Logic Masters India

PRIME EXOTICA

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January 2011 Monthly Sudoku Test

INSTRUCTION BOOKLET

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Submission: http://logicmastersindia.com/M201101S

Discussion: http://logicmastersindia.com/forum/forums/thread-view.asp?tid=252

I think **prime** numbers are like life. They are very logical but you could never work out the rules, even if you spend all your time thinking about them.

– Mark Haddon (Source: http://www.thinkexist.com)

ex-ot-i-ca : Things that are curiously unusual or excitingly strange.

-Source: http://www.yourdictionary.com

Happy Mathematical New Year: 2011 is the sum of 11 consecutive prime numbers.
2011 = 157 + 163 + 167 + 173 + 179 + 181 + 191 + 193 + 197 + 199 + 211.

-Source: http://republicofmath.wordpress.com

This test focuses on **prime numbers** and a few **exotic** variants. The points for each grid are prime numbers (19, 23, etc) and so is the total number of points (499). The time for the test is 101 minutes, a prime number, and bonus points are also based on prime numbers. One Sudoku is based completely on prime numbers, and the others are all rare unusual variants. Many variants may be new for the solvers. So, please spend some time to read the instructions well in advance and discuss your doubts in the forum.

Puzzle Types

Sudoku		Points
1.	DNA Sudoku	59
2.	Kid Sudoku	23
3.	Kombinance Sudoku	47
4.	MultiTab Sudoku	71
5.	Numerologidoku	47
6.	PeepHole Sudoku	37
7.	Poker Sudoku	37
8.	Prime Number Sudoku	31
9.	Product Sudoku	59
10.	Quad Sudoku	23
11.	Rhombus Sudoku	23
12.	Rossini Sudoku	19
13.	Tennisdoku	23
	TOTAL	**499**

Bonus points

	No of grids correctly solved	Bonus
A. Quantum Bonus	7	17
	8	19
	9	23
	10	29
	11	31
	12	37
	13	41

	No of grids correctly solved	Bonus
B. Time Bonus	12	2* (No of minutes remaining)
	13	5* (No of minutes remaining)

Test solving

Thanks to **Frederic Stalder (Fred 76)** for test solving all puzzles.

Important points for Test

- Test duration is **101 minutes**
- The test will contain **9x9 grids** only.
- The grids will be in alphabetical order (starting with DNA and ending with Tennisdoku), not in order of points.
- Puzzle Booklet (PB) will contain the Sudoku grids and instructions. Examples will not be included.
- PB contains one grid per page - **13 pages** in all.
- For every sudoku, **exactly 10 cells** will be marked as the Answer Key.
- Answer key shall be enabled after **51 minutes**.

Instructions and Examples

1. DNA Sudoku   [59 points]

Each row, column and 3x3 box must contain every digit from 1 to 9.

There is a DNA molecule with two strands of equal length, marked in orange and blue colours. The two strands are connected at one point (marked as 'A').

The sum of all corresponding numbers in the two strands is 10 (6 in the example). Cells are marked with alphabets, starting with 'A'. Corresponding numbers are marked by the same letter in both stands. For example, the sum of cell D in orange strand and cell D in blue strand would equal 10.
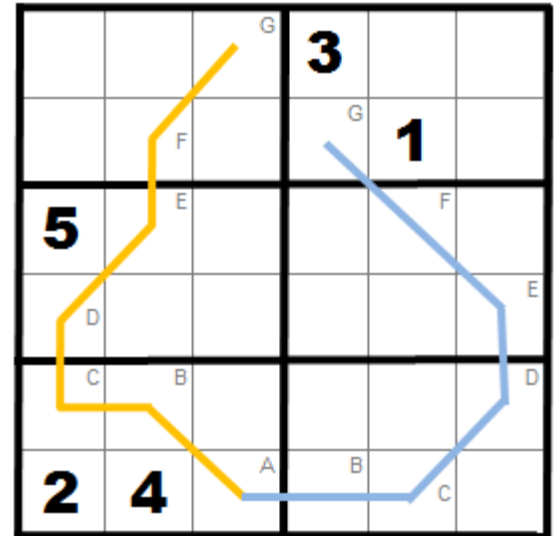
## 2. KID Sudoku   [23 points]

Each row, column and 3x3 box must contain every digit from 1 to 9.

The clues (to the left of some rows) have been provided by a kid who does not know counting (or addition) beyond 9 (6 in the example).

Each digit in the clue indicates the sums of (one or more) continuous numbers from left to right for the row, with the additional constraint that no sum can exceed 9.

For example, if the numbers in a row are 123456789, the clue will be 696789. If the numbers in a row are 182736459, the clue will be 99999.
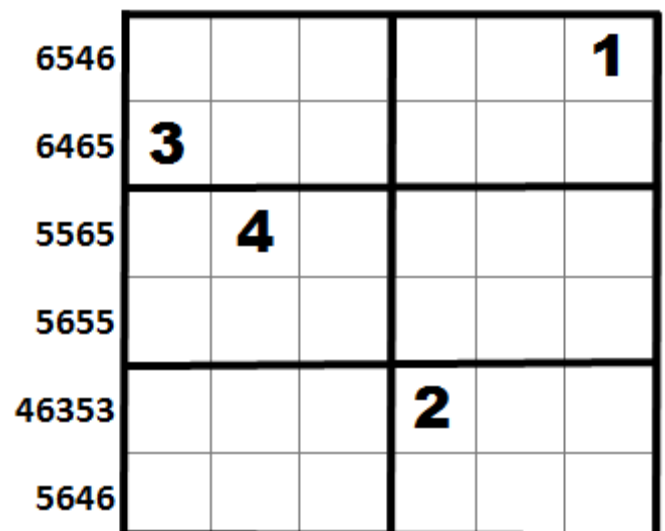
3.   KOMBINANCE Sudoku   [47points]

Each row, column and 3x3 box must contain every digit from 1 to 9.

There are four coloured cells in every 3x3 box. The sum of four coloured cells in every box equals 17.

However, the combination of 4 numbers in each box is different. For example, if the four coloured numbers in one box are (9,5,2,1) then this combination cannot repeat in any other 3x3 box.

4.   MULTITAB Sudoku   [71 points]

Each row, column and 3x3 box must contain every digit from 1 to 9.

MultiTab stands for MULTIplication TABle.

Each marked cage contains six different digits where the 3-digit number is the result of multiplying a 1-digit number with a 2-digit number.

All cages read either from left to right OR from top to bottom.

5. NUMEROLOGIDOKU   [47 points]

Each row, column and 3x3 box must contain every digit from 1 to 9.

All names should be converted to a two-digit "clue number" by adding the number for each letter as per numerology rules given below the grid.

For example, the name RISHI has five letters – R, I, S, H and I. The numbers for these letters, as per the numerology rule, are 18, 9, 19, 8 and 9. If we add these numbers we get 63. So the "clue number" for RISHI is 63.

Names

AMIT
MIN
RAKESH
ZITI

The "clue numbers" for given names should be filled in the shaded cells. All "clue numbers" in the shaded cells read from left to right.

Letter	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26

# 6. PEEPHOLE Sudoku   [37 points]

Each row, column and 3x3 box must contain every digit from 1 to 9.

All given clues have been obtained using different shaped blue peepholes and are part of the finished Sudoku.

All peephole clues represent different physical regions in the solved grid. Clues cannot be rotated/reflected. None of the given numbers in the grid is part of the peephole clues.
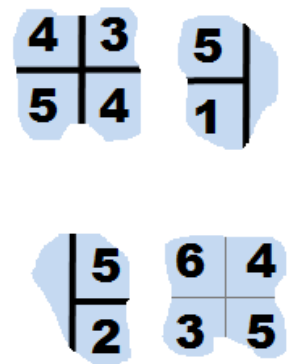
7. POKER Sudoku   [37 points]

Each row, column and 3x3 box must contain every digit from 1 to 9. The five numbers on the lines must each be one of the five designated hands of poker (2 hands in the example). There should be exactly one hand of each type.

The five types are:
1) Four of a kind: Four numbers of the same rank + a different number
2) Full house: Two numbers of the same rank + Three numbers of another rank
3) Straight: Five consecutive numbers
4) Three of a kind: Three numbers of the same rank and two different numbers
5) Two pair: Two numbers of the same rank + Two numbers of another rank + a different number

Clues
FOUR OF A KIND (1)
FULL HOUSE (3 AND 4)

The repeating number in three of a kind/ four of a kind will be given. For full house, two numbers will be given, one of which will form a "pair" and the other will represent "three of a kind". For Two pair, again two numbers will be given, both of which will form "pair". For sequence, the first and last number will be given as clues.

8. PRIME NUMBER Sudoku   [31points]

Each row, column and 3x3 box must contain every digit from 1 to 9.

Numbers formed by the digits in shaded squares should be prime numbers. These numbers read from left to right OR from top to bottom.

9. PRODUCT Sudoku   [59 points]

Each row, column and 3x3 box must contain every digit from 1 to 9.

The number on the top left of each cage denotes the product of the numbers inside the cage.

All numbers inside a cage must be different.

10. QUAD Sudoku   [23 points]

Each row, column and 3x3 box must contain every digit from 1 to 9.

Numbers in the shaded squares must be a set of four consecutive numbers. Treat 9 and 1 as consecutive numbers in this puzzle (6 and 1 in the example).

11. RHOMBUS Sudoku   [23 points]

Each row, column and 3x3 box must contain every digit from 1 to 9.

There are some rhombus shaped figures in the grid.

The sum of numbers on the rhombus vertices should be a multiple of the central number (the number inside the rhombus).

12. ROSSINI Sudoku   [19 points]

Each row, column and 3x3 box must contain every digit from 1 to 9.

The double arrows indicate that the nearest 3 digits in the row (column) are in ascending or descending order (the highest number is always in the direction of the double arrow).

If there is no double arrow outside a row/column, the nearest 3 digits CANNOT be in either ascending or descending order.

13. TENNISDOKU   [23 points]

Each row, column and 3x3 box must contain every digit from 1 to 9.

Tennis ball (solid circle) indicates a possible final score of a set in a tennis match.

The numbers outside the grid on the left indicate the scores of all sets marked in the row, read from left to right. (e.g. 2:1 indicates 2 sets won and 1 set lost)

The numbers outside the grid on the top indicate the scores of all sets marked in the column, read from top to bottom.

In this Sudoku, the number of games won by a player cannot exceed 9, i.e. no two-digit games.

So, for this Sudoku, the possible (winning) final scores of a set in a tennis match are 6-1, 6-2, 6-3, 6-4, 7-5, 7-6, 8-6 and 9-7.

And, the possible (losing) final scores of a set in a tennis match are 1-6, 2-6, 3-6, 4-6, 5-7, 6-7, 6-8 and 7-9.

All valid final set scores are marked by tennis balls. So, if there is no tennis ball between two cells, the two cells cannot indicate a final score of a set.

Solutions

DNA

4	1	2	3	6	5
6	3	5	4	1	2
5	2	4	6	3	1
3	6	1	5	2	4
1	5	6	2	4	3
2	4	3	1	5	6

KID

6	5	4	3	2	1
3	1	2	4	6	5
1	4	5	6	3	2
2	3	6	5	1	4
4	6	1	2	5	3
5	2	3	1	4	6

MULTITAB

2	4	6	5	1	3
5	3	1	4	2	6
3	5	4	1	6	2
6	1	2	3	4	5
4	2	5	6	3	1
1	6	3	2	5	4

NUMEROLOGIDOKU

6	5	2	1	4	3
1	4	3	5	6	2
2	1	6	4	5	3
4	3	5	6	2	1
5	2	4	1	3	6
3	6	1	2	4	5

PEEPHOLE

1	2	3	6	5	4
5	6	4	3	1	2
2	1	5	4	6	3
4	3	6	1	2	5
6	4	2	5	3	1
3	5	1	2	4	6

POKER

2	4	6	3	5	1
5	1	3	6	4	2
6	3	1	4	2	5
4	2	5	1	3	6
3	6	2	5	1	4
1	5	4	2	6	3

PRIME NUMBER

1	3	6	5	4	2
4	2	5	1	6	3
5	4	3	6	2	1
6	1	2	4	3	5
3	6	1	2	5	4
2	5	4	3	1	6

PRODUCT

4	2	3	5	1	6
6	5	1	2	4	3
3	6	2	1	5	4
1	4	5	3	6	2
5	3	4	6	2	1
2	1	6	4	3	5

QUAD

1	3	5	2	4	6
4	2	6	1	5	3
5	6	3	4	1	2
2	1	4	3	6	5
3	5	1	6	2	4
6	4	2	5	3	1

RHOMBUS

4	2	3	5	1	6
6	5	1	2	4	3
3	6	2	1	5	4
1	4	5	3	6	2
5	3	4	6	2	1
2	1	6	4	3	5

KOMBINANCE

9	3	1	5	4	7	2	8	6
4	7	8	2	6	1	3	5	9
2	6	5	9	3	8	7	1	4
6	9	7	8	5	4	1	3	2
1	8	3	6	9	2	5	4	7
5	4	2	1	7	3	9	6	8
8	5	9	3	2	6	4	7	1
7	2	6	4	1	5	8	9	3
3	1	4	7	8	9	6	2	5

ROSSINI

9	8	3	5	7	6	1	4	2
7	6	2	1	4	8	3	5	9
5	4	1	2	9	3	6	7	8
3	1	7	9	2	5	8	6	4
6	2	5	3	8	4	9	1	7
8	9	4	6	1	7	2	3	5
4	3	6	8	5	9	7	2	1
2	5	8	7	6	1	4	9	3
1	7	9	4	3	2	5	8	6

TENNISDOKU

6	3	4	8	1	9	5	7	2
1	9	8	2	5	7	4	6	3
2	5	7	6	3	4	1	8	9
5	2	9	4	6	8	3	1	7
3	8	6	7	2	1	9	4	5
7	4	1	5	9	3	6	2	8
4	1	5	9	7	2	8	3	6
9	7	3	1	8	6	2	5	4
8	6	2	3	4	5	7	9	1

Puzzle Credits

TENNISDOKU: Ondřej Suchý + Jakub Ondroušek + Jakub Hrazdíra (Fed Sudoku)
http://www.fed-sudoku.eu/sudokuplay/genvar.php?var=196&jazyk=en

DNA SUDOKU: Jiří Hrdina (Fed Sudoku)
http://www.fed-sudoku.eu/sudokuplay/genvar.php?var=123&jazyk=en

POKER SUDOKU: Based on Poker Number Place (JNPC 2010)
http://www.jnpc2010.jp/images/jnpc2010_Eng.pdf

PEEPHOLE SUDOKU: Based on Peeping Number Place (JNPC 2010)
http://www.jnpc2010.jp/images/jnpc2010_Eng.pdf

ROSSINI SUDOKU: Vittorio Schiavone (Argio Logic)
http://www.argio-logic.net/sudoku/sudoku.php

KOMBINANCE SUDOKU: Jiří Hrdina (Fed Sudoku)
http://www.fed-sudoku.eu/sudokuplay/genvar.php?var=172&jazyk=en

MULTITAB SUDOKU: Jan Novotný (Fed Sudoku)
http://www.fed-sudoku.eu/sudokuplay/genvar.php?var=175&jazyk=en