A lot of people have mentioned Binet's formula. But I suspect this is not the most practical way to compute the nth Fibonacci number for large n, because it requires either having a very accurate value of and carrying around lots of decimal places (if you want to do floating-point arithmetic) or expanding large powers of 1+ using the binomial formula. The latter comes out to writing the Fibonacci number as a sum of binomial coefficients.

The following formulas hold, though:which you can find derivations of in <a href="http://en.wiipedia.org/wii/Fibonacci\_number">the Wiipedia article on Fibonacci numbers</a>. This lets you find , for any even or odd, in terms of two Fibonacci numbers with approximately half the index. The result is faster than Binet's formula.