

# Mathematical and Non Mathematical Properties of 17

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## 1 17 in the History

The cave of Lascaux, painted 17,000 years ago, was discovered by Marcel David, 17 years old.

One of the earliest mentioning of the number 17 was by the Egyptians. The Rhind papyrus from 1700BC contained the following

$$2/17 = 1/2 + 1/51 + 1/68$$

(which is FALSE! This is the only error in list of expansions of fractions of the form  $2/n$  into sums of unit or Egyptian fractions.)

The mummy of King Tutankhamen was wrapped in 17 sheets.

The Parthenon is 17 columns long.

The Chinese had a bureaucratic constitution with 17 articles.

The Alhambra, a beautiful Moorish palace which inspired Escher, is composed of 17 kinds of mosaics (in fact, all of the possible ones).

Henri IV celebrated his wedding a second time on December 17, 1600, in Cathedral Saint-Jean in Lyon. His wife Marie de Médicis arrived with about 5000 Italians in 17 galleys.

Queen Anne of Great Britain had 17 children who died before their second birthday. Her only son to survive infancy died at the age of 11.

Nostradamus's quatrain 5,92:

Après le siège tenu dix-sept ans,  
Cinq changeront en tel révolu terme:  
Puis sera l'un esleu de mesme temps,  
Qui des Romains ne sera trop conforme.

(cf <http://www.infobahnos.com/~ledash/johnpaul.html#>).

Shakespeare wrote 17 comedies (in the 17th century). Hamlet reigned for 17 years.

Beethoven wrote 17 string quartets. The first of Händel's Water Music took place on July 17, 1717 (the yellow pigs day!). Domenico Zipoli sailed for South-America in 1717 and landed in July 1717. Gossec wrote a symphony in 17 parts. Titchenko wrote a concerto for cello and 17 wind instruments. Senfl wrote a mass in 17 parts (given on October 2, 1994 at the Festival d'Ambronay). Mendelssohn's op. 54: 17 variations for piano. Bach had an orchestra with 17 musicians during the Weimar period, when he wrote the concerto for two violins BWV 1043 (*France-Musique, Bach et l'Europe*, December 10, 1995). In 1895, St-Saens had 17 volumes of Rameau's work published (*Radio Classique*, December 13, 1995, 15:30). With one of his fiancées, Alessandro Scarlatti had 17 children including Domenico (*France-Musique*, January 26, 1996); Marin Marais had 17 children (*France-Musique, L'éveil des muses*, February 3, 1996). In 1575, Byrd and Tallis published the "Cantiones Sacrae", dedicated to the Queen: 17 motets by Byrd and 17 by Tallis (from an article in *rec.music.early*, September 5, 1996). Telemann wrote 17 operas.

Fermat had been working as an agent for 17 years. Then he became a councillor at the Parliament of Toulouse, where he had been working for 17 years.

Gauss (born in 1777) constructed the famous 17-gon at the age of 18, having probably thought about it from the age of 17.

There is a famous passage in Plato's Theaetetus in which it is stated that Theodorus (Plato's teacher) proved the irrationality of

$$\sqrt{3}, \sqrt{5}, \dots,$$

'taking all the separate cases up to the root of 17 square feet, at which point, for some reason, he stopped'. But we don't know the exact meaning of the Greek word  $\mu\epsilon\chi\rho\iota$ , translated as 'up to' by Heath: either 'up to but not including' or 'up to and including'. (*An Introduction to the Theory of Numbers*, Hardy/Wright, section 4.5, pp 42-44)

Marconi used 17 patents of Tesla's (cf *ST Magazine* 75, p 54).

The French revolution took place in 1789 ( $8 + 9 = 17$ ).

In Chatou (78400, France), a street is called *rue des dix-sept* (i.e. street of the seventeens). The extension of *rue de Sahüne* was given this name in December 1880. In 1878, the town council considered that property Fauchat was suitable to be a future town hall. But the heirs refused to sell the house separately, and the town council didn't want to (or couldn't) buy the whole domain. Mayor Bousson engaged its fellow citizens to form a civil company to buy all of it. This company was constituted by 17 people. It gave the town the house and some land while it sold the surplus by lots, making a profit given to the town. The names and the photos of these 17 are displayed on a board in the town hall. These are Mr. Albin, Barbier, Bardon, Baudry, Blin, Bousson, Coulon, Déjardin, Dijon, Ducellier, Huser, Lambert, Laubeuf, Marais, Sandel, Sarazin and Yvon. Source: tourist bureau of Chatou.

## 2 Symbols and Religion

### 2.1 Bible

The number 17 is used 13 times in the Bible: Genesis 7:11, 8:4, 37:2, 47:28; 1 Kings 14:21, 22:52; 2 Kings 13:1, 16:1; 1 Chronicles 24:15, 25:24; 2 Chronicles 12:13; Jeremiah 32:9; Judith 1:13. The word "seventeen" is used 17 times; the four additional references are: Judges 8:14; 1 Chronicles 7:11; Ezra 2:39; Nehemiah 7:42.

The 17th book is the shortest. Someone has spent 17 years looking for the exact middle point of the Bible. It is the psalm 117 which is the shortest. The longest one is the psalm 119 (divisible by 17).

$$2^2 + 3^2 + 5^2 + 7^2 + 11^2 + 13^2 + 17^2 = 666 \text{ (number of the Beast).}$$

The Flood started on the 17th. Noah's Ark landed on the Mount Ararat (alt. 17,000 feet) on the 17th.

### 2.2 Miscellaneous

In *Au bonheur des mots*, by Claude Gagnière, ed. Robert Laffont, p 206:

The Italians fear the 17's, because 17 is written XVII in Roman numerals, which is the anagram of VIXI, which means "I lived", i.e. "I am dead". In Italy, buildings do not have a 17th floor, hotels do not have a room 17, and Alitalia planes do not have a seat 17 [neither do Air Inter planes and British Airways Concorde]. When Renault marketed its R17 and wanted to export it to Italy, it had to be renamed "Renault 177". Napoleon Bonaparte, who was more Italian than French in his education, refused to give the signal for his coup on "vendredi 17 brumaire" and postponed it until the following day.

In *Dictionnaire des symboles*, ed. Robert Laffont / Jupiter (1982), p 360:

This number, as well as 72 (the two being related: 17 being  $9 + 8$ , 72 being  $9 \times 8$ ) presents a high symbolical importance.

In the Islamic tradition, 17 is the number of *rak'a* (liturgical gestures), part of the five daily prayers. 17 is also the number of words in the call to the prayer. In the Muslim folklore, the symbolical number 17 appears in legends mainly, particularly in the 17 pieces of advice muttered at the king's ear during his crowning and in the 17 parts of the standard (M. Mokri, *Les secrets de Hamza*).

It is mainly in the Chi'ism (and, because of its influence, in the Turkish epico-religious literature in Anatolia) that a quasi-magical importance is given to the number 17. . . From the ancient times, the Chi'ist mystics had venerated the number 17; this veneration has

its origins in the ancient Pythagorean speculations lying on the letters in the Greek alphabet... 17 represented the number of those who would rise from the dead and each one of those people was to receive one of the 17 letters of the alphabet, making up the highest name of God, which is certainly related to the blade of the Star, arcanum 17 in the Tarot game whose symbolism evokes mutation, rebirth, and which Dr Allendy considers to be *Karmic Liberation* (ALLN, 364). Moreover, according to *The Book of the Balance* by Gâbir ibn Hayyân, an alchemist and a soufi, *the shape (sura)* of every thing in the world is 17; 17 is the very *basis* of the theory of the Balance and must be regarded as the *canon of the equilibrium* of every thing.

The number 17 has a particular importance in the tradition of the trade guilds which acknowledge 17 journey men initiated by Alî, 17 patrons of those who founded the muslim guilds initiated by Selmân-i Fârsî, and 17 main guilds (MELN, 455 s.).

To the ancient Greeks, 17 represents the number of consonants in the alphabet, with 9 silent consonants and 8 semi-vowels or semi-consonants. These numbers were also tightly linked with musical theory and the harmony of the spheres.

We previously wrote that 17 was  $9 + 8$  and 72 was  $9 \times 8$ ; furthermore when adding the digits of these numbers, we get 8 for 17, and 9 for 72. The 9 : 8 ratio is endlessly recurrent in the ancient Greeks' arithmological speculations, whether in grammar, music (the 9 : 8 ratio being represented by the middle strings of the lyre), metric theory or cosmology.

This number may have been regarded as ill-fated in Roman Ancient Times because its figures XVII are the same as VIXI, meaning "I lived".

## 3 Today's 17's (20th century)

### 3.1 Computing and Video Games

#### 3.1.1 HP48

On the version D of the HP48SX, 17 bugs have been found (cf William C. Wickes' file on hpcvra.CV.HP.COM).

In the 3rd issue of the French review *Haute Performance*, the example chosen for the challenge (page 10) is divisible by 17 (it is 2754), and the program ran for 0.102 second (divisible by 17) for this example. In the 6th issue, page 5 (rubric *programmes divers*, title *Le recordman*), it is written that an adherent has sent a 17-page letter!

On the HP48SX (in *radian* mode), 17 is the least positive integer  $n$  such that

$$\text{INV}(\text{INV}(\sin n)) = \sin n, \quad \text{INV}(\text{INV}(\cos n)) = \cos n, \quad \text{and} \quad \text{INV}(\text{INV}(\tan n)) = \tan n.$$

#### 3.1.2 Atari

In the 36th issue of the French review *Atari Magazine*, at the page 17 of the detachable insert, 14 file names end with 17!

In a file A\_LIRE of the software *Le Rédacteur 4* for the Atari, an example of hour is given (on line 438): 17h 17' 18"; in fact, since on the Atari computers the number of seconds is always even, it can be 17h 17' 17" as well. In the database *AZthèque*, each form contains 17 fields of free definition, and each of the fields contains 17 subrubrics.

In the assembler *Assemble* on the Falcon, the k-factor used by the internal conversion into *packed* is 17 by default (cf French user manual, p 26). There are 17 kinds of optimization (cf French user manual, p 59).

In the French software *Compte-Chèque* on the Atari, the date can be modified. The example given in the user manual (page 55) is July 17, 1987 (I discovered this on November 17, 1993).

On the Atari ST, just after the computer has been switched on, 17 files at the maximum can be simultaneously displayed in the desk windows, in text display.

The joystick controller of the Jaguar has 17 buttons.

The Falcon 030 operating system supports 17 countries (cf *The Atari Compendium*, p 3.5): USA, Germany, France, United Kingdom, Spain, Italy, Sweden, Switzerland (French), Switzerland (German), Turkey, Finland, Norway, Denmark, Saudi Arabia, Holland, Czechoslovakia, Hungary.

About the *Moon Speeder* game on the Falcon, in *ST Magazine* 90: “You are Damon Schumberger, the world champion of gliders, and for the first time since the terrible accident of March 2117, which killed 17 of the 23 pilots of the championship and left you paralyzed for life in your chair...”.

### 3.1.3 Acorn

On *The RISC Disc* volume 1 CD-ROM for the Acorn Risc PC, there are 17 Photo CD images.

From the help of *Black Hole 2*: “Mode 12 sprites should be around  $34 \times 17$  pixels. Mode 20 sprites should be around  $34 \times 34$ ”. According to *RISC OS style guide*, large icons (for the files) must be 68 OS units high (i.e. 34 pixels in high resolution), and small icons must be 34 OS units high (i.e. 17 pixels in high resolution).

Under RISC OS, the system calls are done with the assembly instruction SWI followed by a 24-bit number. The bit 17 of this number, called bit X, is very particular: it has an influence on the error handling (it is the only bit the programmer must know the meaning).

With the *VoiceMail* software (answerphone system), one can record over 17 hours of messages if there are 100 MB of free disk space (cf manual, p 2).

By default, 17 files are displayed in the *filer* windows, in *full info* display.

### 3.1.4 Processors

For the processor 68030 in a *Ceramic Surface Mount* case, 17 pins are attributed to GND.

A square meter of silicon (chip) costs 17,000 FF (cf *ST Magazine* 75, p 18).

The ARM6 (the Risc PC, Newton, and 3DO processor) has 17 registers (accessible in User mode): 16 general registers (including the PC and the SP) and the status register.

C. Liem, P. Paulin, M. Cornero and A. Jerraya’s article *Industrial Experience Using Rule-driven Retargetable Code Generation for Multimedia Applications* (8th International Symposium on System Synthesis, in Cannes, France, September 13–15, 1995) deals with a VLIW chip that has a 68 bit wide instruction. Thus this instruction is written with 17 hexadecimal digits.

### 3.1.5 Computer Arithmetic

```
From moler@mathworks.com (Cleve Moler)
Newsgroups: sci.math.num-analysis,comp.arch
Subject: Status of a Hard/Software Pentium FDIV Workaround
Date: 5 Dec 1994 06:19:06 -0500
```

[...]

For example, the denominator in Coe’s now famous ratio

4195835/3145727

is

$3145727 = 3 \cdot 2^{20-1} = 23.99999237060547 \cdot 2^{17}$

In this case,  $n = 23$  and  $f = 1 - 2^{-(17)}$ . The 17 consecutive high order ones in  $f$  make this example an instance of worst-case error.

[...]

There are 17 significant decimal digits for the type `double` in C.

During summer 1996, a lot of computations were performed on about a hundred machines to search for, in particular, all the machine numbers  $x$  in double precision between  $1/2$  and  $1$  ( $2^{52}$  cases) such that  $\exp x$  has the following form: the first 54 bits can have any value and the following 49 bits are identical. In total, 17 numbers were found.

### 3.1.6 Unix

From the man of `rn`:

```
On the newsgroup selection level, the prompt looks like this:  
***** 17 unread articles in talk.blurfl|read now? [ynq]
```

```
At the pager level (within an article), the prompt looks  
like this:  
|MORE| (17%)
```

In `zsh`, `history` builtin will, by default, only show you the last 17 commands, regardless of actual history size (cf `zsh` man and FAQ).

### 3.1.7 Internet

The list of the mailing-lists is posted to `news.lists` and `news.answers` in 17 postings (to limit the size of each article). I discovered this by searching *seventeen* in the list of the FAQs on November 9, 1995.

Read in `rec.arts.tv`:

```
I can't believe this. I post ONE reply, and somehow, it gets posted  
SEVENTEEN TIMES!!! For all of you who had to waste time finding out all  
seventeen replies were the same one, I'm sorry. I have no idea what AOL  
did to make my ONE reply post SEVENTEEN times!!!
```

A list of 17 cybercafés in France is given in *Télérama* 2394, November 29, 1995, page 96: Agde: *Internet'Thé*; Besançon: *Le Web*; Bordeaux: *Cyberstation*; Courbevoie-la Défense: *Extrapole*; Grenoble: *Le Cyberforum*; Lyon: *Connectik Café*; Marseille: *Cyb.Estami.Net*; Nice: *La Douche-Internet Couleur Café*; Paris: *UGC WorldNet Café*, *Café Orbita*, *Le Web Bar*, *Net Coffee*, *Virgin Mégastore*, *Bistrot Internet*, *ZOWEZO*, *High Tech Café*; Strasbourg: *Best Coffee Shop*.

Read in `fr.network.internet`:

Si vous étiez dérangés dix-sept fois par jour dans votre boulot par des gens qui vous téléphonent directement pour vous demander des produits de votre boîte, alors que ce n'est pas votre boulot, vous finiriez par avoir ce genre d'énervement :-)

(Translation: *If you were disturbed 17 times a day during your work by people who directly phone you to ask you for products of your firm, whereas it isn't your job, you'll end up getting worked up.*)

The addresses of *Internet au bout des doigts* are grouped under 17 categories: références et ressources; culture; littérature; publications; médias électroniques; éducation; pour les petits et les plus grands; tourisme; francophonie; science; sports; les arts gourmands; les inclassables; Internet, informatique et multimédia; les Libertels; utilitaires; des petits extra... à télécharger. Cf

<http://www.neomedia.com/iabdd/adresses/adresse.htm>

In the *Webs d'Or* printemps-été 1996, there were more than 17,000 votes.

On <http://www.mygale.org/09/arobase/arobase/aloe0012.htm>, @robase selected 17 good plans to have a free e-mail address.

### 3.1.8 Miscellaneous

If piracy ended, 17,000 jobs could be created in Europe (cf *ST Magazine* 75, p 14).

From *Constructing Minimal Broadcast Networks*, N. Ossipova's analysis (D.E.A. Informatique): In the large class of minimum broadcast networks (MBN), one can find graphs that also realize a lower bound  $B(n)$  over the number of edges. Unfortunately, recognizing them is a NP-complete problem; there is no method to construct MBG for any  $n$ . The  $B(n)$  values are only known for  $n = 2^k$  and  $n \leq 17$ . Cf A.M. Farley, S.T. Hedetniemi, S. Mitchell, A. Proskurowski (79), *Minimum Broadcast Graphs*, *Discrete Mathematics*, 25, pp 189-193, and S.L. Mitchell, S.T. Hedetniemi (80), *A Census of Minimum Broadcast Graphs*, *J. Comb., Inf. & Syst. Sci.*, 9, pp 119-129.

Newsgroups: comp.sys.acorn

From: J.Herbert1@student.lut.ac.uk

Subject: Re: StrongARM and MultiProcessor Implementations

Date: Tue, 14 Mar 1995 21:19:36 GMT

[...]

Yeah but brain cells are incredibly slow. Image recognition in the human brain goes through a singular path of only 17 neurons however it has to branch through a few million to actually do any work quickly.

[...]

17 is described at MIT as "the least random number" (cf GNU Jargon File).

In the GNU Jargon File: "I've been chasing that bug for 17 hours now and I am thoroughly gronked!", "If you impose a limit of 17 items in a list, everyone will know it is a random number — on the other hand, a limit of 15 or 16 suggests some deep reason (involving 0- or 1-based indexing in binary) and you will get less {flamage} for it.", "By extension, the corruption resulting from N cascaded fandangoes on core is 'Nth-level damage'. There is at least one case on record in which 17 hours of {grovel}ling with 'adb' actually dug up the underlying bug behind an instance of seventh-level damage! The hacker who accomplished this near-superhuman feat was presented with an award by his fellows."

From the T<sub>E</sub>X/L<sup>A</sup>T<sub>E</sub>X FAQ:

If you are looking, for instance, for the answer to question 17, and wish to skip everything else, you can search ahead for the regular expression '^17)''.

*Team 17's* FAQ (<http://www.team17.com/T17/T17FAQ.html>) is composed of 17 questions. From this FAQ: In early 1988, Martyn Brown founded the *17Bit Public Domain library* for Atari ST and Amiga computers. The name came from the fact that the machines were using 16-bit technology and the library aimed to be “That bit better” thus the name *17Bit* was formed. *Team 17* was a development team formed from *17Bit* contacts.

A software patent protects the software for 17 years. Cf

<http://web.mit.edu:1962/tiserve.mit.edu/9000/24581.html>

There are 17 questions in the ASCII Art FAQ.

The DVD, that will replace the CD-ROM, can store up to 17 GB (*SVM*, January 1997, page 86).

## 3.2 Math

The number 17 appeared twice in the 5th French Championship of the Mathematical and Logical Games (Championnat de France des Jeux Mathématiques et Logiques): the solution to the 3rd exercise of the heats was 17; and in the 2nd exercise of the 2nd day of the finals, the 17th card was asked.

In the 9th exercise of the 7th International French Championship of the Mathematical and Logical Games (Championnat International de France des Jeux Mathématiques et Logiques), the answer was 289 (there are 17 rows of 17 cabbages).

At the finals of the 8th International French Championship of the Mathematical and Logical Games (Championnat International de France des Jeux Mathématiques et Logiques), second session, in the 2nd exercise: there are 17 animals in Belbosse zoo.

At the finals of the 9th International French Championship of the Mathematical and Logical Games (Championnat International de France des Jeux Mathématiques et Logiques):

- First session: 4th exercise: there have been 17 phone rings during the day. 5th exercise: the answer is 17. 12th exercise: the answer is  $(2^3 + 1)(2^4 + 1) = 9 \times 17 = 153$ .
- Second session: the question of the 2nd exercise is: “What is the 17th number in this list?”

The first issues of the French review *Jouer Jeux Mathématiques* costed 17 francs. In the 3rd issue (page 16), the solution to the problem “Records à battre”, which had been set in the 2nd issue (page 17), is given; the answer is 17. The answer to the problem “Aventure en Nouvelle-France” of the 6th issue is 17.

In the 11th issue of *Jouer Jeux Mathématiques*, there is, concerning the first question of the competition: a poplar grove has 289 poplars ( $17 \times 17$ )... (see the rubric “open problems”, page 17, ...). The most chosen numbers (between 1 and 100) at the second tiebreaker are 17 and 23 (4 times). Among the 12 winners, the most chosen number is 17 (twice).

In each issue of *Jouer Jeux Mathématiques*, properties of a number are given: rubric “la Vie des Nombres”. In the 17th issue, the chosen number is  $289 = 17^2$ . In the 8th issue, the chosen number is 512 and it is written: “On the circle graduated into 360 points, 512 is [...] at 3/8 round from 17, a number rich in curiosity.”

At the French Mathematical Summer University in 1991, there were always 17 students. At the French Mathematical Summer University organized by the FFJM in 1992, there were 17 teachers, assistants and personalities.

In the French review *Math & malices*, readers can send the answers to the set problems, which allows them to win points. Each time these points reach a multiple of 17, the reader receives a pin.

The best factor table is D.N. Lehmer’s one: *Factor Table for the first ten millions*, which gives the smallest factor of all the numbers which are not divisible by 2, 3, 5 or 7, till 10,017,000.  $(2^{148} + 1)/17$

is the largest prime number found without a computer; it has been found by Ferrier in 1951. (*An Introduction to the Theory of Numbers*, Hardy/Wright, p 10 and p 22)

In M. Kac and S.M. Ulam's book *Mathematics and Logic* (French title: *Mathématiques et Logique*), the first chapter is composed of 17 sections (it is the only chapter having more than one section).

Banach used to hold meetings of math problems in a café. Ulam said that one of them had lasted 17 hours. (*Quadrature* 14, p 2)

The first *Quadrature* where there is an advertisement for the French Mathematical Summer University is the 17th issue.

Here are two problems from a French math book (seconde 1993-94):

- Determine the name of a bird [in French], knowing that this name has 5 letters, and that if each letter has a value equal to its rank in the alphabet, the sum of the first 2 letters is equal to 17, the sum of the next 2 letters is equal to 17, the excess of the sum of the last 2 letters over the sum of the first 3 letters is equal to 17, and the product of the 2nd letter by its complement to 17 is equal to the 12/5 of the product of the 3rd letter by its complement to 17 [Answer: *hibou* (owl)]. [Note: for *hirondelle* (swallow), the sum of the first 2 letters is equal to 17, the sum of the next 4 letters is equal to 51 ( $= 3 \cdot 17$ ), the sum of the next 2 letters is equal to 17, and the sum of the last 2 letters is equal to 17.]
- Two cyclists are riding on a circular track, at constant speeds. The track is 170 meters long. When they're riding in opposite directions, they meet every 10 seconds. When they're riding in the same direction, the one overtakes the other every 170 seconds. What are their respective speeds?

Problem of the 17 camels: a sheik has 3 children and owns 17 camels. His will stipulates that the eldest is to receive half his property, the second son is to receive the third of his property, and the third one is to receive the ninth of his property. On his death, how would you share out? Solution: borrow a camel, share out, and give back a camel ( $\frac{1}{2} + \frac{1}{3} + \frac{1}{9} = \frac{17}{18}$ ).

Well-known and interesting problem:  $x$  and  $y$  are integers between 2 and 100. Stef knows  $S = x + y$ , and Pat knows  $P = xy$ , but they do not know  $x$  and  $y$ . "I can't calculate them" Pat says, "I knew" Stef says, "So I know these two numbers" Pat says, "In this case, so do I" Stef concludes. Solution:  $S = 17 = 13 + 4$ .

From an article from Chris Caldwell ([caldwell@unix1.utm.edu](mailto:caldwell@unix1.utm.edu)) posted to the `sci.math` news-group: 17 primes of the form  $n! + 1$  are known. The corresponding values are: 1, 2, 3, 11, 27, 37, 41, 73, 77, 116, 154, 320, 340, 399, 427, 872 and 1477. There is no other for  $n < 4580$ .

Seen in `rec.puzzles`:

```
> Quick! Pick a number between 12 and 5. Got it? Now page down...
>
> The number you picked was 7 right?
>
> Freaky?
```

Actually, I picked 17. I guess I'm not very good at following instructions. Or maybe it was those eggs I had for breakfast.

On May 1, 1996, the least number for which the *Non-Dominating Queens Problem* has not been completely solved yet is  $N = 17$  (on May 1, 1996, I saw the file <http://www.bigfoot.com/~velucchi/papers.html> for the first time).

In the 19th issue of the French review *Quadrature*, there is a problem which consists in finding all the solutions of the equation  $n^2 + 100 = q^3$  where  $n$  and  $q$  are integers. I proved that there are only 3 solutions, corresponding to  $q = 5$ ,  $q = 10$  and  $q = 34$ ; amongst these solutions, the only prime divisor of  $q$  prime to  $10 = \sqrt{100}$  is 17.

The symbol for what might be called the most celebrated constant in mathematics is the 17th letter of the original Greek alphabet,  $\pi$ . The original alphabet contained three letters which are now obsolete, one of which was *digamma*, the sixth letter.

Another small puzzle: four boys want to cross a bridge, which will be destroyed in 17 minutes. The boys respectively need 2, 3, 5, 6 minutes to cross the bridge. The bridge is very old, so only two boys can simultaneously cross it. It is night, and they need a light; so it is necessary that two boys cross the bridge, then one comes back with the light and so on. . .

### 3.3 Science

Pluto is the only planet out of the ecliptic plane. Its orbit is inclined of  $17^\circ$ . The last mission to the Moon was on Apollo 17 in 1972 ( $17 \times 116$ ). The period of revolution of Callisto, discovered in the 17th century by Galileo, around Jupiter is 17 days.

<http://microgravity.msad.hq.nasa.gov/aIntro/spaceflight.html>: one would have to travel more than 17 times farther than the moon to reduce Earth's gravitational pull to one millionth of that at Earth's surface.

On June 20, 1996, Columbia starts its longest mission. The scheduled duration — 17 days — will be a record for a shuttle as long as the amount of fuel allows to reach such a duration. For the first time, a microscopic TV camera filmed the astronauts tying to their seats. Then they could be observed for the eight and a half minutes (i.e. 17 half-minutes) for which the shuttle reached its orbit at an altitude of about 400 km. Source: *Reuters French News*.

The universe is around  $10^{17}$  seconds old.

The first collision of Supernovae that could be observed occurred 17 million light-years from the Earth (source: *France 2*, teletext, June 11, 1997).

In the South hemisphere, there are 17 species of penguins (cf *Géo*, July 1995). Their divorce rate is 17%. After eating, a penguin has an average weight of 17 kg (source: a scientific film).

The periodical cicada has a juvenile stage of either 13 years or 17 years. It is conjectured that the reason that these insects have a juvenile stage of a prime number of years is that it makes it difficult for their predators to *lock onto* their life cycle and decimate them every time they emerge as adults, e.g. a predator with a life cycle of 4 years might pose problems for them if they had a juvenile stage of 16 years.

There are 17 muscles in the tongue.

A mygale eats a spearhead [French word: *fer de lance*] (the most dangerous snake in South-America) in 17 hours (cf *Télérama* 2432, August 21, 1996, p 61).

From an article posted to several newsgroups: *Also the arguments of Glashow and Lederman: True, the standard Model does explain a very great deal. Nevertheless it is not yet a proper theory, principally because it does not satisfy the physicists naive faith in elegance and simplicity. It involves some 17 allegedly fundamental particles and the same number of arbitrary and tunable parameters, . . .*

The element selenium [Se], whose atomic number is 34 ( $17 \times 2$ ) was discovered by Jons Berzelius in 1817 ( $1 + 8 + 1 + 7 = 17$ ).

In Antarctica, 17 countries have installed scientific research stations.

## 3.4 Art, Culture

### 3.4.1 Literature

The Japanese poetry Haiku contains 17 syllables.

Paul Auster's first book was rejected 17 times (cf an interview on *France-Inter*, on October 13, 1993; *Télérama* 2396, December 13, 1995, p 46). The editing of the film *Brooklyn Boogie* lasted 17 months (cf *Télérama* 2396, p 48).

The town library in Lyon has 17 floors, that contain 1,700,000 documents. Cf

<http://www.asi.fr/bm/collect.htm>

### 3.4.2 Music, Dance

Hölder's scale is composed of 17 notes.

There are 17 academies of music in Paris (districts 1 to 4 are grouped in one establishment).

Jean-Michel Damase wrote *17 variations pour quintette à vent*.

Oliviers Dejours created a version of Bach's *Art de la Fugue* for the Concert Impromptu implicating 17 wind instruments.

Here is a description by Lincoln Kirstein of how the famous double diamond opening formation for George Balanchine's ballet *Serenade* (his signature piece, probably the most popular ballet he ever created, and the first he ever choreographed in his chosen home America) came to pass. "Balanchine commenced by lining up as many girl students as chanced to be in his class... On that day they were seventeen. These he placed in military order according to height...":

```
      x      x
     x  x  x  x
    x  x  x  x  x
     x  x  x  x
      x      x
```

This first day of staging was March 14, 1934 (03/14/34).

### 3.4.3 Films, TV

Television series *The Prisoner* created by Patrick McGoohan consists of 17 one-hour episodes.

In the film *An American in Paris*, Gene Kelly dances for 17 minutes (cf *Télérama* 2405, February 14, 1996, p 24).

Michel Sumpf's film *Le Géographe manuel* was shot by 17 different cameramen (cf *Télérama* 2429, July 31, 1996, p 20).

### 3.4.4 Miscellaneous

Voyage n°17 is an interactive work by Jean-Marie Dallet, which has been presented at Artifices 3 (contemporary art and new technologies) in particular.

### 3.5 Media

In August 1991, in the French broadcast *La nuit des étoiles filantes*, someone phoned to say that his grandson had seen 17 shooting stars.

In 1991, the French radio *Radio Classique* could be heard in 17 towns (cf *Télérama*, November 6, 1991, p 164).

In the French television broadcast *Arthur, émission impossible*, there was a rubric named “17 secondes de plaisir”, where a barebreasted girl danced for 17 seconds (cf *Télérama* 2239, p 76).

294,219 (=  $17 \cdot 17 \cdot 307$ ) advertisements were broadcasted in 1991 by the French channels, which took up 1,702 hours (cf *Télérama* 2247, p 22).

A French advertisement for Toyota says: “When it is 50° in the shade, in places where there is no shade, a dromedary can stay up to 17 days without drinking, and lose 30% of its weight without having trouble.”

On September 8, 1994, in the 8 o'clock news, on the French first channel: in the report on the birth rate, the first family from Burkina Faso had 17 children; in the report on Formula One, the article from the regulation which had been shown was the article 17.

On *France-info Toulouse*, on Saturday June 10, 1995: “The *Herald Tribune* sets up in Toulouse: the famous American newspaper will be published here from June 13 [...] it will be distributed in 17 departments of the large South-West, and also in Spain. [...] the *Herald Tribune* wants to strengthen its position of the first international daily in France.”

*Euronews* was created by 17 European state TVs.

The game *Questions pour un champion* is broadcasted in 17 countries (cf *Télérama* 2388 p 96).

In an advertisement for Lattoflex bedding: 17 days at -17%, from October 1 to October 17, 1995.

A magazine for young girls is called *Seventeen*.

On *Arte*, in SECAM, the teletext pages are broadcasted every 17 seconds in average (cf *Arte*, teletext, page 106). On *Arte*, until November 17, 1996, the broadcast of all the teletext pages required 26 seconds, from now it only requires 8 seconds (page 113).

A new French radio station, *Le Mouv'*, started broadcasting on June 17, 1997. In the morning on *France-Inter*, it was said that the radio was to start broadcasting at 17 h 17 m 17 s. The radio will first broadcast in 17 towns: Agen, Alençon, Angoulême, Bourgoin-Jallieu, Chalon sur Saône, Chartres, Chatellerault, Evreux, Gap, Mende, Montélimar, Moulins, Niort, Poitiers, Villeneuve sur Lot, Le Puy, Toulouse. Toulouse was the first transmitter to be activated; its frequency is 95.2 MHz (divisible by 17).

### 3.6 Politics, Justice

The Treaty of Maastricht contains 17 protocols, divided into 289 sections. The inhabitants of a village near Luchon (in France) chose to vote unanimously for; they were 17.

All 117 involved countries signed the GATT on December 15, 1993 (17 days before January 1, 1994).

In Touvier's trial, the jurors had to answer 17 questions.

The European Commission has 17 members.

In the *Figaro Magazine* of December 30, 1994, there is an article “1994: the Political Year in 17 Drawings” (Calvi's drawings).

In an article from the French newspaper *Le Canard enchaîné* of March 22, 1995, about the OM-

VA affair: “Mellick, on March 17 (17, the fatal day!), after his ex-parliamentary attachée’s evidence, denying she was with him at Tapie’s on June 17, 1993, in a trance, declaring...”

The current Portuguese government has 17 ministers.

During the Péchiney’s privatization in 1995, 17 millions actions were to be sold at the price of 187 FF (=  $17 \times 11$ ).

The French CNIL (commission nationale de l’informatique et des libertés) has 17 members (law 78-17 on January 6, 1978, article 8).

On August 26, 1997, *Amnesty International* published a report according to which there are 17 sentences to death per day in China.

On April 17, 1997, Brigitte Bardot delivered a racist sentence, which was examined by the 17th criminal court of Paris.

### 3.7 Army

Pearl Harbor was attacked by 17 Japanese squadrons. When the USS Arizona sunk, 1117 members of its crew died, and 334 survived.

The first atomic bomb, prepared by 1700 people, was dropped onto Hiroshima 17 seconds late (*France 2* news on August 6, 1995, at 8 pm).

Gandhi was assassinated on January 30, 1948, at 17:17.

On November 17, 1972 ( $1972 = 17 \times 116$ ), General Peron went back to Argentina, after a 17-year exile.

Parallel 17 divided North and South Vietnam. Cf

<http://www.nova.edu/Inter-Links/fun/puzzles/language>

The Lebanon war lasted 17 years: 1975-1992.

In 1993, 4 French tourists had been detained hostage by Kurds in Turkey for 17 days. On January 25, 1996, 17 French tourists have been abducted by a tribe in Yemen.

Jean Hatzfeld was 17 times on a drip (cf his book *L’air de la guerre*, p 147).

There were 17 injured people in the bomb attack on August 17, 1995, at 17, in Paris. There was another bomb attack on October 17: anniversary of the slaughter of Algerian demonstrators in 1961 ( $34 = 2 \times 17$  years ago), cf *Infomatin*.

17,000 children have been killed in Bosnia from 1992 to 1995. In average 17 people were killed each day in Sarajevo during the war (*France-Inter*, December 14, 1995, “Le Téléphone Sonne”).

The I.R.A. bomb attack in London early in February 1996 took place after a 17-month ceasefire.

On February 11, 1996, 17 people (finally 18) were killed in a bomb attack in Algeria. 17 communal guards were killed on July 10, 1996 in Algeria; the communal guard, about 17,000 men, was created to support the security forces in the fight against the Islamists (source: *France 2*, teletext, July 12, 1996).

On September 4, 1996, the USA launched 17 missiles against Iraq.

In the U.S.A., there are 17 treating plants put in charge of reducing the nuclear warheads. At the climax of the Cold War, it was estimated that each camp could kill the whole opposing population 17 times with their nuclear weapons. Source: documentary *Le démantèlement des armes nucléaires* on the French channel *Planète*.

### 3.8 Events

17 people died following the Furiani disaster.

The football worldcup 1994 started on June 17, and ended on July 17.

The matches of the football worldcup 1998 will be broadcasted thanks to 17 cameras (source: *La Dépêche du Midi*, September 24, 1997).

The parade of *L'Armada de la Liberté* from Rouen to Le Havre (France) took place on July 17, 1994.

Each year the *Tour de France* goes through *les 17 tournants* (vallée de Chevreuse).

In 1995 there are 17 Grands Prix (they usually are 16): Brazil, Argentina, San Marino, Spain, Monaco, Canada, France, England, Germany, Hungary, Belgium, Italy, Portugal, Europe, Pacific, Japan, Australia.

At the competition Song Eurovision 1995, the ranked-17 country (Russia) had 17 points (at most one country can have its rank equal to its number of points).

In the semifinal of *Trophée Campus* in 1995, Fribourg's team had 17 competitors for the final puzzle, realized in 68 seconds (multiple of 17).

The XIIIth Music Festival of the Vieux Lyon started on November 17, 1995 and lasted 17 days.

17 hostages were killed during the Olympic Games in 1972.

The Olympic Games in Atlanta in 1996 lasted 17 days: from 7/19 to 8/4 (217th day of the year). 197 countries were represented by 10700 athletes. The long jump board reaches the 17-meter domain, though some jumps exceed 18 meters. The bomb attack in the center occurred at 1:17. The paralympic games consisted of 17 sports: archery, athletics, basketball, boccia, cycling, equestrian, fencing, football, goalball, judo, lawn bowls, powerlifting, shooting, swimming, table tennis, tennis, volleyball.

On September 10, 1996, former liner *France* (the biggest and the fastest liner in the world when it was launched), renamed *Norway* in 1979, returned for the first time to Le Havre, which it left 17 years before.

Carl Lewis, regarded as the athlete of the century, had 17 gold medals: 9 in the Olympic Games, 8 times world champion.

### 3.9 News Items

The only American cannibal spent 17 years in prison.

In 1992, a madman who had killed 17 people and kept their remains in his apartment was discovered at Milwaukee.

J.-L. Etienne's expedition on the Erebus had 17 people.

In Waddesdon Manor, a Renaissance-style château built by Baron Ferdinand de Rothschild, 17 rooms were restored (cf *Time*, April 25, 1994).

On *France-Info* on August 19, 1995 (in the morning): "Terrible flood in Morocco, there are dozens of casualties. According to the French consulate, a group of 17 Frenchmen arrived safe and sound yesterday at the consulate, in Marrakech, but we haven't heard from two groups of Frenchmen, among them a group of 17 young men."

In the *Figaro*, August 26, 1995: a worker got almost unharmed out of a fall from the 17th floor.

Seen in Canada NewsWire [translated from French]: *TORONTO, January 2 – In 1996, all the vehicles imported to Canada will have to have an identifying number (NIV) exclusive to each vehicle*

allowing to distinguish it from the other vehicles in the world. This requirement is current since the early 80's within the context of road safety, in the U.S.A. and in Canada. Most of current vehicles have an alphanumeric number consisting of 17 digits; for those who don't have it, it will be more difficult to enter Canada.

Seen in Canada NewsWire [translated from French]: *JAKARTA, January 17 – Seventeen companies from Ontario belonging to the commercial mission Equipe Canada have concluded new agreements today within the context of a signature ceremony in Indonesia.*

Two of the most important earthquakes in 1994 and 1995 occurred on January 17: on January 17, 1994 in California (Los Angeles), and on January 17, 1995 in Japan (Kobe). In the two cases, the latitude was  $34^\circ$  ( $= 2 \times 17$ ), and the longitudes were  $-118^\circ$  and  $135^\circ$  respectively ( $-118 + 135 = 17$ ).

*France 2*, teletext, on July 17, 1996: it took 17 years to a British woman to realize that her husband actually was a woman, who used “an artificial penis”.

Sunday August 18, 1996: Metro Police detectives nabbed a man and his girlfriend and charged them with 17 counts of robbery. This same man, in 1986, was a Brinks truck driver, and at that time stole 17 sacks of money from the truck.

*France 2*, teletext, on November 17, 1996: Istanbul: 17 people killed in a fire; bomb attack in Dagestan: 17 people killed.

*France 2*, teletext, on March 31, 1997: On Sunday March 30, 1997, a jumbo from British Airways flew from New-York to London with only one passenger on board, a 33-year-old businessman. The 17 stewards who usually take care of the 426 passengers that the plane can take were entirely devoted to him. The flight had been late because of a power failure and all the other passengers had preferred to take another plane not to be late.

*France 2*, teletext, on June 13, 1997: A 17-meter high fairground roundabout was stolen in the Netherlands. . .

*France 2*, teletext, on September 13, 1997: A 36-year-old British successfully underwent an operation consisting in removing her head from her spinal column then putting it back to correct its orientation. Bridget Fudgelle was suffering from a bone deformation that compelled her to permanently keep her head bended down and turned to the left. The operation lasted 17 hours, after which the surgeon put the head back by fixing it with a metallic plate and two screws.

### 3.10 Records

The world record of sitting in ketchup is 17 hours.

The Rhone floods in October 1993 have been the 3rd of this importance for 153 years (153: sum of the first 17 positive integers).

On January 8, 1994, the French TGV spent 17 hours to go from Paris to Nice!

Chicago hit a new record low on January 18, 1994, of  $-17^\circ\text{F}$ .

Jeanne Calment, the France's oldest citizen, celebrated her 119th ( $= 7 \times 17$ ) birthday on February 21, 1994; she has outlived 17 presidents.

In 1987, Hideaki Tomoyori recited 40,000 digits of  $\pi$  in 17 hours.

The bridge *Vasco da Gama* in Portugal, the most important of Europe, is 17-km long.

### 3.11 Other Subjects

There were 17 failed attempts of the crossing of the Atlantic by balloon, before the Spirit of St-Louis succeeded.

In India, 17 languages are spoken.

In France, you have to dial 17 to call the police. The *yellow* pages of the phone book are consulted 17 billions times a year. There are 17 towns in the world with more phone numbers than inhabitants.

Diderot and d'Alembert's Encyclopedia has 17 volumes with texts. Larousse encyclopedia has 17 volumes.

Planet Hollywood (the new Hard Rock Café in New-York) is open 17 hours a day (10h-3h). A meal costs \$17 on average.

A survey shows that 17-year-old American boys think about sex every 17 seconds on average.

17-year-old girls possess (on the average) 17 square feet of skin.

A ton of recycled paper allows to save 17 trees.

In the lycée Pierre de Fermat at Toulouse, the new chemistry room contains 17 work posts (parts of tables).

The entrance examination for France's Ecole Polytechnique 1992 was composed of 17 questions.

There are 17 methods of strangulation (cf P. Salvadori's film *Cible émovante*).

In the game of *Diplomacy*, there are 34 supply centers. In a 2-way draw they must be split 17-17.

In France, in the highway code test, there is a test called "perfo test", which consists in punching a card. On the first side of this card, there are 17 questions.

The word *humuhumunukunukuapua* (state fish of Hawaii) does not have any vowel other than "u" until its 17th letter.

A champagne flute holds 17 cl.

The Tower Bridge in London can hold 17 tons.

17 is the smallest number (non-negative integer) that is written in French as a compound word: *dix-sept*.

There are 17 boarding gates at Toulouse-Blagnac airport.

The White House is on the 17th street in Washington.

In a laundrette in La Panne (first Belgian town on the coastline after the France-Belgium frontier), there are 17 washing machines (June 13, 1995).

From a postcard:

Seventeen reasons to live in the Midwest:

1. pot roast every Sunday
2. best pesticide commercials in the country
3. free and available parking
4. wholesome, unjaded youth
5. more Catholics than you can shake a stick at
6. freedom from fear of falling off the edge of the continent
7. access to little-known fine beers such as Schaeffer, Hudepohl and Stag
8. dynamite homegrown
9. birthplace and still best place for jazz
10. no typhoons
11. the people are mostly good eggs
12. no big hills to climb so better gas mileage
13. greater chance of seeing UFOs
14. quaint native customs – tractor pulling, flag waving and cow tipping
15. basketball is at least as important as football
16. lots of silos and barns for pastoral landscape painters
17. home of Bunny Bread – “That’s what ah said...”

The Invalides have 17 yards.

There are 17 round trip TGVs a day between Paris and Bordeaux, they take 177 minutes (cf an SNCF advertisement in September 1995).

The French word *chauvin* comes from Chauvin, a very patriotic soldier of Napoleon’s, who was injured 17 times. In fact, it is only a legend.

In the FAQ *Bookstores in Western North American Cities* ([rec.arts.books](#)): *And elsewhere in Washington: [...] Old London Bookstore (111 Central Ave, Bellingham, 360-733-7273). A seventeen-room historical mansion in the dead center of town. Entire rooms on everything you can imagine, SF, mysteries, philosophy, archeology, “the classics”, you name it. Every room in the house except the bathroom is floor-to-ceiling, wall-to-wall used hardcover books. There are chairs and lamps scattered about for customers to use to do a little reading, and the owners frequently serve finger foods and tea/coffee. The store is also the owner’s home (you have to walk around the bed to view the shelves of books in the bedroom) so it isn’t just a walk-in type place. Someone is home most times, but you’ll need to call ahead to make sure it’s okay to come by. You’ve got to see this place to believe it.*

Brigham Young, the successor of the Mormons founder, had 17 wives (and 56 children). Cf *Le Figaro*, November 18, 1995.

There are 17 power stations in France (cf *France-Inter*, December 4 or 5, 1995).

There are 17,000 post offices in France (cf *Livret A*, 1989).

In the 3rd issue of the magazine *Ouverture* (December 1995) published by the Association des clients de la Banque Populaire Toulouse-Pyrénées, the recipe of the club *le Rendez-vous des Gourmets*: Take 17 members living in or near Toulouse...

The *WonderWine* (Canadian powdered wine) costs \$17 (*Nulle part ailleurs*, on January 2, 1996).

In Ireland, there is a Bed and Breakfast called *Seventeen*. Its address is: 17 Sea Road, Galway, Ireland. Cf

<http://www.galway-guide.com/pages/seventeen>

About 17,000 billion francs are exchanged each day on the monetary markets (according to an article posted to `fr.soc.divers` on March 13, 1996).

There are 17 cinemas in Lyon, suburbs not included (cf *Lyon Poche*): *Ambiance*, *Astoria-UGC*, *Ciface Bellecombe*, *Cifa St Denis*, *Le cinéma*, *Cinéma Opéra*, *CNP Bellecour*, *CNP Odéon*, *CNP Terreaux*, *Comœdia-UGC*, *Fourmi Lafayette*, *Institut Lumière*, *Les 8 NEF*, *Cinéjournal*, *Pathé*, *U.G.C. Part-Dieu 2*, *U.G.C. Part-Dieu 4*.

Disneyland opened on July 17, 1955 (1955: divisible by 17).

In Lebanon, there are 17 legally recognized religions: 5 Islamic groups, 11 Christian groups (4 Orthodox, 6 Catholic, 1 Protestant) and 1 Judaic group.

The roof of the terminal building of the Denver International Airport (DIA) is formed into 34 peaks (17 on each side) to represent Colorado's majestic Rocky Mountains. The DIA occupies 34,000 acres and serves 17 airlines. Cf

<http://infodenver.denver.co.us/~aviation/diaintro.html>

In Spain there are 17 autonomous regions.

*France 2*, teletext, on September 15, 1996: DHL wish they establish on Strasbourg-Entzheim airport; this would create 1,700 jobs and 17 flights per night are scheduled.

In the game of go, the maximum number of handicap pieces for the black side is 17 (cf gnu go).

On September 27, 1996, at the question "Pouvez-vous citer quelques films de chevet?" of a poll in the newsgroup `fr.rec.cinema.discussion`, someone answers in 17 lines and writes "voilà, 17 lignes, record à battre :-)".

From an article posted to the newsgroups `fr.soc.divers` and `fr.soc.politique` on October 1, 1996 (translated from French):

```
>>I propose that teachers do 40 h/week for classes
>>from 12 to 17 pupils max for their pupils' good.
>>And you?
>They'll prefer 17h with 40 pupils to 40h with 17 pupils!
>Aren't mad!
I rather believe that they prefer 17h with 17 pupils...
```

The 17th letter Q occurs with frequency .17% in English.

From the French magazine *Figaro Madame*, June 1, 1996: *The Village is a very smart camping site. A real private club with 17 tents (50m<sup>2</sup>) and terraces. For two years, they have been made of wood: they have been called the "chalets". It is more intimate. 17 companies have their summer quarters there. The same ones since 1980, except chalet Rado Watch, which has replaced Seiko's for three years...*

In Loto7, one can win 17 FF, 177 FF, 1777 FF, etc...

The shop at the 17 rue Etienne Marcel in Paris is called *le 17*.

In `rec.puzzles` archives (trivia):

Q: What is alive, green, lives all over the world, and has seventeen legs?

A: Grass. I lied about the legs.

In the heart of the Monterey Peninsula, California, there is a scenic tour called the 17-Mile Drive.

No other stretch of land offers the natural wonder and solace of 17-Mile Drive at Pebble Beach.

The magnificent scenic tour hugs the dramatic Pebble Beach coastline and delves deep into the 5,000-acre Del Monte Forest.

You'll marvel at The Lone Cypress, Seal and Bird Rocks, Fanshell Beach, Point Joe and Carmel Bay. You will be inspired by the natural wonders as you travel this showcase of glorious sights set against the rolling surf and nestled amid protective canopies of cypress.

Along the way, you'll encounter the emerald fairways of such famous golf courses as The Links at Spanish Bay, Spyglass Hill and the world-renowned Pebble Beach Golf Links.

Tranquil gatherings of gentle deer, frolicking sealife and enterprising birds will entertain you. You'll see black cormorants, brown pelicans, California sea otters and lazy sea lions in their natural habitat.

Colorful wildflowers dot the scene, adorning the cool, soothing hues of the seashore and dunescape.

This spectacular natural setting is enhanced by manmade beauty that includes two lovely hotels, many fine restaurants, the only Ansel Adams Gallery outside Yosemite Park and unique retail shops.

You'll satisfy all your desires as you dine at our seven fabulous restaurants. Or stop by The Pebble Beach Market, where you'll enjoy a gourmet lunch on the lawn.

Then browse through The Lodge retail promenade with over 11 shops or walk down to the legendary 18th green of Pebble Beach Golf Links.

Visit scenic perfection today on Pebble Beach's 17-Mile Drive.

The big lounge of the city hall of Lyon has 17 chandeliers.

## 4 Literature, Films, . . .

### 4.1 Literature

In Homer's *Odyssey*, Ulysses travelled to Pheacia for 17 days (canto V, verse 278; canto VII, verse 267).

By the end of Barjavel's book *Ravage*, François and Blanche have 17 children.

In Arthur C. Clarke's *Rama II*, the scientific team had their first incident after 17 days (chapter 3). There are 17 restaurants in the shopping mall of the DTC.

In Agatha Christie's book *The Man in the Brown Suit*: the heroine had 87 pounds and 17 shillings left (chapter 2); on the paper the heroine had picked up, it was written "17.122 Kilmorden Castle" (chapter 3). The Kilmorden-Castle left on January 17, 1922 (chapter 7). The heroine and two other passengers quarrelled to have the cabin 17 (chapter 9).

In Bernard Clavel's book *Harricana* (first volume of the saga *Le Royaume du Nord*): The Robillards settle in the far North, on a railway building site. They plan to open a shop and the first train is to bring them their first delivery: 17 boxes (chapter 32).

One of the characters of Gene Wolfe's book *The Book of the New Sun, Shadow of the Torturer* is called Cadroe of the Seventeen Stones.

In Jean-Marie Laclavetine's book *Demain la veille*, Hélène had 17 babies (cf page 67, éd. Gallimard).

Here are two references from Georges Perec's *Cantatrix Sopranica L.*:

- Lai, A. & Chou, O. Dix-sept recettes faciles au chou et à l’ail. I. Avec des tomates. J. Ass. philharmon. Vet. lang. fr. 3, 1–99, 1931a.
- Lai, A. & Chou, O. Dix-sept recettes faciles au chou et à l’ail. II. Avec d’autres tomates. J. Ass. philharmon. Vet. lang. fr. 3, 100–1, 1931b.

About a book, *In My Father’s Study*, written by Ben Orlove: “I recently wrote a book in which the number 17 plays an important role. It’s a memoir about my father. Sample 17-items include collages of “found poems” (textes trouvés, like objets trouvés) and a suitcase whose lock is set to the combination 818,  $8 + 1 + 8 = 17$ .” The book costs \$17.

In Bram Stoker’s *Dracula*: Mina Harker’s journal, 29 September: *He accordingly set the phonograph at a slow pace, and I began to typewrite from the beginning of the seventeenth cylinder.*

There are 8 references to 17 in Charles Darwin’s *The Voyage of the Beagle*. The only 17 that is not a distance or time measure occurs at chapter V: *Azara states, that a female in a state of domestication laid seventeen eggs, each at the interval of three days one from another.*

In Frédéric Fajardie’s book *L’homme de Berlin*, page 17 (ed. NéO): “[Jean-Yves Lascot] tourna crânement, et coup sur coup, deux courts métrages qui totalisèrent dix-sept spectateurs.” and “puisque “les autres”, c’est-à-dire la totalité de la planète — moins dix-sept —, n’étaient qu’un “tas de cons” incapables de le comprendre”.

Simenon’s book *Le passager du Polarhys* had had the initial title *Quai 17* (source: *Lire* 240, November 1995).

André Breton wrote a book *Arcane 17*.

In Kundera’s book *La lenteur*: “Le prince Charles d’Angleterre n’a aucun pouvoir, aucune liberté, mais une immense gloire: ni dans la forêt vierge ni dans sa baignoire cachée dans un bunker au dix-septième sous-sol il ne peut échapper aux yeux qui le poursuivent et le reconnaissent.”

## 4.2 Comic Strips

### 4.2.1 W. Vance and J. Van Hamme’s *XIII*

In *Le jour du Soleil Noir* (vol. 1), page 21: Kim Rowland lives at 612 (=  $36 \times 17$ ), 17th street, in Eastown; page 37: the film was shot 3 months and 17 days ago.

In *Là où va l’Indien* (vol. 2), page 24: 17 is written on the shelves; page 43: Kim Rowland has the number XVII.

### 4.2.2 *Achille Talon*

In *Achille Talon, Le Roi des Zôtres*: page 17B: the castle has 17 radars; page 18A: the king’s schedule starts at 17 (bedtime at 22:17); page 21B: King Abzkon XIII wants to edge his way into his little secret passage number 17; page 39A: Prumpf says “Could you tell me whether the bus number 17 follows the route which is suitable for me?”

In *Achille Talon et le trésor de virgule*: page 13B: “Our only prohibition is that the law allows us not to serve you after the 17th drink!”; page 39A: “My colonel, the hole number 17 is finished. . .”

### 4.2.3 *Tintin*

In *L’oreille cassée*, Tortilla occupies the cabin 17 on the ship *Ville de Lyon*.

In *Les 7 boules de cristal*, children find Tournesol’s hat at port St Nazaire, on quay 17.

### 4.3 Films, TV

In the film *Mary Poppins*, the children live at the 17.

In the film *Peur sur la ville*, the first victim falls from the window of her apartment on 17th floor.

In the film *Le gendarme à New York*: the Italian policemen scored 17 goals to the French policemen at the table football; Ludovic Cruchot had the number 17 at baseball; the number of the return plane was 017.

In the film *La Grande Vadrouille*, the musicians must resume at the 17th bar.

At the end of the film *A Fish Called Wanda*, Wanda and Archie married in Rio and had 17 children.

In the film *Blade Runner*, Leon is the NGMAC41717, and was brought into service in 2017.

In the film *Flash Gordon*, the only quoted article from Ming's law is the article 17.

In the film *Gremlins*, for a moment Gizmo watches TV: the racing car that one can see has the number 17.

In George Lucas's film *THX 1138*, THX 1138's roommate (who is at the origin of THX's rebellion) has the number LUH 3417. At the very beginning of the film, one can hear: "you deviate 0.17 to the right".

In the film *The Great Escape*, Danny writes down "17" before digging one of the tunnels; someone asks why 17: it is his 17th tunnel.

In the film *L'Etoile du Nord*: Sylvie is in the car 11, compartment 6; Nemrod and his mistress have the room 17 in the hotel; Edouard struck Nemrod to death 17 times with a carafe.

In the film *Jeux interdits*, at the beginning, 17 dead were talked about.

In the film *Le Lyonnais, Vidéo-meurtre*, Irène lives at the 17.

In the film *Angélique et le Roy*, Prince Rakoczi has 17 counties.

In the film *The Island of Dr Moreau*, Braddock is adrift for 17 days.

In Jean-Pierre Mocky's film *Noir comme le souvenir*, 17 years pass between Garance's death and the time at which the film takes place.

In Chris Walas's film *The Fly 2*, the main events take place in block 17.

One of Alfred Hitchcock's film is called *Number Seventeen*. The French title of the film *Foreign correspondent* is *Correspondant 17*.

In the film *The crossing guard*, there is a big red encircled 17 in close-up.

In Walt Disney's film *Dumbo*, Dumbo collapsed a pyramid of 17 elephants.

In the film *Alien<sup>3</sup>*, the first victim was killed in airing pipe 17.

In Stanley Kubrick's film *2001: a Space Odyssey*, Dr Floyd goes into the cabin 17 of the spatial station for his identification; later, he phones and this costs \$1.70. In Arthur C. Clarke's book, the staff of base Clavius consists of 1,700 men and women.

In George Lucas's film *Star Wars*, Obi-Wan Kenobi must pay 17,000 to Han Solo for the trip to Alderande.

In Michael Mann's film *Heat*, the gangland killing before the final face-to-face takes place at the 17th floor.

In the film *Outland*, 17 workers have a police record.

At the beginning of Christian de Chalonges's film *Malevil*: "We have modified this plan 17 times".

In Renny Harlin's film *The Long Kiss Goodnight*, the room of the little girl is room 17.

In Luc Besson's film *The Fifth Element*, Korben's mother left 17 messages on his answering machine.

In Carroll Ballard's film *Fly Away Home*, a 13-year-old girl takes a flock of 17 young orphaned geese under her wing.

At the beginning of Roger Spottiswoode's film *Tomorrow Never Dies*, there were 17 survivors.

In the film *La voie est libre*, an unemployed person takes passengers of the subway hostage after writing, in vain, 17 times to the SNCF (or to the minister) to get a job.

In the film *Caught in the Act* of the new series *The Outer Limits*, there are 17 messages on the answering machine. In *La voix de la raison* [English title?], the two quoted reports from the film *The Sandkings* are reports 17 and 51. In *Stitch in Time*, it is about of an investigation on 17 similar strange murders, and a man who killed 17 women will be executed on a July 17, the day on which the main events of the film take place. In *Resurrection*, the traitor is a GX17. In *Trial by Fire*, 17 minutes remain before the impact when the president of the U.S.A. arrives in the atomic fallout shelter.

In the series *The X-Files*:

- Case # X-1.09-111293, *Space*: "Listen, there are about 17,000 things that may go wrong in the shuttle, and there are about 17,000 people who make sure that it doesn't happen." [translated from French]
- Case # X-1.17-021894 (i.e. the 17th one), *E.B.E.*: 17 UFOs would have been seen in one hour around Fort Benning, Georgia.
- Case # X-1.23-050694, *Roland*: at some moment, Roland counts stars; he reaches 17, then one has the next scene.
- Case # X-2.04-100794, *Sleepless*: the end takes place on the way 17 in a warehouse.
- Case # X-3.08-111795, *Oubliette*: the story takes place 17 years after Lucy escaped from Carl Wades.
- Case # X-3.11-121595, *Revelations*: Kevin must divide 11 by 170. He writes 11, then 17, but at this moment his hands start bleeding.
- Case # X-4.09, *Tunguska (1/2)*: Skinner lives at the 17th floor, where a man will be thrown from.

There is a 17 in one of the films from *Imagina* 1994-95.

At the *Guignols de l'Info* on March 16, 1995: Edouard Balladur fell 17 times in stunt-riding.

#### 4.4 Newspapers and Magazines

In the *Triplés* of the *Figaro* 15,103 (March 6, 1993): "Maman, tu sais, les bébés ça adore les chewing gums! \_ 17, il en a mangé!!" [Mommy, did you know babies love bubble gum? He ate 17.] (with 17 in large letters).

In *Pour la Science* 161 (March 1991), Ian Stewart's *Visions mathématiques*: "These priests are asking me the impossible. If they want a red eclipse, why do they not sacrifice 17 goats themselves to the goddess of hunting? ...".

In the scenario imagined in *Télérama* 2299 (February 2, 1994), there will be 17 news programs in the morning, in 10 years (cf p 61).

On one of the drawings from the *Figaro* of October 7, 1995, there is a car with the number 17.

## 4.5 Internet

Students from E.N.S. Ulm (France) wrote a little story. The narrator's aphasia lasted 17 minutes.

In French, because it is not translatable (found in a French newsgroup): "Comment caresser une femme dans 17 départements à la fois?"

Il faut d'abord trouver une femme dans la Moselle. S'assurer qu'elle est Seine, Gironde et bien en Cher. Lorsque l'on sent son Eure venue, on commence par lui caresser le Haut-Rhin puis on descend vers le Bas-Rhin. On contourne alors l'Aisne pour entrer dans la Creuse. Là, on trouve quelque chose de bien Doubs. Sans perdre le Nord, on attend que ca Vienne et si on ne se débrouille pas comme un Manche, on peut y rester jusqu'à l'Aube. En Somme, il ne s'agit Pas-de-Calais pour être un Hérault."

In a signature: "To express oneself in seventeen syllables if very diffic."

From an article posted to `fr.rec.humour` on February 7, 1996 (translated from French): "It's the story of a Swiss forger (yes, they exist, recently some of them even managed to forge fake coins, so fake that they aren't even accused of forgery, but only of swindle!) In short, our forger prints fake banknotes of 17. Of course everyone refuses his notes. Then he thinks about going to use them in Appenzell (For the non-initiated, Appenzell is a very beautiful place, but comes from another time; the best proof is certainly that it's no more five years since women may vote)... Let's resume... he decides to use them in Appenzell and goes to buy the newspaper in a kiosk. He pays with his note of 17 ... and the employee gives him back a coin of 15."

From an article posted to `fr.rec.humour` on February 11, 1996 (translated from French): "A dwarf had 17 children (it is short but it is good)".

Quotation found in

<http://exp1.wam.umd.edu/~yankovic/quotations.html>

"My mule wouldn't walk in the mud – (sniff) – so I had to put seventeen bullets in 'im" (Willie).

Quotation: "If you paid seventeen dollars for a mailbox and you only got one love letter, it would still be worth it. On the other hand, if you never ever get even one love letter, then you should get your seventeen dollars back... I'd like to speak to the manager please." – Charlie Brown

There is a French Web page devoted to Sherlock Holmes called *Les Dix Sept Marches (The Seventeen Steps)*:

<http://www.interpc.fr/mapage/canevet/holmes/16shaacc.html>

The title of this page comes from *A Scandal in Bohemia*:

"You see, but you do not observe. The distinction is clear. For example, you have frequently seen the steps which lead up from the hall to this room?"

— Frequently.

— How often?

— Well, some hundreds of times.

— Then how many are there?

— How many? I don't know.

— Quite so! You have not observed. And yet you have seen. That is just my point. Now, I know that there are seventeen steps, because I have both seen and observed."

In a signature: "a penny for your thoughts... seventeen cents for your entire brain".

Read in `fr.rec.cinema.discussion`:

```
> Euh ... je serais moins affirmatif mais c'est vrai que ca parle peu de
> films dits "cultes" : par exemple moi c'est Blade Runner (on aime ou
> on aime pas, moi je l'ai vu 17 fois), he ben personne il en parle
> c'est bien dommage :(
```

```
Si, si. Bon, d'accord, je l'ai pas vu 17 fois, mais je vote pour (soyons
catégoriques : par rapport a la Guerre des Etoiles y'a pas photo).
```

## 4.6 Miscellaneous

On <http://www.imagnet.fr/momes/>, *Comptines, chansons et poésies numériques*:

Une et une

Une et une la lune  
Deux et deux les yeux  
Trois et trois les rois  
Quatre et quatre la pâte  
Cinq et cinq les épingles  
Six et six la chemise  
Sept et sept la pastèque  
Huit et huit pomme cuite  
Neuf et neuf grands yeux de bœuf  
Dix et dix la remise  
Onze et onze la demi-once  
Douze et douze la bouse  
Treize et treize la fraise  
Quatorze et quatorze l'arabasse  
(*pomme entière cuite au four*)  
Quinze et quinze la pince  
Seize et seize la grosse caisse  
Dix-sept et dix-sept la musette

*The Cure's* best album is called *Seventeen Seconds*; the refrain says: "Seventeen seconds, a measure of life". One of Winger's songs is called *Seventeen*.

In 1926, Paul Klee created a painting called *Les 17 égarés*.

## 5 My 17's

Around 1985, my phone number was 34 85 24 00: 3 of the 4 components are divisible by 17.

At the E.N.S. Lyon, we had a project of programmation in Scheme to give on October 21, 1993. On October 17, I finished mine, and I decided to read the one of a friend. I saw that his report had been saved on October 17, at 17:17!!

When I went to the LaBRI presentation (in Bordeaux) in February 1994, in the train, the seat 17 (written out of the compartment) had the number 15 inside (and the seat 15 had the number 15). In the hotel, I had the room 17.

On August 17, 1994, I came back by train from Lyon to Toulouse. The first train was to leave Lyon at 17:17. We had to wait for the second train for 17 minutes (the first train was to arrived in Montpellier at 20:36, and the second train was to leave Montpellier at 20:53).

During the summer holidays in 1994, I regularly connected to the E.N.S. with my modem; but there was a line problem, and I had to make several attempts, because the communication was generally cut off after 17 seconds (seen on the phone bill).

On October 14, 1994, other students from the E.N.S. came in my room, with two English girls who had been invited. One of these girls was born on the 17th, the other girl had a 17-pearl necklace. Someone showed me the place of the fridge reserved for the eggs: there were 17 locations for the eggs.

The neighbor facing Redwood, a new computer shop in Lyon, has 17 parrots.

A friend of mine, who is interested in this paper on the 17's, showed me his D.E.A. report: it ends at page 17 and the bibliography is composed of 17 references.

The first article I've posted to the `comp.sys.arm` newsgroup is the article 17.

At the L.I.P. seminar (at the E.N.S. Lyon) on December 14, 1994, examples of irrational numbers were chosen:  $\sqrt{17}$ ,  $\pi$  and  $e$ .

On March 3, 1995, I went to a friend's to see his NeXT. He showed me an application on learning with a neuronal network, where an animal had to learn how to balance a perch. The animal completely learned at its 666th try (it managed to balance the perch for more than 2 min 30 s); 666 is the sum of the squares of the first prime numbers up to 17. Note: the animal usually learns after 200 to 300 tries.

In 1994/95, my phone number at the E.N.S. is 72 72 82 89. All phone numbers start with 72728. For me, the last 3 digits are  $289 = 17^2$ .

In 1995, I do my training period in Denmark. The French guide *Le Petit Futé* for Denmark has the number 17. The only French TV channel that can be received (TV5) has the number 17.

My WWW pages have been opened to the public since July 17, 1995. The HTML version of the list of properties (except the mathematical properties) appeared on November 17, 1995.

On November 13, 1995 at the E.N.S., I played for the first time to the *Algebraic Whist*, a Whist extension being played with a Tarot game + one card (79 cards in total), and a hat for each player. We were 6 and the game was played in 21 turns: 1 card for the first turn, . . . , 10 cards for the tenth turn, a trumpless turn, then one goes downwards, the last turn (with one card) being special (cf below). Points are counted as follows: when a player fulfils his contract, he gets as many points as the number of his tricks; otherwise he loses the difference between his announced number and his actual number of tricks. Now here are the 17's. At the first turn (of my first game), the card that has been turned over to indicates the trump was the 17 magic (the Star, cf section *Symbols*). 6 or 7 turns before the end, I bet that I would arrive at 17. 2 turns before the end, I still was first with 16 points, and the second (Bill Allombert, who, like me, had attended the French U.M.E. organized by Danny Loeb in 1991 and 1992) had 15 points; we might still arrive both at 17. Bill announced 2 and I announced 0, but Bill didn't get 2 tricks. I didn't get a trick, so I stayed at 16. The last turn, as I said, is special: each player puts his card onto his hat without looking at it; thus each one knows the other players' cards, but not his own card. I had to talk first, and I announced 1 (it was the only way to arrive at 17), which was sensible since I knew that none of the other cards was a trump. The next one to talk (he was ranked last with  $-16$  points) announced 1 too. Eventually I got the trick, so that I arrived first with 17 points, and the last one had  $-17$  points.

There are 17 P.J.'s in the 1995/96 Amber campaign at the E.N.S.

In 1995, there are (at least) two new newspapers at the E.N.S.: *Le Gros Rouge* and *L'éphémère*. On the first issue of the *Gros Rouge*, the date is October 17, 1995 (in fact, it was brought out much later, but they forgot to change the date). In the second issue of the *éphémère* (I don't have the first issue), it is written that the deadline to send articles for the next issue is December 17.

In January 1996, at the exam of *Architectures Temps Réel* (Real Time Architectures) of the D.E.A. Informatique de Lyon, 3rd part: the exercise dealt with periodic tasks and one sporadic task; this task issued its request at the time  $t = 17$ .

At the course *métaconnaissances* of the D.E.A. Informatique de Lyon, we were given the paper of Master's degree exam of the previous year; there was an example of an integer: it was 17. The last problem at the exam was: *Let  $N_1$  be the mark you'll have for the previous questions. Let  $N_2$  be an integer in the range of 0 to 17. Your mark for this 4th problem will be:  $3 - (3|N_1 - N_2|/17)$  in the general case,  $2.5 - (3|N_1 - N_2|/17)$  if  $N_2$  is in the range 8-9 but not  $N_1$ . What is  $N_2$ ?*

At the written session of the D.E.A., I'm 17th out of  $34 = 2 \times 17$ . The median is divisible by 17.

I took my 1000th meal at the E.N.S. restaurant on February 17, 1996 (the 1000th meal is important, for one goes round the counter).

There are 17 seats in the L.I.P. "coffeeroom". They were changed late in 1995; before they were also 17.

For my training period of the D.E.A., I have to implement some algorithms of multiple precision multiplication. With my program, the classical algorithm in  $n^2$  is better than Karatsuba's algorithm up to a size of 17 words, where a word is a 50-bit integer.

The identifier of my site [http://www.ens-lyon.fr/~vlefevre/yp17\\_fra.html](http://www.ens-lyon.fr/~vlefevre/yp17_fra.html) for the Webs d'Or 96 is  $1207 = 17 \times 71$ .

On June 20, 1996, at 16:45, someone wanted to phone me (but I wasn't there) and let the phone ring 17 times.

In 1996/97, the registration paper for the Université Claude Bernard Lyon 1 (France) has 17 frames to fill in.

I was the 17th to sign Mirko Vidovic's *Livre d'Or*.

I was the 17th to sign the petition (<http://www.mygale.org/09/petition/>) to protest against France Télécom.

On March 22, 1997, I went to a coding-party by train. I had the seat 71 in coach 17. The train for the return journey left from line 17.

## 6 Mathematical Properties

### Property 1

17 is the only prime number which is the sum of four consecutive primes:

$$17 = 2 + 3 + 5 + 7$$

### Property 2

17 is the exponent of the 6th Mersenne prime.

### Property 3

17 is the 3rd Fermat prime.

### Property 4

Therefore the regular 17-gon is constructible with a ruler and compasses.

### Property 5 (Les nombres remarquables - F. Le Lionnais - Hermann)

The ring of the integers of the real quadratic field  $\mathbb{Q}(\sqrt{17})$  is euclidian, thus factorial.

### Property 6 (Les nombres remarquables - F. Le Lionnais - Hermann)

The ring of the integers of the cyclotomic field  $\mathbb{Q}(\xi_{17})$  is factorial.

### Property 7 (Les nombres remarquables, and M. J. Zenger, The "Number of Mathematics")

17 is the fifth Euler lucky number, i.e.  $n^2 + n + 17$  is prime for all  $0 \leq n < 16$ .

If you write numbers in a spiral starting with 17, the first 16 on the diagonal 17-19 are prime; the 17th is of course 289.

The last produced prime is 257, the number which succeeds 17 as a Fermat prime.

### Property 8 (Les nombres remarquables - F. Le Lionnais - Hermann)

17 is the largest integer  $n$  such that there exists  $n$  real numbers  $0 < a_1, a_2, \dots, a_n < 1$  such that for all  $k \leq n$ , the first  $k$  numbers are in different intervals  $[\frac{i-1}{k}; \frac{i}{k}]$ , with  $i \leq k$  (largest solution to the Steinhaus problem). Cf E. R. Berlekamp and R. L. Graham, Irregularities in the Distributions of Finite Sequences, *Journal of Number Theory*, 2, pp. 152–161, 1970.

**Property 9 (Les nombres remarquables - F. Le Lionnais - Hermann)**

17 is the length of the longest known (in 1977) arithmetic progression such that all its terms are primes. The first term is 3,430,751,869 and the difference is 87,297,210 ( $= 17 \cdot 5,135,130$ ). (S. Weintraub, Seventeen primes in arithmetic progression, *Math. Comput.* 31, 1977, 1030)

**Property 10 (Les nombres remarquables - F. Le Lionnais - Hermann)**

There are 17 crystallographic groups of the plane.

**Property 11 (Jouer jeux mathématiques 3, p 16)**

An integer  $n$  greater than 4 is given. One tries to obtain  $n$  with numbers 1, 2, 3, 4, in any order, with the operations  $+$ ,  $-$ ,  $\times$ ,  $\div$ , and with brackets, then with 2, 3, 4, 5, then with 3, 4, 5, 6, and so on, until there is a number  $k$  for which one can't obtain  $n$  with  $k, k + 1, k + 2, k + 3$ . For instance, if  $n = 28$ , one has  $(1 + 2 \times 3) \times 4 = 28$ ,  $(2 \times 5 - 3) \times 4 = 28$ ,  $4 \times (5 + 6 \div 3) = 28, \dots$  The number  $k$  is maximal for  $n = 17$  (one can obtain 13 equalities).

**Property 12 (Bilboquet Hebdo 4 - January 17, 1992)**

One considers a complete unoriented graph with  $n$  vertices. The edges are colored with 3 colors. For  $n \geq 17$ , one can always find 3 vertices linked by edges of the same color (this property is not true for  $n < 17$ ).

17 is the minimal number of people who have to be invited to be sure that 3 of them like each other, 3 of them hate each other or 3 of them do not know each other.

**Property 13 (\*)**

41,616 is a triangular number and a square:

$$41,616 = \frac{17^2(17^2 - 1)}{2} = (12 \cdot 17)^2$$

**Property 14 (\*)**

$$\tan x = x + \frac{1}{3}x^3 + \frac{2}{15}x^5 + \frac{17}{315}x^7 + o(x^7)$$

**Property 15 (Monte J. Zenger, The “Number of Mathematics”)**

The sum of the digits of  $17^3$  is equal to 17:

$$17^3 = 4,913 \quad \text{and} \quad 4 + 9 + 1 + 3 = 17$$

The only other numbers having this property are: 0, 1, 8, 18, 26 and 27, but 17 is the only prime.

**Property 16 (\*)**

Let  $F(n)$  be the  $n$ -th Fibonacci number:

$$F(0) = 0, \quad F(1) = 1, \quad F(n) = F(n - 1) + F(n - 2)$$

and  $S(n)$  the sum of the digits of  $n$  (written in the decimal base). One has:

$$S(F(17)) = 22 \quad \text{and} \quad S(F(22)) = 17$$

17 is the smallest number in such a couple of different numbers.

**Property 17 (\*)**

$17^6$  is written in base 10 using 8 different digits: 24,137,569. This is way there are many integers  $n$  for which the sum of the  $n$ -th powers of its digits is divisible by 17 (2, 3, 4, 6, 8, 10, 12, 14, plus a multiple of 16).

The even solutions less than 15 are explained by the following theorem (applied with  $p = 17$  and  $n = 1$ ): if  $p$  is a prime number, and  $\alpha$  an integer such that  $p > n\alpha + 1$ , then

$$\sum_{k=n}^p \binom{k}{n}^\alpha \equiv 0 \pmod{p}$$

cf my article *Triangle de Pascal dans  $\mathbb{Z}/p\mathbb{Z}$  avec  $p$  premier* on my web pages or in *Quadrature* 12 (May/June 1992), pp 41-42.

The fact that one can add a multiple of 16 to a solution is due to Fermat's theorem and to the primality of 17.

If the digits of odd rank are taken, one obtains a multiple of 17:

$$2,176 = 17 \cdot 2^7 (1 + 7 + 2 + 7 = 17)$$

$$\log(17^6) = 16.99928 \dots \approx 17$$

**Property 18 (\*)**

The  $n$ -th triangular and square number is:

$$\frac{(17 + 12\sqrt{2})^n + (17 - 12\sqrt{2})^n - 2}{17 + 17 - 2}$$

**Property 19 (Bilboquet Hebdo 4 - January 17, 1992)**

17 is the smallest integer which can be written as a sum of a square and a cube in two different ways:

$$17 = 3^2 + 2^3 = 4^2 + 1^3$$

**Property 20 (Bilboquet Hebdo 4 - January 17, 1992)**

Every convex polyhedron has at least one stable face (i.e. a face on which the polyhedron can stay motionless). A polyhedron must have at least 17 faces to attain this bound.

**Property 21 (Bilboquet Hebdo 4 - January 17, 1992)**

There are 17 ways of surrounding a point with regular polygons (positions differing by a permutation of the polygons are counted only once).

**Property 22 (Bilboquet Hebdo 4 - January 17, 1992)**

To convert degrees to radians, you have to multiply by 0.017 (approached value).

**Property 23 (Théorie des corps - J.-C. Carrega - Hermann)**

$$\cos \frac{2\pi}{17} = \frac{-1 + \sqrt{17} + \sqrt{34 - 2\sqrt{17}} + \sqrt{68 + 12\sqrt{17} + 2(-1 + \sqrt{17})\sqrt{34 - 2\sqrt{17}} - 16\sqrt{34 + 2\sqrt{17}}}}{16}$$

**Property 24 (\*)**

17 is the largest prime factor of the smallest Carmichael number.

**Property 25 (\*)**

(8;15;17) is the third Pythagorean triplet having coprime terms.

**Property 26**

The *class* of a number, defined by Kummer, can be set as follows:

$$h = \frac{|P|}{(2\lambda)^{\mu-1}} h_2 \quad \text{with} \quad \mu = \frac{\lambda - 1}{2}$$

(cf Edwards' book *Fermat's Last Theorem*). For  $\lambda = 37$ , the first irregular prime,  $\mu - 1 = 17$ .

**Property 27 (\*)**

17 is the only integer  $n$  such that  $n^n$  hasn't less than 3 digits and the sum of the first 3 digits of  $n^n$  (written in the decimal base) is equal to  $n$ .

**Property 28 (\*)**

Let  $f(k)$  be the smallest number  $n$  such that  $n!$  has at least  $k$  distinct digits in base 10 ( $1 \leq k \leq 10$ ). 17 appears twice:  $f(8) = f(9) = 17$ ; the other numbers appear less than twice.

**Property 29**

Construct an isocles right-angled triangle with legs of length one; the length of the hypotenuse is  $\sqrt{2}$ . Then, construct on the hypotenuse another right-angled triangle whose edges are  $\sqrt{2}$ , 1 and  $\sqrt{3}$  long. And so on. . . construct on the hypotenuse of the last triangle a new right-angled triangle whose edges are  $\sqrt{n}$ , 1 and  $\sqrt{n+1}$  long (always turning in the same way). In this way, we construct all the square roots of the integers until 17. But, for 18, the last triangle overlaps the first one.

**Property 30**

Take any cubic equation. Take a point along the curve and draw its tangent, extending it to another point on the curve. The area between that line segment, the perpendicular to the line drawn through the second point of intersection and the curve is exactly  $1/17$  of the total area under that line.

**Property 31**

17 is the average of the first two perfect numbers (6 and 28).

**Property 32**

Pythagoras thought that 17 brought ill luck because it is between a square (16) and the double of a square (18), or because it lies midway between 16 and 18, the only perfect numbers, meaning that the perimeter and area of a rectangle can equal only these integral values at the same time.

**Property 33**

The largest prime less than 1,000,000 is 999,983 (= 1,000,000 - 17).

**Property 34**

In bridge, a hand contains 10 points on average. But the variance (i.e. the square of the standard deviation) is  $17 + 1/17$ .

**Property 35**

Ptolemy approximated  $\pi$  as  $3 + \frac{17}{120}$ . Later, Viale improved this by considering the regular  $3 \cdot 2^{17}$ -gon.

**Property 36**

The probability of having a pair by choosing two cards randomly among 52 cards is  $3/51 = 1/17$ .

**Property 37 (\*)**

$\frac{17}{\log 17}$  is close to an integer:

$$\frac{17}{\log 17} = 6.00025 \dots \approx 6$$

The next integer giving a smaller difference is 163.

**Property 38 (Les nombres remarquables - F. Le Lionnais - Hermann)**

$$\zeta(4) = \sum_{n=1}^{\infty} \frac{1}{n^4} = \frac{\pi^4}{90} = \frac{36}{17} \sum_{n=1}^{\infty} \frac{1}{n^4 \binom{2n}{n}}$$

**Property 39 (\*)**

17 colors are sufficient to color a map defined on a surface of genus 17. And there exists a map for which 17 colors are necessary. The following formula is used:

$$k = \left\lceil \frac{7 + \sqrt{1 + 48g}}{2} \right\rceil$$

**Property 40 (\*)**

$$4^{17} = 17,179,869,184$$

**Property 41 (\*)**

$$17^4 = 83,521$$

1, 2, 3, 5 and 8 are the Fibonacci numbers composed of only one digit (in the decimal base).

**Property 42 (\*)**

$$17^5 = 1,419,857$$

The rational number  $\frac{8,571,419}{9,999,999} = 0.85714198571419857 \dots$  is very close to  $\frac{6}{7}$ .

**Property 43 (\*)**

$$\text{If } f(n) = \sum_{i=1}^n \sqrt[i]{i}, f(15) = 17.00136\dots$$

**Property 44 (\*)**

In an hour (60 minutes), there are 17 primes (i.e. there are 17 primes less than 60).

**Property 45 (\*)**

Let  $n$  be an integer greater than 1. Consider the number formed by writing successively the first  $n$  primes (in the decimal base). 17 is the smallest integer  $n$  such that this number is divisible by  $n$ .

**Property 46 (\*)**

17 is the smallest prime number  $n$  such that neither  $2n + 1$  nor  $4n + 1$  is a prime.

**Property 47 (\*)**

17 is the smallest positive integer  $p$  such that  $222k + p$  is a prime for all  $0 \leq k \leq 3$ . Moreover, if  $222k + p$  is a prime for all  $0 \leq k \leq 3$ , then for  $k = 4$ ,  $222k + p$  can't be a prime (because 222 is not a multiple of 5). The second integer  $p$  having this property is 157 (look at the first and the last digits!).

17 is also the smallest positive integer  $p$  such that  $402k + p$  is a prime for all  $0 \leq k \leq 3$ . Like for  $n = 222$ , if  $402k + p$  is a prime for all  $0 \leq k \leq 3$ , then for  $k = 4$ ,  $402k + p$  can't be a prime. But here, for  $k = 5$ ,  $402k + 17$  is a prime. The second integer  $p$  such that  $402k + p$  is a prime for all  $k \in \{0, 1, 2, 3, 5\}$  is 1997 (look again at the first and the last digits!);  $402k + 1997$  is also a prime for  $k = 6$ , but not for  $k = 7$  because it is divisible by 17.

**Property 48 (\*)**

17 and continued fractions

- $1 + \frac{17}{22}$  is a convergent of  $\pi^{1/2}$ .
- $\frac{28}{17}$  is a convergent of  $e^{1/2}$ .
- $1 + \frac{17}{43}$  is a convergent of  $e^{1/3}$ .
- The first 5 partial quotients of  $e^{1/6}$  and  $17^{1/17}$  are 1, 5, 1, 1, 17.
- $\frac{17}{6}$  is a convergent of  $\log 17$ . The next one is  $\frac{3,924}{1,385}$ . The first 5 partial quotients of  $\log 17$  are 1, 4, 2, 1, 17.
- $\frac{17}{23}$  is a convergent of the solution to the equation  $\cos x = x$  (the next one is  $\frac{694}{939}$ ).

**Property 49 (\*)**

$$\sqrt[3]{17} \approx \frac{18}{7}, \text{ because } 18^3 - 1 = (18 - 1)(1 + 18 + 18^2) = 17 \cdot 7^3.$$

**Property 50 (\*)**

$$92\pi \approx 17^2 \quad \text{and} \quad \frac{\pi^5}{18} \approx 17$$

**Property 51 (\*)**

$$(1 + 17 + 17^2 + 17^3)^{1/4} \approx \frac{17}{2} \quad (\text{because } 17 - 1 = 2^4)$$

**Property 52 (\*)**

$$\log n! \leq 2n \Leftrightarrow n \leq 17$$

**Property 53 (\*)**

There are 17 ways of paying 100 FF with coins of 2 FF and 3 FF (H.E.C. problem – France).

**Property 54 (\*)**

Consider the sum of the even rank digits and the sum of the odd rank ones of a number divisible by 11, written (in the decimal base) with the 10 digits 0, 1, 2, 3, 4, 5, 6, 7, 8, 9 (each once). One of these two sums is equal to 17 (the other is equal to 28).

**Property 55 (Tangente 24, p 19)**

In phenomena of directed percolation, close to the threshold, the propagation speed is proportional to the distance to the threshold raised to a power near 0.17.

**Property 56 (\*)**

Let  $n$  be a positive integer and  $F(n)$  the smallest positive number (if it exists) which is not a palindrome such that the  $F(n)$  and the number obtained by reading  $F(n)$  from right to left (in the decimal base) are both divisible by  $n$ . 17 is the smallest integer  $n$  which does not divide 10 such that  $F(n)$  is divisible by  $n^2$ . 17 is also the smallest integer  $n$  such that  $F(n)$  is a square.

**Property 57 (\*)**

Let  $\Phi(n) = 1 + \sum_{k=1}^n \phi(k)$ , where  $\phi$  is Euler's function.  $\Phi(n)$  is the number of the terms of the Farey series of order  $n$ . 17 is the smallest prime which is not in  $\Phi(\mathbb{N} \setminus \{0\})$ . Let  $n$  be the smallest integer such that  $\{\Phi(k)\}_{1 \leq k \leq n}$  contains more composed numbers than prime numbers;  $n$  is also the smallest integer such that  $\Phi(n)$  is divisible by 17.

**Property 58 (\*)**

$$17^{28} = \underline{28351092476} \dots \quad \text{and} \quad 17^{30} = \underline{081934657258} \dots$$

**Property 59**

Take a 7 legged spider and fix the ends of his legs to the plane, and allow his body and knees to move in the plane (self intersections are allowed. . .). Assume that the legs are fixed to points on a regular heptagon and that the legs are just a little bit longer than necessary to meet at the middle. Then the space of all “configurations” of the spider is “easily” seen to be the 17 holed torus.

**Property 60 (Usenet, newsgroup sci.math, December 13, 1993)**

“Pillai and, independently, Brauer showed that in every set of fewer than 17 consecutive integers, at least one is relatively prime to all other members of the set. However, the same is not true for sets of 17 or more consecutive integers.” — Joe Roberts, *Lure of the Integers*, MAA 1992, p 128.

For example, among the 17 numbers 2184–2200 inclusive, no number is relatively prime to all of the others.

**Property 61**

If  $n > k + 3$  and  $k > 3$ , there are exactly 17 isomorphism classes of maximal 2-cliques of  $k$ -sets of an  $n$ -set.

A  $t$ -clique is a set of points with maximum distance between any two at most  $t$ . Two  $k$ -sets  $S$  and  $T$  are at distance  $|S - T| = |T - S|$ .

**Property 62 (Les mathématiques aujourd'hui - bibliothèque Pour la Science - Belin)**

There are 17 infinite families of non abelian finite simple groups.

**Property 63**

$$\zeta(3) = \frac{6}{P(0)-} \frac{1^6}{P(1)-} \frac{2^6}{P(2)-} \frac{3^6}{P(3)-} \cdots \text{ with } P(x) = 34x^3 + 51x^2 + 27x + 5.$$

**Property 64**

17 is the smallest prime number that is in neither the Fibonacci series, nor the Lucas series.

**Property 65**

The constant of a magic square of order 4 is  $34 = 2 \cdot 17$ . The famous magic square on Durer's plate *Melancholia* is symmetric: symmetric numbers in relation to the center sum to 17. Concerning the diabolic magic squares of order 4, the antipodal numbers (on the torus) sum to 17.

**Property 66**

17 is the smallest integer  $n$  such that, from every sequence of  $n$  real numbers, one can find a monotonous sub-sequence of 5 elements (consequence of Erdős - Szekeres theorem).

**Property 67 (\*)**

17 is the smallest palindrome integer in base 2 having more 0's than 1's (note: one can either consider that 0 has 0 digit or restrict to positive integers).

**Property 68 (\*)**

$$\sum_{i=0}^4 i^i = 17^2$$

**Property 69**

17 is the maximal number of vertices of graphs having neither a 4-clique nor a independent 4-set, i.e.  $R(4) - 1 = 17$ , where  $R(n)$  are Ramsey numbers.

**Property 70 (An Introduction to the Theory of Numbers - Hardy/Wright - section 20.1, p 298)**

All but 17 positive integers can be expressed as the sum of 7 or fewer cubes.

**Property 71**

There are 17 nonabelian groups of order less than 17.

**Property 72 (Game Theory and Emotions, by Steven J. Brams, Dept of Politics, New York Univ.)**

Of the 78 distinct  $2 \times 2$  strict ordinal games of conflict, 57 are conflict games that contain no mutually best outcomes for the players. Of these, 12 are frustration games in which the choice of a dominant strategy by one player inflicts the two worst outcomes on the other (frustrated) player; 6 are self-frustration games in which it is the player with the dominant strategy who is frustrated by the best response of the other player. Altogether there are 17 different games of frustration or self-frustration (one is common to both classes), which is 30% of all the conflict games.

### Property 73

The first step in Brams & Taylors envy-free method of cutting up a cake among 6 players is for the first player to cut the cake into 17 pieces.

### Property 74 (\*)

17 is a number  $n$  such that there exists an integer  $k$  such that the  $k$ -th prime number  $n$  is equal to the sum of the prime numbers less or equal to  $k$ . The other two numbers having this property are 5 and 41.

### Property 75 (\*)

17 is the arithmetic mean of 11 and 23, a couple of primes of the form  $(n, 2n + 1)$ , i.e.  $n$  is a Sophie Germain prime. Moreover, 17 in base 16 is written like 11 in base 10, and 23 in base 16 is written like 17 in base 10 (10 and 16 are the most used bases).

### Property 76 (Usenet, newsgroup `sci.math.num-analysis`, January 30, 1996)

The Mackey-Glass Time-Series

$$\frac{dx(t)}{dt} = \frac{0.2x \cdot (t - \tau)}{1 + x^{10}(t - \tau)} - 0.1x(t)$$

gets chaotic with  $\tau > 17$ .

Reference: Michael C. Mackey and Leon Glass, *Oscillation and Chaos in Physiological Control Systems*, *Science*, vol. 197, pp. 287–289, July 1977.

### Property 77 (<http://www.math.harvard.edu/~hmb/issue2.1/SEVENTEEN/seventeen.html>)

At the above URL (which is no longer valid), it was written: “For any configuration of Rubik’s Cube, the solution is at most 17 quarter turns away.” However this is wrong. In fact, what can be easily shown with counting arguments is that some configurations *cannot* be solved with at most 17 quarter turns.

(Updated on 2010-05-26)

### Property 78 (<http://www.math.harvard.edu/~hmb/issue2.1/SEVENTEEN/seventeen.html>)

King and Rook can mate King in 17 moves maximum.

### Property 79 (\*)

Let  $G(n)$  be Golomb’s sequence:  $G(n)$  is the number of times that  $n$  belongs to the sequence.  $G(n)$  can be calculated by induction thanks to Colin Mallows’s formula:

$$G(1) = 1, \quad G(n) = 1 + G(n - G(G(n - 1))).$$

$\bar{x}$  denotes the mirror of  $x$  in base 10; for instance  $\overline{4913} = 3194$ . The smallest couple  $(x, \bar{x})$  such that  $G(x) = \bar{x}$  and  $x$  has several digits is (71, 17).

**Property 80 (Monte J. Zerger, The “Number of Mathematics”)**

The number  $17\# = 2 \cdot 3 \cdot 5 \cdot 7 \cdot 11 \cdot 13 \cdot 17$ , primorial 17, is the product of the successive integers 714 and 715. Nelson, Penny, and Pomerance conjectured that  $17\#$  is the largest primorial which is the product of successive integers (cf C. Nelson, D. E. Penney and C. Pomerance, 714 and 715, *Journal of Recreational Mathematics*, 7:2, pp. 87–89, 1974). The others are  $2\#$ ,  $3\#$ ,  $5\#$  and  $7\#$ . A computer check established that if any other pair of consecutive integers exist whose product is a primorial, then these integers exceed  $10^{6021}$ .

**Property 81 (Monte J. Zerger, The “Number of Mathematics”)**

Moreover  $17\#$  is the product of four successive Fibonacci numbers:

$$17\# = 510 \cdot 510 = 714 \cdot 715 = 13 \cdot 21 \cdot 34 \cdot 55$$

**Property 82 (Monte J. Zerger, The “Number of Mathematics”)**

All the primes in  $17\#$  are emirps, primes that remain primes when the digits are reversed. The 17th prime is 59. If we “embed” it within 17, we obtain the 17th Fibonacci number: 1597, itself an emirp.

**Property 83 (Monte J. Zerger, The “Number of Mathematics”)**

Every positive integer greater than 17 can be represented as the sum of three pairwise relatively prime integers, all of which are greater than 1. But 17 can not, making it the largest number not so expressible. Cf W. Sierpinski, *250 Problems in Elementary Number Theory*, American Elsevier, New York, pp. 4, 38, 1970.

**Property 84 (Monte J. Zerger, The “Number of Mathematics”)**

Euler proved that  $17 = 2^3 + 3^2$  is the only number which is the sum of two consecutive positive integers, one of which is a square and the other a cube (cf L. Dickson, *History of the Theory of Numbers*, Chelsea, New York, Vol. 2, p. 533, 1992).

Since  $2^3$  and  $3^2$  are thought to be the only adjacent powers (Catalan’s conjecture), 17 may be the only integer which is the sum of adjacent powers.

**Property 85 (Monte J. Zerger, The “Number of Mathematics”)**

17 is the smallest natural number whose reciprocal’s decimal expansion contains all the digits:

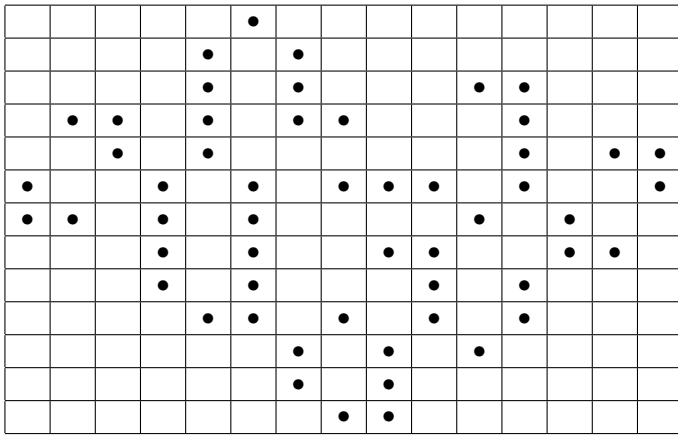
$$\frac{1}{17} = 0,0588235294117647\dots$$

**Property 86**

In degree mode,  $\tan(\cos(\sin x)) = .017\dots$  for any  $x$ .

**Property 87 (Noam D. Elkies)**

For many years, 17 was the smallest number  $n$  such that no oscillator of period  $n$  and finite size was known in Conway’s Life. This is no longer true; on April 27, 1997, Dean Hickerson (dean@math.ucdavis.edu) found the following:



There are now only eleven  $n$  for which a finite period- $n$  oscillator remains unknown: 19, 23, 27, 31, 37, 38, 41, 43, 49, 53, and 57.

**Property 88**

There are 17 classes of polynomial functions  $f : \mathbb{R}^3 \rightarrow \mathbb{R}$  of degree 2 for the affine equivalence.