numbers do have their uses, so I suppose the bigger the prime the better. For one thing, prime numbers are used for hash tables. I have no idea what a hash table is and for what I get paid, I'm not about to look it up.

But prime numbers are especially dandy things when you are dealing with computer encryption. That's what lets you do online banking or order stuff by

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computer using your credit card.

This involves a bunch of math we won't go into here, but one thing I read said a computer that could check 1 trillion numbers a second would take about 122 *quadrillion* years to exhaust all possibilities involved in breaking a typical 128-bit encryption based on prime numbers. I have no idea if that is really true, but those are some pretty impressive numbers, don't you think?

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