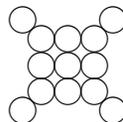


# 13 Thirteen XIII



Corresponding ordinal: thirteenth.

The number 13 is the seventh odd number, the sixth prime number, and the eleventh deficient number.

When you reverse the digits of the prime 13, you get 31 which is also prime. We say that 13 is an *emirp*. In fact if you reverse the digits of 13 in any base less than 13 you get a prime—except for the base  $6 = (13 - 1) / 2$ . But if  $p$  is a prime and  $b = (p - 1) / 2$  is even, then writing  $p$  in base  $b$  we get  $21_b$ , and  $12_b$  is divisible by 2 because  $b$  is even.

The number 13 is the second prime of the form  $4k + 1$ , the first being 5. So, according to Fermat, it must be the sum of two squares, which it is:  $13 = 2^2 + 3^2$ .

As a sum of four or fewer squares:  $13 = 2^2 + 3^2 = 1^2 + 2^2 + 2^2 + 2^2$ .

As a sum of nine or fewer cubes:  $13 = 5 \cdot 1^3 + 2^3$ .

As the difference of two squares:  $13 = 7^2 - 6^2$ .

The number 13 appears in two Pythagorean triples:  $[5, 12, 13]$  and  $[13, 84, 85]$ . Both are primitive, of course.

As a sum of three odd primes:  $3 + 3 + 7$  and  $3 + 5 + 5$

The number 13 appears in the third pair of twin primes: 11, 13.

There are 13 archimedean solids, from a *truncated tetrahedron*, with eight faces, to a *snub dodecahedron*, with ninety-two faces.

You can slice a donut into a maximum of 13 parts with three cuts of a knife.

The number 13 is the first of the “teen” numbers. The suffix “teen”, which is just “ten” misspelled, makes thirteen mean three plus ten

The thirteenth President of the United States was Millard Fillmore.

The thirteenth state to enter the Union was Rhode Island, the last of the colonies to ratify the Constitution.

## 2 Chapter 13 Thirteen XIII

There were thirteen colonies that originally formed the Union called the United States.

The 13 stripes on the American flag represent the 13 colonies, which became the first 13 states.

The thirteenth largest state in the Union is Utah.

The number 13 is widely regarded as an unlucky number. If you fear this number, you are said to have triskaidekaphobia. “Tris kai deka” means three and ten in Greek. It is said that Franklin D. Roosevelt was such a triskaidekaphobic that he died on Thursday, April 12, rather than face another Friday the 13th.

A plane closed polygon with 13 sides is called a triskaidecagon.

The number 13 is called “a baker’s dozen” presumably from an old practice of including an extra loaf of bread to avoid being penalized for short weight.

Carbon 13 is an isotope of carbon of mass number 13 that constitutes about 1.1% of natural carbon. It has spin 1/2 so can be used in nuclear magnetic resonance spectroscopy.

Motion pictures are labeled as PG 13 to advise parental guidance for children under the age of 13.

There are 13 cards in each of the four suits (spades, hearts, diamonds, clubs) in a standard deck of cards.

The following equation is certainly true

$$\text{ELEVEN PLUS TWO} = 13 = \text{TWELVE PLUS ONE}$$

Moreover, the two three-word expressions are anagrams of each other. (Number Freak)