Input for Carnival of Math: Number 115, October 2014

I visited Singapore in 1996 and the people were very kind to me. So I though this might be a little payback for their kindness. Good Luck.

David Brooks

The "Mathematical Association of America" (http://maanumberaday.blogspot.com/2009/11/115.html) notes that:

115 = 5 x 23.

115 = 23 x (2 + 3).

115 has a unique representation as a sum of three squares: $3^2 + 5^2 + 9^2 = 115$.

115 is the smallest three-digit integer, *abc*, such that (*abc*)/(*a***b***c*) is prime: 115/5 = 23.

STS-115 was a space shuttle mission to the International Space Station flown by the space shuttle *Atlantis* on Sept. 9, 2006.

The "Online Encyclopedia of Integer Sequences" (http://www.oeis.org) notes that 115 is a tridecagonal (or 13-gonal) number. Also, 115 is the number of rooted trees with 8 vertices (or nodes). If you do a search for 115 on the OEIS website you will find out that there are 7,041 integer sequences that contain the number 115.

The website "Positive Integers" (http://www.positiveintegers.org/115) notes that 115 is a palindromic and repdigit number when written in base 22 (5522).

The website "Number Gossip" (http://www.numbergossip.com) notes that: 115 is the smallest three-digit integer, abc, such that (abc)/(a*b*c) is prime. It also notes that 115 is a composite, deficient, lucky, odd odious and square-free number.

The website "Numbers Aplenty" (http://www.numbersaplenty.com/115) notes that:

It has 4 divisors, whose sum is σ = 144. Its totient is φ = 88.

The sum of its prime factors is 28.

The product of its digits is 5, while the sum is 7.

It is a semiprime because it is the product of two primes, and also an emirpimes, since its reverse is a distinct semiprime: 511 = 7 *·73.

It is a cyclic number.

It is not a de Polignac number, because 115 - 21 = 113 is a prime.

It is a nude number because it is divisible by every one of its digits and also a Zuckerman number because it is divisibly by the product of its digits.

It is a Duffinian number.

115 is a lucky number.

It is a plaindrome (not "palindrome") in base 7, base 9, base 10, base 13 and base 15.

It is a nialpdrome in base 5, base 6, base 11, base 12, base 14 and base 16.

It is a zygodrome in base 2.

It is a junction number, because it is equal to n+sod(n) for n = 98 and 107.

It is a pernicious number, because its binary representation contains a prime number (5) of ones.

It is a polite number, since it can be written in 3 ways as a sum of consecutive naturals, for example, 7 + ... + 16.

It is an arithmetic number, because the mean of its divisors is an integer number (36).

115 is a deficient number, since it is larger than the sum of its proper divisors (29).

115 is an equidigital number, since it uses as many digits as its factorization

(3 digits).

115 is an odious number, because the sum of its binary digits is odd.

The Google website Numberopedia (https://sites.google.com/site/numberopedia/numbers110-119) notes the following about 115:

115 is the atomic number of the chemical element Uup (Ununpentium, Latin word for 115)

First 3 digits in the Dewey Decimal Classification System for library books on Time.

115 = (174 – 90 + 0 + 6 + 25, and that 115^4 = 174,900,625 (notice – same digits in the same order).

115 is the emergency telephone number when calling in Iran.

115 is the number of cardinals who actually participated to vote for the 265th Pope succeeding the Pope John Paul II in April 2005, even though 117 cardinals were eligible.

The website Wikipedia (http://en.wikipedia.org/wiki/115) notes historical events that occurred in the year 115 A.D. (or 115 B.C.E.), and (http://en.wikipedia.org/wiki/115_%28number%29) notes other interesting facts about the number 115 such as:

In the year 115, Pope Alexander I died and was succeeded by Pope Sixtus I (the 7th Pope).

115 is a Heptagonal Pyramidal number.

115 is the fire service emergency number in Mauritius and Italy.

115 is the ambulance emergency number in Vietnam.

Though 115 is not a prime number the website "Prime Curios"

(http://primes.utm.edu/curios/page.php?short=115) notes that:

115 (or 5! - 5) is the smallest composite number of the form $p! - p$, where p is a prime number.

115 is the smallest integer n, in which pi(n) occurs at the nth decimal place of pi.

π(115) = (1*1*5)^1 + (1*1*5)^2.

Also at this site:

1,111,111,111,111,111,111,111,111,111,111,111,111,111,111,111,111,111,111,177,711,111,111,111,111,111,111,111,111,111,111,111,111,111,111,111,111,111,111 is a 115 digit prime number that is a special wing prime with 777 as its central digits.

9,466,666,666,666,666,666,666,666,666,666,666,666,666,666,666,666,666,666,666,666,666,666,666,666,666,666,666,666,666,666,666,666,666,666,666,666,666,649 is a 115 digit prime number that is palindromic and is a "Holey" prime.

I have also found

Asteroid 115 is named Thyra.

115 is a Centered Nonadecagonal (19-gonal) number.

115 is written CXV in Roman Numerals.

115 can be written as the difference of two squares in two different ways: $115 = 14^2 - 9^2 = 58^2 - 57^2$.

The 115^{th} prime number is 631.

The 115^{th} composite number is 152.

The 115^{th} Fibonacci number is 483,162,952,612,010,163,284,885.

1,111,111,111,111,111,111,111,111,111,111,111,111,111,111,111,111,111,111,177,711,111,111,111,111,111,111,111,111,111,111,111,111,111,111,111,111,111,111 is a 115 digit prime number that is a special wing prime with 777 as its central digits.

115 can be expressed as the sum of three distinct squares: $115 = 3^2 + 5^2 + 9^2$.

The number 998001 is a pretty smart number. If I take it's inverse and express it as a decimal expansion I find that it can count to 115.

1/998001 = 0.000,001,002,003,004,005,006,007,008,009,010,
011,012,013,014,015,016,017,018,019,020,
021,022,023,024,025,026,027,028,029,030,
031,032,033,034,035,036,037,038,039,040,
041,042,043,044,045,046,047,048,049,050,
051,052,053,054,055,056,057,058,059,060,
061,062,063,064,065,066,067,068,069,070,
071,072,073,074,075,076,077,078,079,080,
081,082,083,084,085,086,087,088,089,090,
091,092,093,094,095,096,097,098,099,100,
101,102,103,104,105,106,107,108,109,110,
111,112,113,114,115,…

Notice that the fraction "counts" in three digit chunks, from zero to 115 without any mistakes.

If you add the decimal expansions of these three fractions you get:

1/869565217391130434782609+

1/255754475703222506393861994884910485915089514066 5+

1/22239519626358278661180939842099410642410763927 50…
4416768597796841988213054877882797731539375069498 5+

0.000000000000000000000011500000000023000000000003450000000
000460000000000575000000000690000000000805000000000920000
000000103500000000011500000000012650000000001380000000000149
500000000016100000000001725000000000184000000000195500000000
020700000000021850000000023000000000024150000000025300000
000002645000000000276000000000287500000000299000000000031 05
000000000322000000000033500000000034500000000035650000000 0
368000000000037950000000003910000000000402500000000041400000 0
000425500000000043700000000044850000000046000000000047150
000000004830000000000494500000000050600000000051750000000 05
290000000000540500000000055200000000005635000000000575000000 0
000586500000000059800000000006095000000000621000000000632500
000000064400000000006555000000000667000000000678500000000069
000000000007015000000000713000000000072450000000007360000000 0
007475000000000759000000000077050000000007820000000000793500 0
000000805000000000081650000000008280000000000839500000000085 1
00000000008625000...

Which upon closer inspection is the 115 times table with the number written in 13 digit chunks:

0.	0000000001150 = 10 * 115
0000000000000 = 0 * 115	0000000001265 = 11 * 115
0000000000115 = 1 * 115	0000000001380 = 12 * 115
0000000000230 = 2 * 115	0000000001495 = 13 * 115
0000000000345 = 3 * 115	0000000001610 = 14 * 115

0000000000460 = 4 * 115	0000000001725 = 15 * 115
0000000000575 = 5 * 115	0000000001840 = 16 * 115
0000000000690 = 6 * 115	0000000001955 = 17 * 115
0000000000805 = 7 * 115	0000000002070 = 18 * 115
0000000000920 = 8 * 115	0000000002185 = 19 * 115
0000000001035 = 9 * 115	0000000002300 = 20 * 115
(continued)	0000000002415… and so on!

How far can I go with this? Well, I don't know … yet!

The decimal expansion of the fraction 1/9,999,999,999,885 is 0.000000000000100000000001150000000013225000000152087500001749006250020113571875231306076565160019880499340228625742412629196037745235754434070211175991807428523905785428024916532422286540122856295211412847394931247745041709349067979657514281766061 41... Upon closer inspection you might notice that it produce a sequence of numbers showing (in 13 digit chunks) the powers of 115 beginning with 115^0.

0.	
0000000000001	= 115^0
0000000000115	= 115^1
0000000013225	= 115^2
0000001520875	= 115^3
0000174900625	= 115^4
0020113571875…	= 115^5

This pattern does not continue very far because the powers of 115 increase quite quickly. Since the fraction I used produces 13 digit chunks the values quickly start overlapping. However I am a skilled mathematologist. (someone who attempts to study all things mathematical: math, mathematician, psychology of mathematics, theology of mathematics, history of mathematics, mathematical nutrition, … (this list is long) I can find a fraction that will go further, or as far as I want to or need to.