



Mu Sigma

TLH- Jaw dropping Ancient Math Techniques around the world

Do The Math

Chicago, IL

Bangalore, India

www.mu-sigma.com

Jaw dropping Ancient Math
Techniques around the world

Proprietary Information

"This document and its attachments are confidential. Any unauthorized copying, disclosure or distribution of the material is strictly forbidden"

Basic approach in Math

1. What we have --- what we can do with it.
2. What we want --- what I should do to attain it.
3. Similarities

How did ancient people in Ethiopia multiply numbers?

$$34 \times 7$$

Two columns of holes were made, and pebbles were gathered

Hole in Column1		Hole in column 2
34		7

Half the previous number, always drop the remainder

Hole 1		Hole 2
34	E	7
17		
8	E	
4	E	
2	E	
1		

Half the previous number, always drop the remainder

Hole 1		Hole 2
34	E	7
17		
8	E	
4	E	
2	E	
1		

Count the pebbles which are marked good.
 $14 + 224 = 34 \times 7$

Hole 1		Hole 2
34	Even - Evil	7
17	Good	14
8	E	28
4	E	56
2	E	112
1	Good	224

Will it work the other way

Hole 1		Hole 2
7	G	34
3	G	68
1	G	136

Will it work always and why?

H1		H2	CALCU
100	E	10	0
50	E	20	0
25	G	40	40
12	E	80	0
6	E	160	0
3	G	320	320
1	G	640	640
			1000

Why does it work?

Hole 1		Hole 2	Calculation	Binary for hole 1
34	Evil	7	0	0
17	Good	14	14	1
8	Evil	28	0	0
4	Evil	56	0	0
2	Evil	112	0	0
1	Good	224	224	1
			238	

A Question to the group

How did human beings understand that stars are huge and are very far away?

How did humans know that a star has come back to its previous position?

How did human beings find the radius of earth?

How did humans find the angle of inclination of earth?

How did human beings understand that stars are huge and very far away?

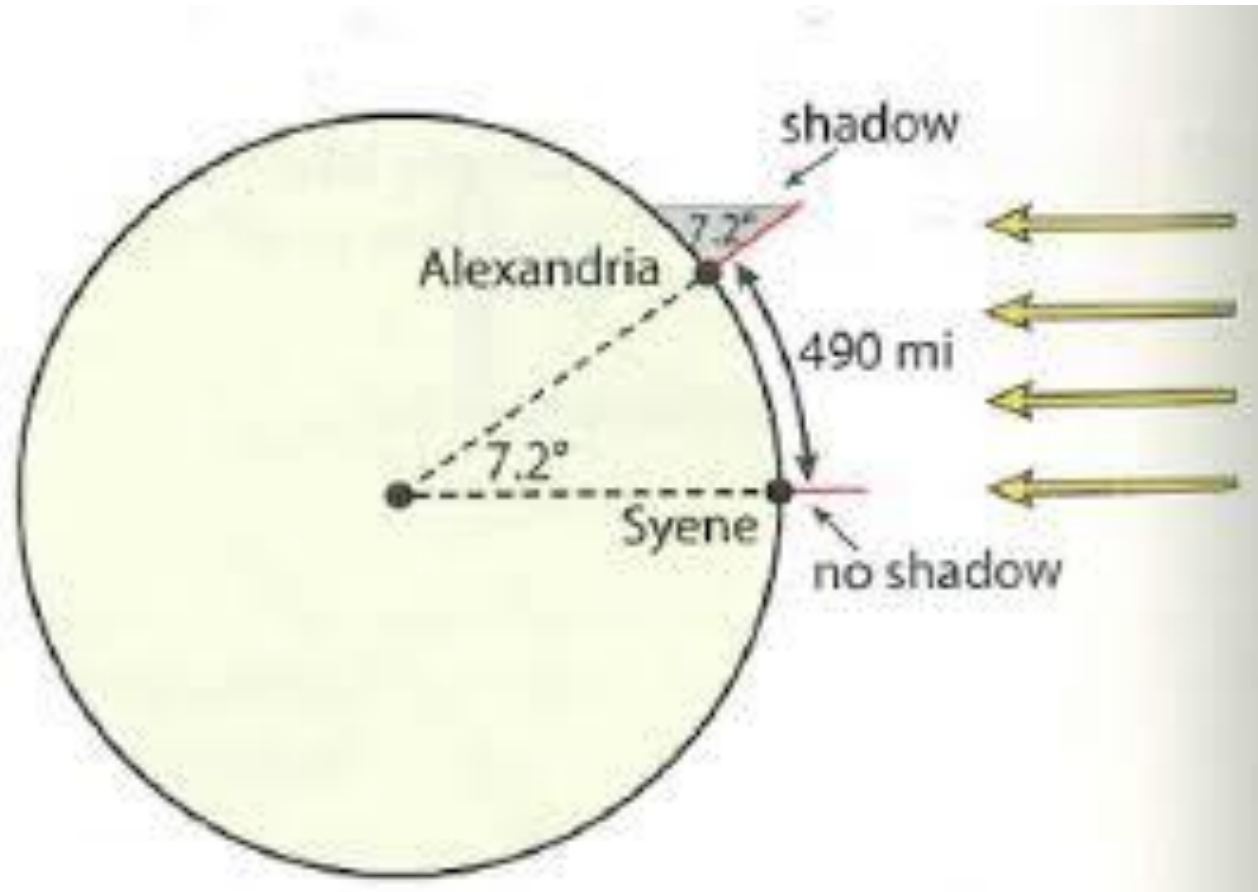
Just imagine that you are moving fast.

The objects near you moves faster than that are far away.

How did Humans know that a star has come to its previous position?



How did human beings find the radius of earth?



Bode's law

Titius-Bode law, empirical relationship between the mean distances of the planets from the sun.

If each number in the series 0, 3, 6, 12, 24, ... (where a new number is twice the previous number) is increased by 4 and divided by 10 to form the series 0.4, 0.7, 1.0, 1.6, 2.8, 5.2, 10.0, 19.6, 38.8, 77.2, ... ,

Bode's law holds that this series gives the mean distances of the planets from the sun, expressed in [astronomical units](#).

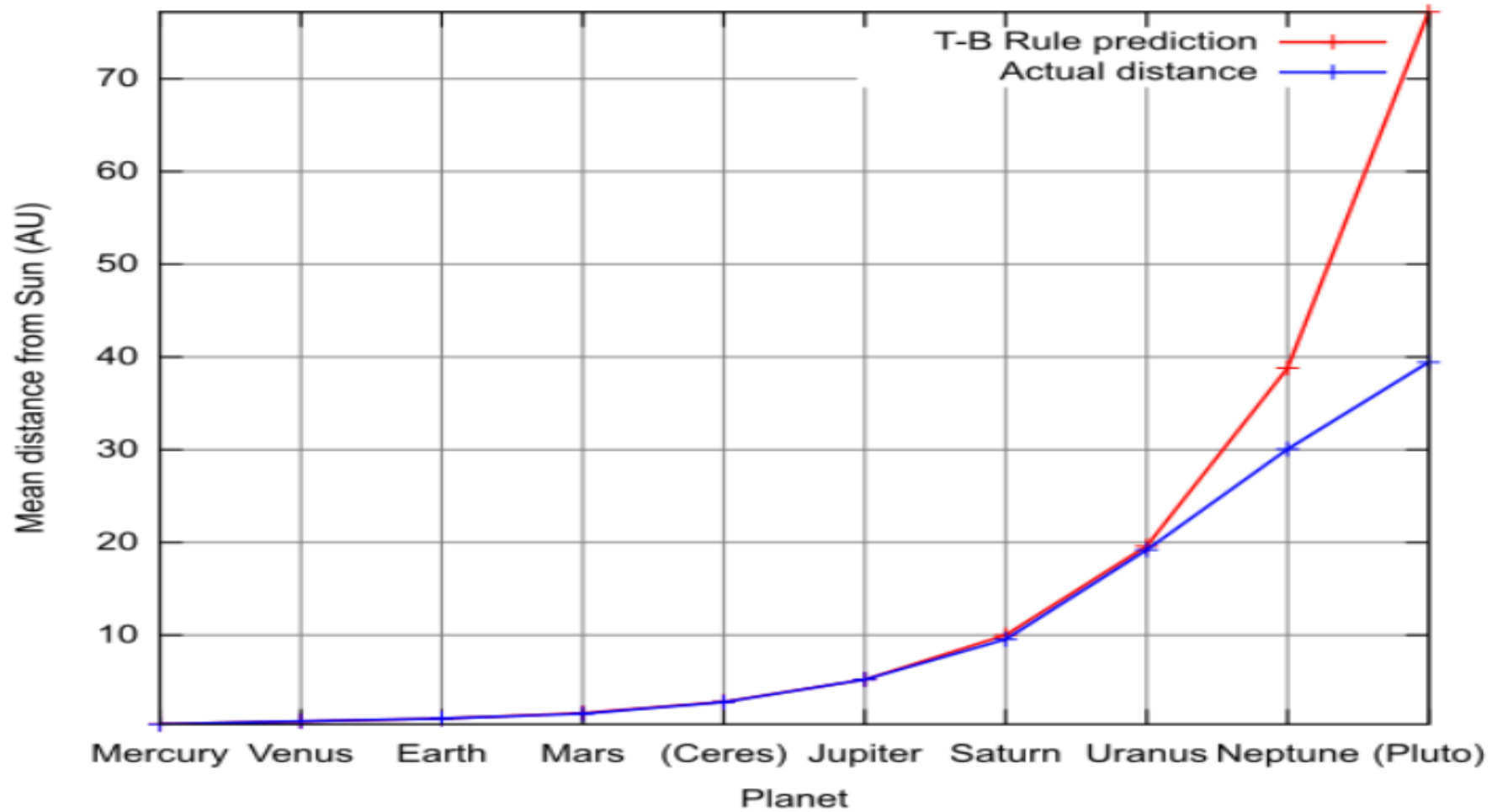
Bode's law

		add 4	Divide by 10
Mercury	0	4	0.4
Venus	3	7	0.7
Earth	6	10	1
Mars	12	16	1.6
	24	28	2.8
Jupiter	48	52	5.2
Saturn	96	100	10

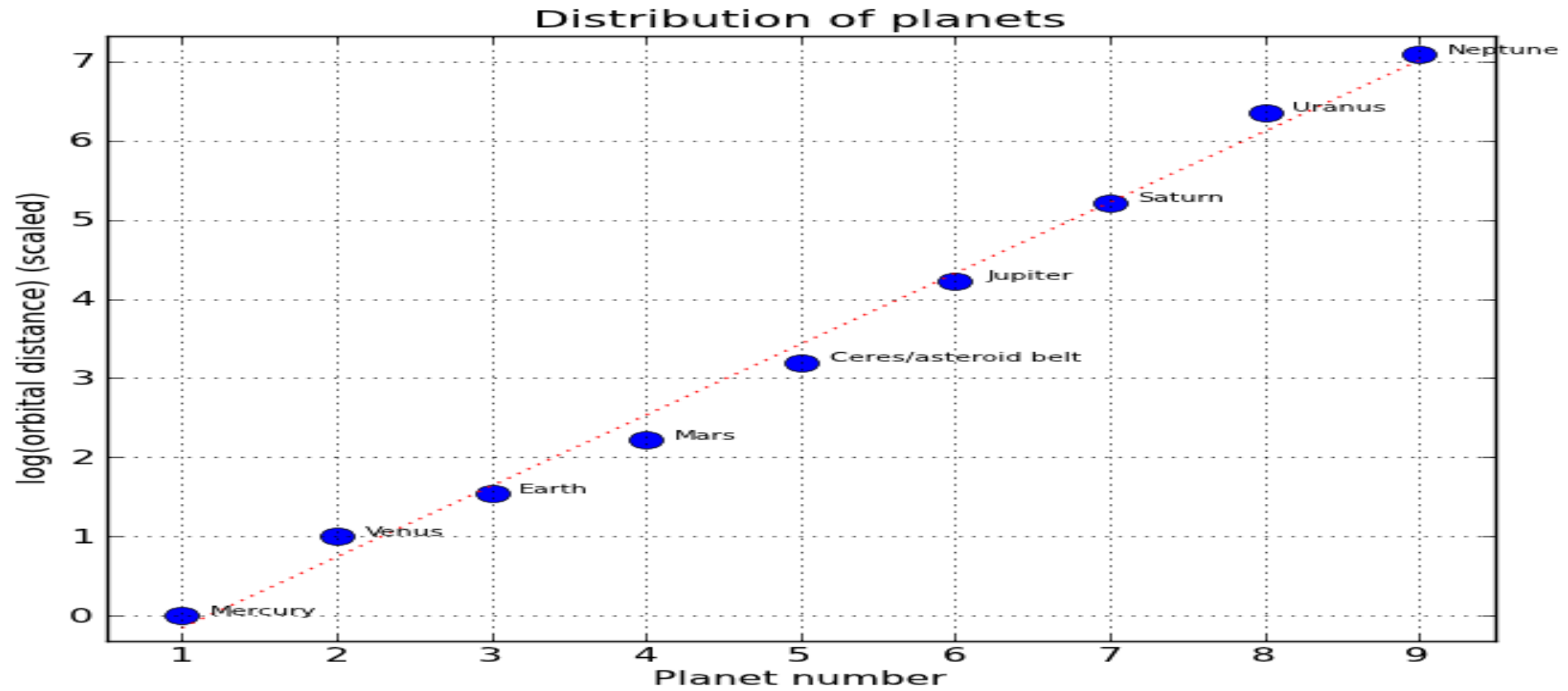
Comparing with actuals

	Planet	2^k	Bode (AU)	Actual (AU)
1	mercury	0	0.4	0.39
2	venus	1	0.7	0.72
3	earth	2	1.	1.
4	mars	4	1.6	1.52
5	asteroids	8	2.8	2.77
6	jupiter	16	5.2	5.2
7	saturn	32	10.	9.54
8	uranus	64	19.6	19.2
9	neptune	128	38.8	30.06
10	pluto	256	77.2	39.44

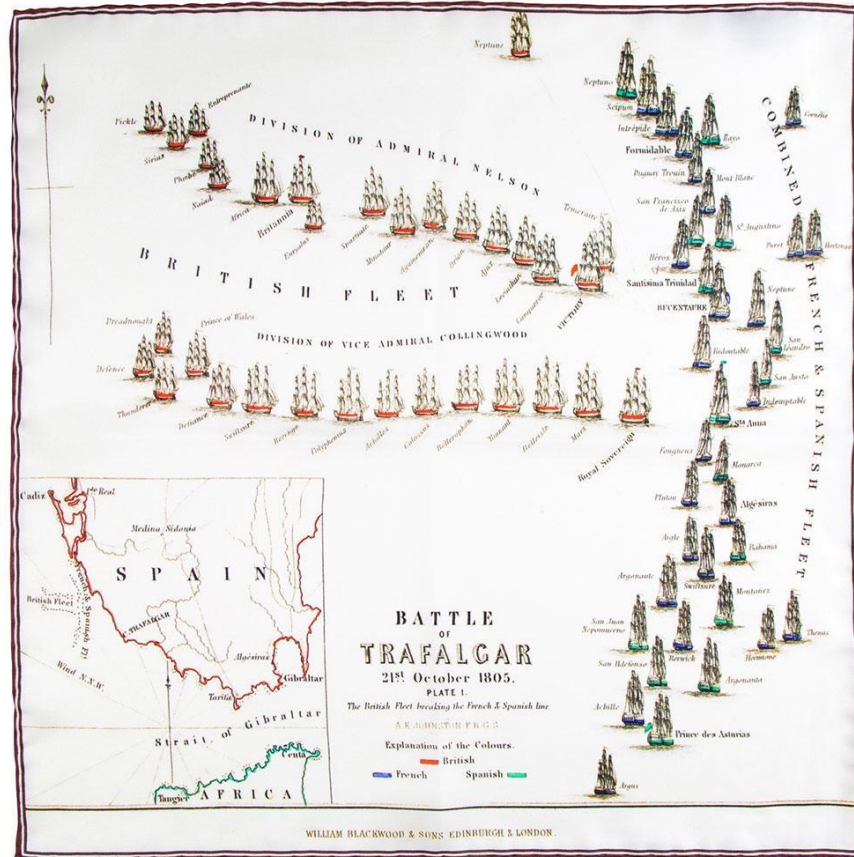
Comparing with actuals



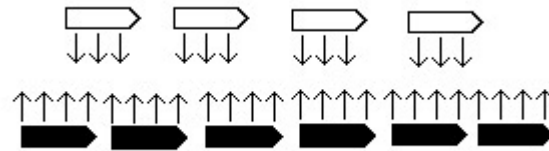
Lognormal distribution



Battle of Trafalgar



Use of calculus to study optimal strategy used.(See the link)



Key take away

Clever idea with simple tools + proper data collection + ingenious analysis took human race to a place where we are now.

Let us look back at our ideas and appreciate each others.



Question and Answer

Thank you