

Golden Nook

Ver. 1.4

The Golden Nook is a collection of functions, definitions, formulas and examples concerned with the Golden Mean number ϕ (Phi), the Fibonacci and the Lucas numbers.

Definitions, formulas and examples are presented in separate document Golden Mean Formulae. Some formulas in this document are collected from different internet pages, others were found with the assistance of the functions `fib()`, `luc()` and `gold()`.

Functions and programs for TI-89

Gold(expression) is a function which tries to find elementary presence of the Golden Mean (number ϕ) in the given expression and transforms it in the form where the number ϕ is presented with the greek letter ϕ . Multiple presence of the number ϕ can be detected and presented. (See Gold.txt)

DenPhi(expression) is a function which eliminates the number ϕ from the denominator of the expression. (See Gold.txt)

F1	F2	F3	F4	F5	F6	
Tools	Algebra	Calc	Other	PrgmID	Clean Up	
$\frac{\sqrt{5}+1}{2} \rightarrow g$						
$\frac{\sqrt{5}+1}{2}$						
$\text{gold}((\sqrt{5}-1) \cdot (\sqrt{5}+3))$						
$4 \cdot \phi$						
$\text{gold}(e^{3 \cdot g+1})$						
$e^{\phi^2 \cdot \sqrt{5}}$						
$\text{gold}(e^{(3g+1)})$						
MAIN	DEG AUTO	FUNC	30/30			

F1	F2	F3	F4	F5	F6	
Tools	Algebra	Calc	Other	PrgmID	Clean Up	
$\text{gold}(5 \cdot \sqrt{5} - 5)$						
$\frac{10}{\phi}$						
$\text{denphi}\left(\frac{10}{\phi}\right)$						
$10 \cdot (\phi - 1)$						
$\text{gold}(\sin(72^\circ))$						
$\frac{\sqrt{\phi} \cdot 5^{1/4}}{5}$						
$\text{gold}(\sin(72^\circ))$						
SOURCE	RAD AUTO	FUNC	30/30			

Fib(n) is a function which calculates the n_{th} Fibonacci number. The integer results are exact for $\text{abs}(n) \leq 58$.

Luc(n) is a function which calculates the n_{th} Lucas number. The integer results are exact for $\text{abs}(n) \leq 57$.

The results of both functions depend on the Complex Format mode setting. In the “REAL” mode the results are also real and in the “RECTANGULAR” or “POLAR” Complex Format mode the results are complex. The results for integer arguments are always integers.

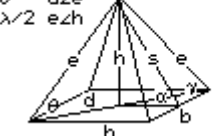
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F1=	F2=	F3=	F4=	F5=	F6=
Tools	Algebra	Calc	Other	Pyramid	Clean Up
■ fib(2)					
■ fib(2.123) 1.09308045094					
■ fib(1.123) 1.00902939409					
■ fib(3.123) 2.10210984503					
■ fib(1.123) + fib(2.123)					
2.10210984503					
fib(1.123)+fib(2.123)					
SOURCE	RAD AUTO	FUNC	30/30		

F1=	F2=	F3=	F4=	F5=	F6=
Tools	Algebra	Calc	Other	Pyramid	Clean Up
■ $\sqrt{5} \cdot luc(n) \cdot g - 5 \cdot fib(n-1)$					
$\left\{ \frac{\sqrt{5}}{2} + 5/2 \quad \frac{3 \cdot \sqrt{5}}{2} + 5/2 \right\}$					
■ gold($\sqrt{5} \cdot luc(n) \cdot g - 5 \cdot fib(n)$)					
$\left\{ \phi \cdot \sqrt{5} \quad \phi^2 \cdot \sqrt{5} \right\}$					
$\dots n) \cdot g - 5 \cdot fib(n-1) n = \{1, 2\}$					
SOURCE	RAD AUTO	FUNC	30/30		

Pyramid() is a program which calculates basic geometric parameters and dimensions of a given regular square pyramid. In the Cheops' pyramid you can find more than 25 ratios which include the Golden Ratio ϕ . (See Pyramid.txt)

F1=	F2=	F3=
base height	base α	base θ
θ dze	α _zs	
$\lambda/2$ ezh	$\delta/2$ szh	



MAIN	DEG AUTO	FUNC	30/30
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F1=	F2=	F3=	F4=	F5=	F6=
b	$2 \cdot \sqrt{\phi}$				
h	1				
s	ϕ				
e	$\phi^{3/2}$				
d	$2 \cdot \sqrt{2 \cdot \phi}$				
ψ	2.66495772997				
$\psi/4\pi$.212070597928				
MAIN	DEG AUTO	FUNC	30/30		

Review of versions

- ver. 1.0 initial version,
- ver. 1.1 more formulas,
- ver. 1.2 more formulas, improved function gold()
- ver. 1.3 document Golden Mean Formulae in .pdf format; function gold() can accept lists with different types of expressions; functions fib() and luc() calculate the results according to the Complex Format mode setting.
- ver. 1.4 added formulas with trigonometric and hyperbolic functions

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