

Numeration Systems Sudoku Supplementary Materials

Christine Latulippe

Numeration Systems Sudoku Solutions

1687	1731	1637	1811	1661	1557
1557	1811	1661	1687	1731	1637
1811	1637	1731	1661	1557	1687
1661	1557	1687	1731	1637	1811
1637	1661	1811	1557	1687	1731
1731	1687	1557	1637	1811	1661

Table 1: Banneker Sudoku Solution

1882	1850	1545	1585	1550	1202
1585	1550	1202	1882	1545	1850
1545	1882	1850	1550	1202	1585
1202	1585	1550	1850	1882	1545
1850	1545	1882	1202	1585	1550
1550	1202	1585	1545	1850	1882

Table 2: Fibonacci Sudoku Solution

1478	1718	1556	1776	1494	1574
1494	1574	1776	1718	1478	1556
1776	1478	1494	1574	1556	1718
1574	1556	1718	1478	1776	1494
1718	1494	1478	1556	1574	1776
1556	1776	1574	1494	1718	1478

Table 3: Germain Sudoku Solution






Numeration Systems Sudoku Key

Practice working with equivalent representations of numerals in different systems in a fun way with this great hands-on game. Use the tiles to cover the board so that each row, each column, and each 3×2 box contains one each of the six important years featured on your game board.

You do NOT need a unique numeration system represented in each row, column, and 3×2 box.




Egyptian Hieroglyphics

Additive, order of symbols does not matter

	vertical stroke	1
	heel bone	10
	coiled rope	100
	lotus flower	1,000
	bent finger	10,000



Mayan Numerals

Arranged vertically, "almost" base twenty
Multiplicative and additive

	0
	1
	5

Babylonian Numerals

Sexagesimal system (base sixty)
Multiplicative and additive

	10
	1

Roman Numerals

Additive and subtractive

I	1
V	5
X	10
L	50
C	100
D	500
M	1000

Greek Numerals

Additive

A	1	I	10	P	100
alpha		iota		Rho	
B	2	K	20	Σ	200
beta		kappa		Sigma	
Γ	3	Λ	30	T	300
gamma		lambda		Tau	
Δ	4	M	40	Υ	400
delta		mu		Upsilon	
E	5	N	50	Φ	500
epsilon		nu		Phi	
F	6	Ξ	60	X	600
(digamma)		xi		Chi	
Z	7	O	70	Ψ	700
zeta		omicron		Psi	
H	8	Π	80	Ω	800
eta		pi		Omega	
Θ	9	Ϟ	90	Α	900
theta		(koppa)		(san)	

Numbers 1,000 to 9,000 were written as 'A', 'B', and so on to 'Θ'.

	1731 Benjamin Banneker born				•••• — ≡
	MDCCCXI	ΑΧΞΑ			
				1557 Recorde's <i>Whetstone of Witte</i>	MDCLXXXVII
			MDLVII	ΑΧΠΖ	
				— ○ ≡	

Banneker Sudoku Board

			MDCCXXXI	MDCLXI	MDCXXXVII
		ΑΨΛΑ	ΑΧΛΖ	ΑΦΝΖ	ΑΩΙΑ
•••• ≡ ••	•••• •••• ≡		<p>Use these 24 tiles to cover the Banneker Sudoku Board so that each row, each column, and each 3x2 box contains one each of the six important years featured on that board.</p> <p>The "Banneker" Years:</p> <p>1557 Robert Recorde's <i>Whetstone of Witte</i> (first recorded use of modern equals sign)</p> <p>1637 René Descartes' <i>La Géométrie</i> (proposed unification of algebra and geometry into analytic geometry)</p> <p>1661 Guillaume de L'Hôpital born (French mathematician, author of the first textbook on infinitesimal calculus and mathematics published in 1696)</p> <p>1687 Isaac Newton's <i>Principia</i> (including laws of motion, and law of universal gravitation)</p> <p>1731 Benjamin Banneker born (African American astronomer, aided in the surveying of Washington, D.C.)</p> <p>1811 Evariste Galois born (French mathematician, died at the age of 20 in a duel)</p>		
•••• ≡ •	•••• ≡ •				
1637 Descartes' <i>La Géométrie</i>	1661 Guillaume de L'Hôpital born	1687 Newton's <i>Principia</i>			
1811 Evariste Galois born					

Banneker Sudoku Tiles (cut apart)

		1545 <i>Cardano's Ars Magna</i>		MDL	
			ΑΩΠΒ	•••• — —	
1202 <i>Fibonacci's Liber abaci</i>		ΑΦΝ			
		1882 <i>Emmy Noether born</i>			
	<< ▼▼		MDXLV		

Fibonacci Sudoku Board

			MDLXXXV	MDCCCLXXXII	MDCCCL
	— •• =	ΑΦΠΕ	ΑΩΝ	ΑΦΜΕ	MCCII
•••• •• —	•••• — =	ΑΣΒ	<p>Use these 24 tiles to cover the Fibonacci Sudoku Board so that each row, each column, and each 3x2 box contains one each of the six important years featured on that board.</p> <p>The "Fibonacci" Years:</p> <p>1202 Leonardo Fibonacci's <i>Liber abaci</i> (introduced Hindu-Arabic numerals to Europe)</p> <p>1545 Gerolamo Cardano's <i>Ars Magna</i> ("The Great Art", contains the first published solutions to cubic and quartic equations)</p> <p>1550 John Napier born (Scottish mathematician, invented logarithms, and Napier's bones, both of which simplified arithmetic calculations)</p> <p>1585 Simon Stevin's <i>De Thiende</i> (pamphlet which presented a thorough account of decimal fractions, thus popularizing their daily use)</p> <p>1850 Sofia Kovalevskaya born (Russian mathematician who studied with Weierstrass and won the Academy of Sciences' Prix Bordin)</p> <p>1882 Emmy Noether born (German mathematician known for her work in abstract algebra)</p>		
••• •• ••	— ••• ••				
1585 <i>Stevin's De Thiende</i>	1550 <i>John Napier born</i>	1850 <i>Sofia Kovalevskaya born</i>			

Fibonacci Sudoku Tiles (cut apart)

1478 <i>Treviso Arithmetic</i> (author unknown)		MDLVI			
	AΦOΔ	•••• ≡ • ≡	⌚ e e e e e e e e e n		
				AΦNF	•••• •••• ≡ ≡
◀◀▼▼▼ ▼▼▼ 1556 <i>Sumario Compendioso</i> (author unknown)					
		⌚ e e e e e e n n n n n n n n n	◀◀▼▼▼ ◀◀▼▼▼ ◀◀▼▼▼ ◀◀▼▼▼	MDLXXIV	
			1494 <i>Pacioli's Summa de arithmetica</i>		AΥOH

Germain Sudoku Board

◀◀▼▼▼ ◀◀▼▼▼ ◀◀▼▼▼ ◀◀▼▼▼	◀◀▼▼▼ ◀◀▼▼▼ ◀◀▼▼▼ ◀◀▼▼▼	AΥφΔ	AΥOF	AΥIH
◀◀▼▼▼ ◀◀▼▼▼ ◀◀▼▼▼ ◀◀▼▼▼	◀◀▼▼▼ ◀◀▼▼▼ ◀◀▼▼▼ ◀◀▼▼▼	MDCCXVIII	MDCCLXXVI	MCDIXIV
⌚ e e e e e e e e e n	⌚ e e e e e e e e e n	MCDLXXVIII		
•••• — • ≡	•••• • ≡ ≡	⌚ e e e e e e e e e n		
•••• • • ≡	•••• •• •••• ≡	⌚ e e e e e e e e e n		
1776 Marie-Sophie Germain born	1574 William Oughtred born	1718 Maria Agnesi born		

Use these 22 tiles to cover the Germain Sudoku Board so that each row, each column, and each 3x2 box contains one each of the six important years featured on that board.

The "Germain" Years:

1478 *Treviso arithmetic*, author unknown (one of the first printed arithmetic books, printed in Italy)

1494 Luca Pacioli's *Summa de arithmetica* (Italian textbook, contained first examples of double-entry bookkeeping)

1556 *Sumario Compendioso*, author unknown (the first mathematics book printed in the Western Hemisphere, published in Mexico City)

1574 William Oughtred born (English mathematician, invented the first slide rule)

1718 Maria Agnesi born (Italian mathematician who wrote one of the first and most complete works on finite and infinitesimal analysis)

1776 Marie-Sophie Germain born (French mathematician who worked with Lagrange and Gauss, worked in the theory of elasticity and on Fermat's Last Theorem)

Germain Sudoku Tiles (cut apart)