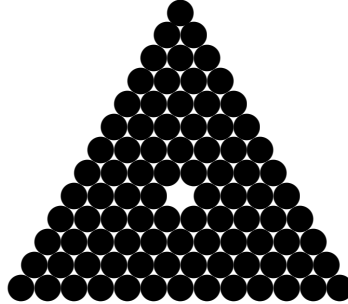# 90 Ninety XC

Corresponding ordinal: ninetieth.

The number 90 is the forty-sixth even number and the sixty-fifth composite number.

As a product of primes: $90 = 2 \cdot 3^2 \cdot 5$.

The number 90 has twelve divisors: 1, 2, 3, 5, 6, 9, 10, 15, 18, 30, 45, 90.

The number 90 is the twentieth abundant number: $s(90) = 1+2+3+5+6+9+10+15+18+30+45 = 144 > 90$. It must be abundant because it is a proper multiple of the perfect number 6.

As a sum of four or fewer squares: $90 = 3^2 + 9^2 = 1^2 + 5^2 + 8^2 = 4^2 + 5^2 + 7^2 = 1^2 + 2^2 + 2^2 + 9^2 = 1^2 + 2^2 + 6^2 + 7^2 = 1^2 + 3^2 + 4^2 + 8^2 = 2^2 + 5^2 + 5^2 + 6^2 = 3^2 + 3^2 + 6^2 + 6^2 = 3^2 + 4^2 + 4^2 + 7^2$.

As a sum of nine or fewer cubes: $90 = 2 \cdot 1^3 + 3 \cdot 2^3 + 4^3 = 1^3 + 2^3 + 3 \cdot 3^3$.

The number 90 appears in eight Pythagorean triples:
$$[48, 90, 102] \quad [54, 72, 90] \quad [56, 90, 106] \quad [90, 120, 150]$$
$$[90, 216, 234] \quad [90, 400, 410] \quad [90, 672, 678] \quad [90, 2024, 2926]$$
None of these is primitive because 90 is twice an odd number.

As a sum of two odd primes: $90 = 7+83 = 11+79 = 17+73 = 19+71 = 23+67 = 29+61 = 31+59 = 37+53 = 43+47$.

The number 90 is a *unitary perfect number*, being the sum of its proper divisors d that have no common factor with $90/d$. That is $90 = 1 + 2 + 5 + 9 + 10 + 18 + 45$. The only other unitary perfect numbers less than 101 are 6 and 60. The next one is 87360.

A 90-degree angle is a right angle.

The number 90 is the only number that is equal to the sum of its digits plus the sum of the squares of its digits.

The number 90 is twice a triangular number and one less than a triangular number. The number 2 is also such a number, in a somewhat trivial way. A more interesting one is 20. After 2, 20, and 90, the next one is 702, and the one after that is 3080.

The number 90 is the largest positive integer n for which the number of primes that are at most n is equal to the number of numbers that are at most n and relatively prime to n. That is, $\pi(n) = \varphi(n)$. The others are 2, 3, 4, 8, 10, 14, and 20. In fact, $\pi(n) < \varphi(n)$ for $n > 90$. For 90, we have $\pi(90) = \varphi(90) = 24$.

The atomic age brought with it strontium 90, a radioactive isotope with atomic weight 90, which is a by-product of nuclear reactors and nuclear explosions. It is particularly hazardous because it tends to get deposited in bone tissue.

The distance between the centers of consecutive bases in major league baseball is 90 feet.