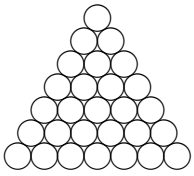
28 Twenty-Eight XXVIII



Corresponding ordinal: twenty-eighth.

The number 28 is the second perfect number: $s(28) = 1 + 2 + 4 + 7 + 14 = 28$. After 6 and 28, the next perfect numbers are $496 = 2^4\left(2^5 - 1\right)$ and $8128 = 2^6\left(2^7 - 1\right)$. It is important here that $2^5 - 1$ and $2^7 - 1$ are primes. Primes of this form are called *Mersenne primes*, and each one corresponds to an even perfect number.

The number 28 is the seventh triangular number: $1+2+3+4+5+6+7 = 28$. See the diagram above. Every even perfect number is triangular because they all have the form $2^{n-1}\left(2^n - 1\right)$ described by Euclid in Book IX, Proposition 36. Letting $m = 2^n$, this is $m\left(m - 1\right)/2$, which is the form of a triangular number.

The number 28 is the fifteenth even number and the eighteenth composite number.

As a product of primes: $28 = 2^2 \cdot 7$.

The number 28 has six divisors: 1, 2, 4, 7, 14, 28.

As the sum of four or fewer squares: $28 = 1^2 + 1^2 + 1^2 + 5^2 = 2^2 + 2^2 + 2^2 + 4^2 = 1^2 + 3^2 + 3^2 + 3^2$. You can check that 28 is the first even number that requires four squares.

As the sum of nine or fewer cubes: $28 = 1^3 + 3^3 = 4 \cdot 1^3 + 3 \cdot 2^3$.

As the difference of two squares: $28 = 8^2 - 6^2$.

The number 28 appears in four Pythagorean triples: $[21, 28, 35]$, $[28, 45, 53]$, $[28, 96, 100]$, $[28, 195, 197]$. The second and the last are primitive.

As a sum of two odd primes: $28 = 5 + 23 = 11 + 17$.

The twenty-eighth President of the United States was Woodrow Wilson.

The twenty-eighth state to enter the Union was Texas.

The twenty-eighth largest state in the United States is Arkansas.

The month of February normally has 28 days. Every fourth year, the years that are multiples of 4, is a "leap year", in which February has 29 days. However, if the year is divisible by 100 but not by 400, then it is not a leap year. Thus, the years 1700, 1800, and 1900 were not leap years, but the year 2000 was a leap year, as was the year 1600. The every-fourth-year rule (the Julian calendar) was pretty good, but after a long time it caused the calendar to get ten days out of whack with the solar year, so in 1582, Pope Gregory instituted our current calendar.

The length of the time between new moons is roughly 28 days, so the four phases of the moon occur at approximately one-week intervals (to the nearest day).

There were 28 sports represented in the Olympic Games 2000.

Would you like a six-day week with 28-hour days? Since $7 \times 24 = 6 \times 28$, this would keep the same number of hours in a week, but allow for more leisurely (and varied) days.