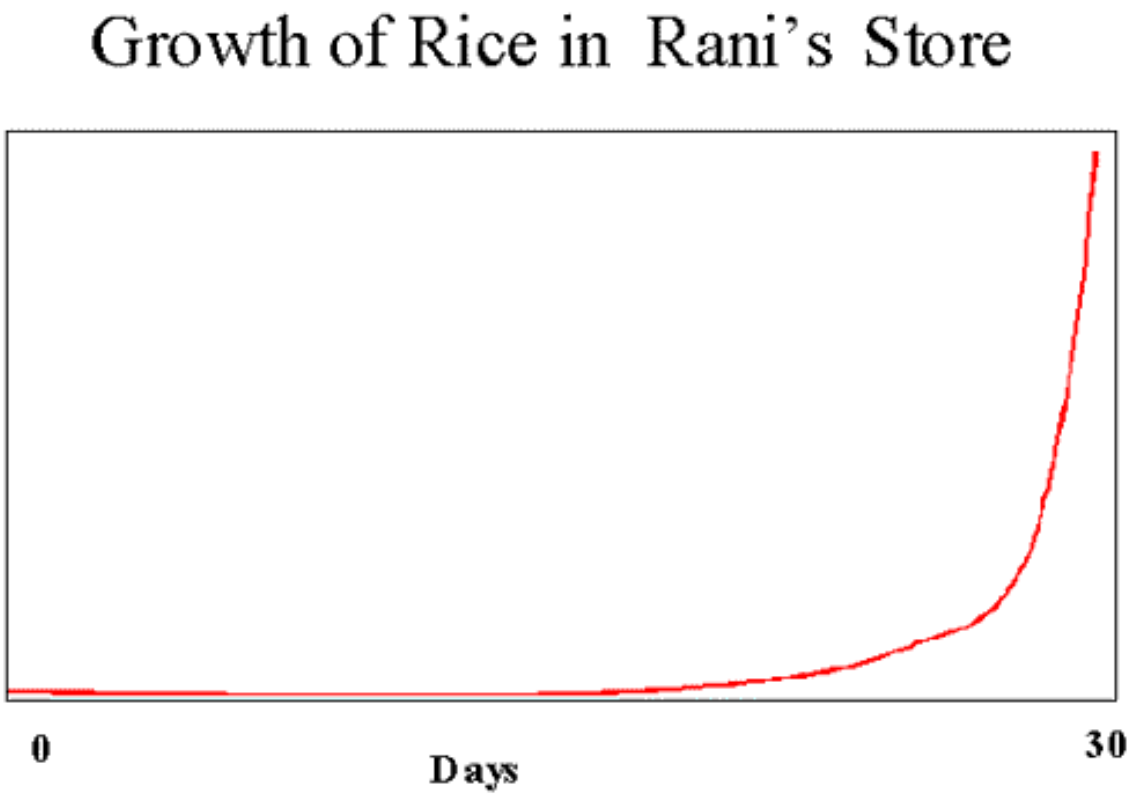
POWER OF BINARY NUMBERS

Many years ago, there lived a selfish raja in India. He ruled that all the people should give him almost all of their rice for safekeeping, so that in a time of need there would be rice to eat. One year, a famine hit and no one had any rice to eat, but the raja would not give the stored rice to the people because he wanted to save it for himself. One day a clever girl named Rani created a plan to help the starving people of India. She asked the raja for one grain of rice and for each day for thirty days she asked the raja to double the amount of rice given the day before. The raja did not realize how much one grain of rice would amount to if it were doubled every day for one month. The raja learned a valuable lesson about selfishness and Rani saved the people of India from starvation through her cunningness and her understanding of math.

LOOK HOW SLOWLY THE NUMBER OF GRAINS OF RICE GROWS IN THE FIRST 15 TO 20 DAYS; THEN, THE GROWTH EXPLODES TO OVER ONE BILLION GRAINS ON THE 30TH DAY.



Complete the following table showing the correct amount of rice for each day.

Table 1

Day	Process	Grains of Rice
0	$1=2^0$	1
1	$2=2^1$	2
2	$2\cdot2=2^2$	4
3	$2\cdot2\cdot2=2^3$	8
4	$2\cdot2\cdot2\cdot2=2^4$	16
5	$2\cdot2\cdot2\cdot2\cdot2=2^5$	32
6	$2\cdot2\cdot2\cdot2\cdot2\cdot2=2^6$	64
7	$2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot2=2^7$	128
8	$2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot2=2^8$	256
9	$2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot2=2^9$	512
10	$2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot2\cdot2=2^{10}$	1024
…	…	…
30	$2\cdot2\cdot2\cdot\ldots\cdot2=2^{30}$ 30 factors	1,073,741,824

1	2	4	8	16	It is very simple to double numbers when we estimate the double of 64 to 125 instead of 128 so it can be doubled to 250, to 500 then the next One times One Thousand on Day 11.
32	64	*125*	250	500	
1 THOUSAND	2T	4T	8T	16T	Again, in 10 days to One Million on Day 21, and to One Billion on Day 31, One Trillion on Day 41, One Quadrillion on Day 51, One Quintillion on Day 61,
32T	64T	*125T*	250T	500T	
1 Million	2M	4M	8M	16M	And to the peasant boy who convinced the King to double One Grain of Rice 64 times if he beat the King in chess, would receive 8 Quintillion Grains of Rice on day 64.
32M	64M	*125M*	250M	500M	

WHEN DOUBLING 32, FIRST SEPARATE 32 INTO ITS MANAGEABLE PARTS:

$$30 + 2$$
$$+\ \underline{30 + 2}$$
$$60 + 4 = 64$$

WHEN DOUBLING 64, FIRST SEPARATE 64 INTO ITS MANAGEABLE PARTS:

$$60 + 4$$
$$+\ \underline{60 + 4}$$
$$120 + 8 = 128$$

WHEN DOUBLING 128, FIRST SEPARATE 128 INTO ITS MANAGEABLE PARTS:

$$100 + 20 + 8$$
$$+\ \underline{100 + 20 + 8}$$
$$200 + 40 + 10 + 6 = 256$$

It is critical that the children approach their early years in math through High School with a confident understanding of at least the first nine binary numbers; try to introduce Sudoku to them using the series binary numbers.

Answers on next page

SUDOKU BINARIES

Every row, column and mini-grid must contain the first nine binary (base 2) numbers:
1, 2, 4, 8, 16, 32, 64, 128, 256

8	32	2			256	16	4	
128				4	2	64		
		128	16			2		256
32			1	256	8			4
256		8			4	32		
		32	256	8				1
	256	1	4			8	2	16

answers to Sudoku Puzzle on previous page

SUDOKU BINARIES

Every row, column and mini-grid must contain the first nine binary (base 2) numbers:
1, 2, 4, 8, 16, 32, 64, 128, 256

4	64	256	8	16	128	1	32	2
8	32	2	64	1	256	16	4	128
128	1	16	32	4	2	64	256	8
1	4	128	16	32	64	2	8	256
32	2	64	1	256	8	128	16	4
256	16	8	128	2	4	32	1	64
2	128	32	256	8	16	4	64	1
64	256	1	4	128	32	8	2	16
16	8	4	2	64	1	256	128	32