

Fibonacci Numbers: Using Binet's Formula

Binet's Formula is an explicit (not recursive) formula for the N^{th} Fibonacci Number:

$$F_N = \frac{\left(\frac{1+\sqrt{5}}{2}\right)^N - \left(\frac{1-\sqrt{5}}{2}\right)^N}{\sqrt{5}}.$$

To compute with this on your calculator, it might be more convenient to use the calculator's memory. (Please see the instruction manual, probably available on the Web.)

For example, you might store $\left(\frac{1+\sqrt{5}}{2}\right)$ in one memory location and $\left(\frac{1-\sqrt{5}}{2}\right)$ in another.

Say

$$(1+\sqrt{5})/2 \quad \boxed{\text{STO} \rightarrow} \quad A$$

and

$$(1-\sqrt{5})/2 \quad \boxed{\text{STO} \rightarrow} \quad B.$$

Then to compute F_{30} , you would type

$$(A^{30} - B^{30}) / \sqrt{5}$$

to get 832,040. ■