Mu Sigma

Thursday Learning Hour

Rules of Thumb in Statistics
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Do The Math

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Need for Rule of Thumb

Titius–Bode law

"... supposing the distance of the Earth from the Sun to be divided into ten equal Parts, of these the distance of Mercury will be about four, of Venus seven, of Mars fifteen, of Jupiter fifty two, and that of Saturn ninety five." (1715)
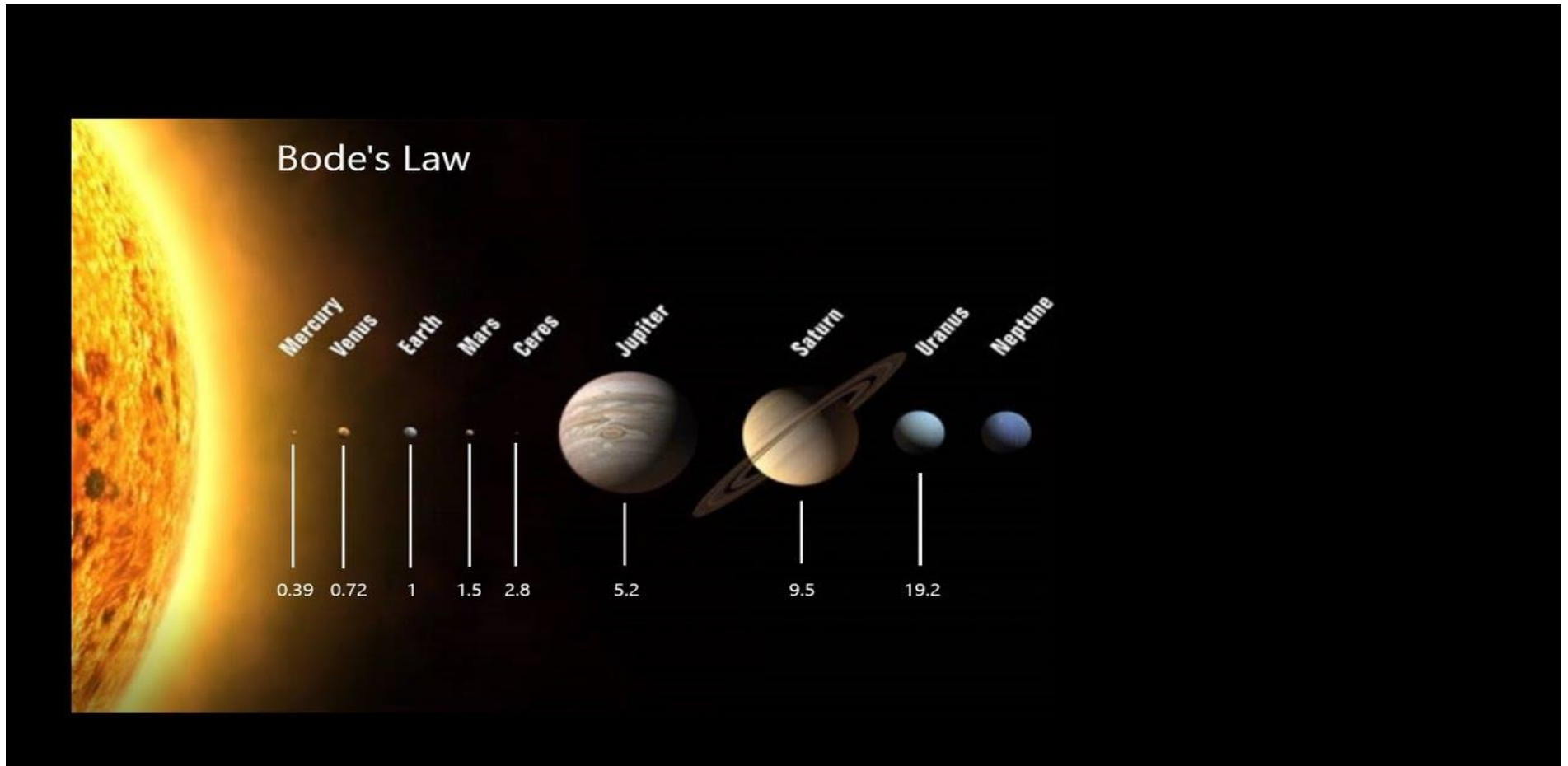
0,3,6,12,24,48,96

Add 4 to all the terms

4, 7, 10, 16, 28, 52, 100

Divide by 10

0.4, 0.7, 1, 1.6, 2.8, 5.2, 10

Bode's law

Estimating: Be Like Fermi

First detonation of the atom bomb, the Trinity Test site, on July 16, 1945

He was one of the atomic scientists observing the blast from base camp.
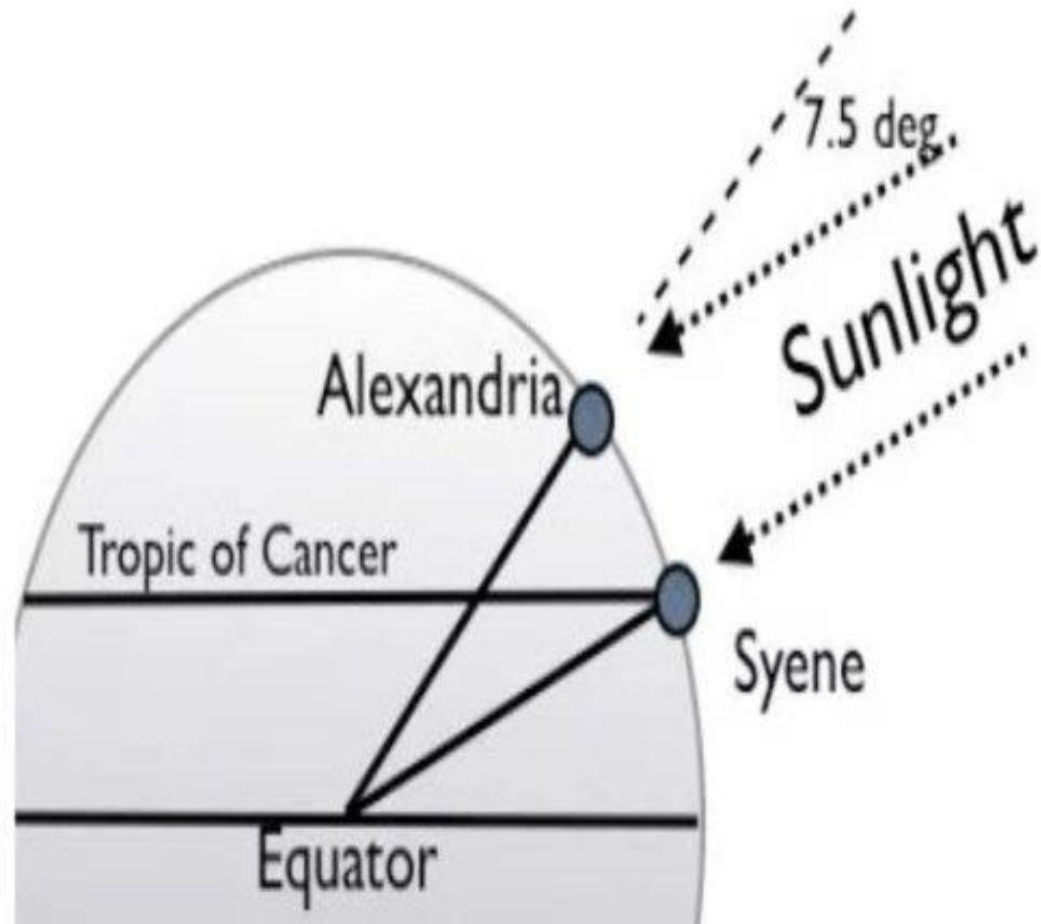
…

…

Fermi concluded that the yield must be greater than 10 kilotons.

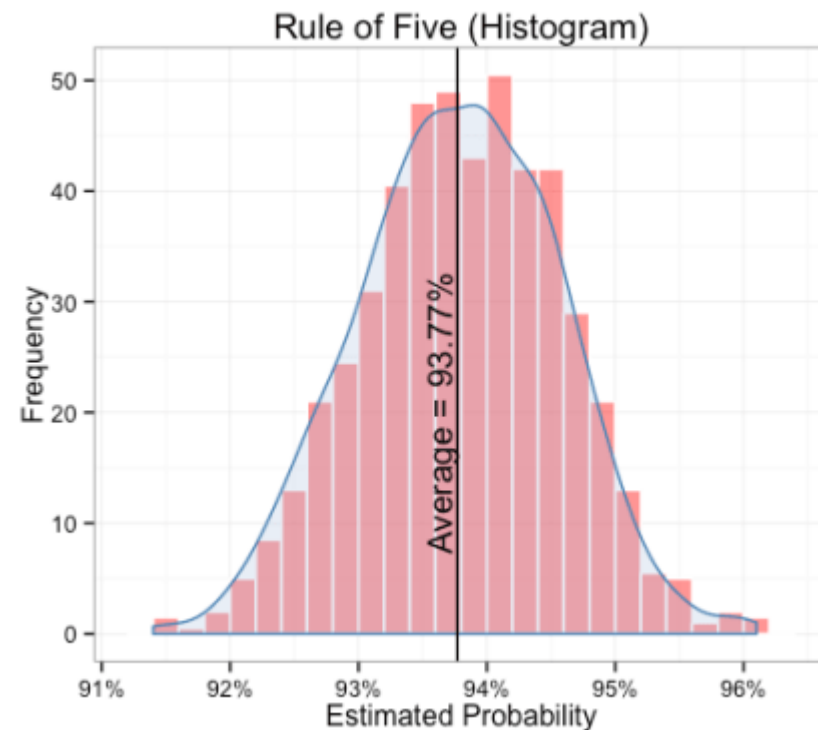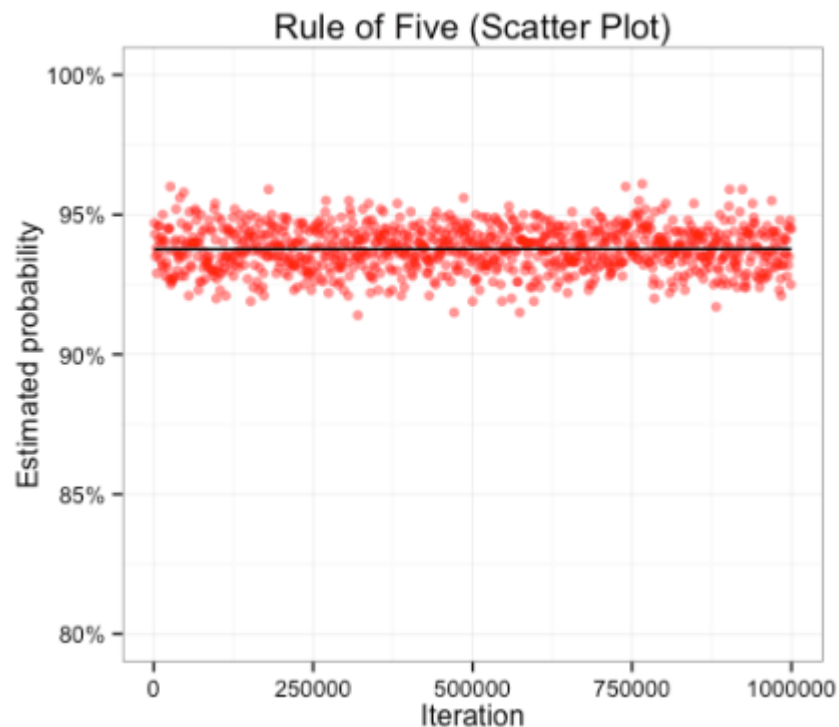The actual was 18.6 Kilotons.

How was the radius of earth found?
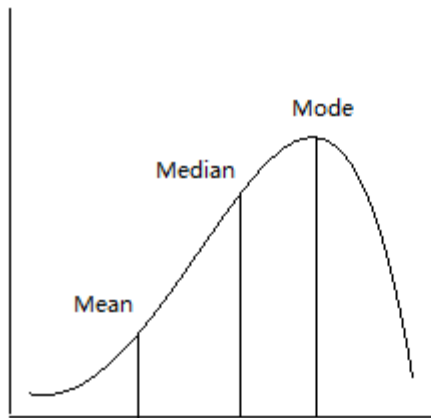
▸ Just using two sticks

Rules of Thumb

1 : Rule of five

There is a 93.75% chance that the median of a population is between the smallest and largest values in any random sample of five from that population.
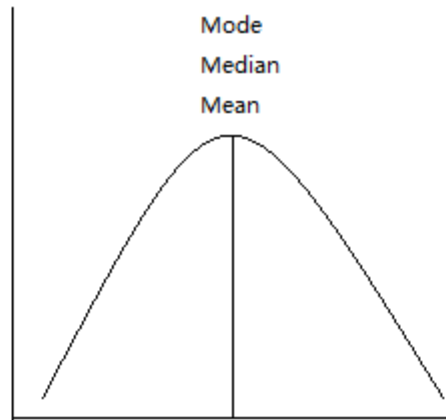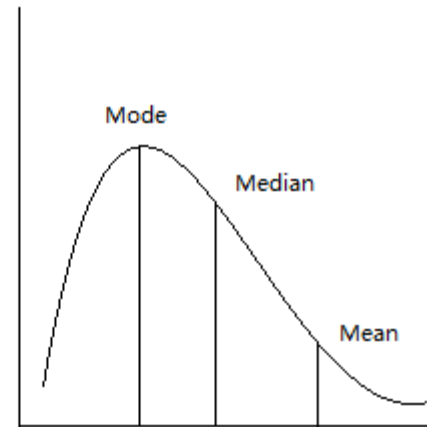
Rules of Thumb

2. |Mean- median| <= SD

| Left skew | Normal Distribution | Right skew |

Rules of Thumb

▶ 3. Standard Deviation

$$\sigma \approx \frac{Sample\ Range}{4}$$

Rules of Thumb

▸ 4 LEHR'S equation for Sample Size

$$n \geq \frac{16}{\Delta^2}$$

$$\Delta = \frac{\mu_1 - \mu_2}{\sigma}$$
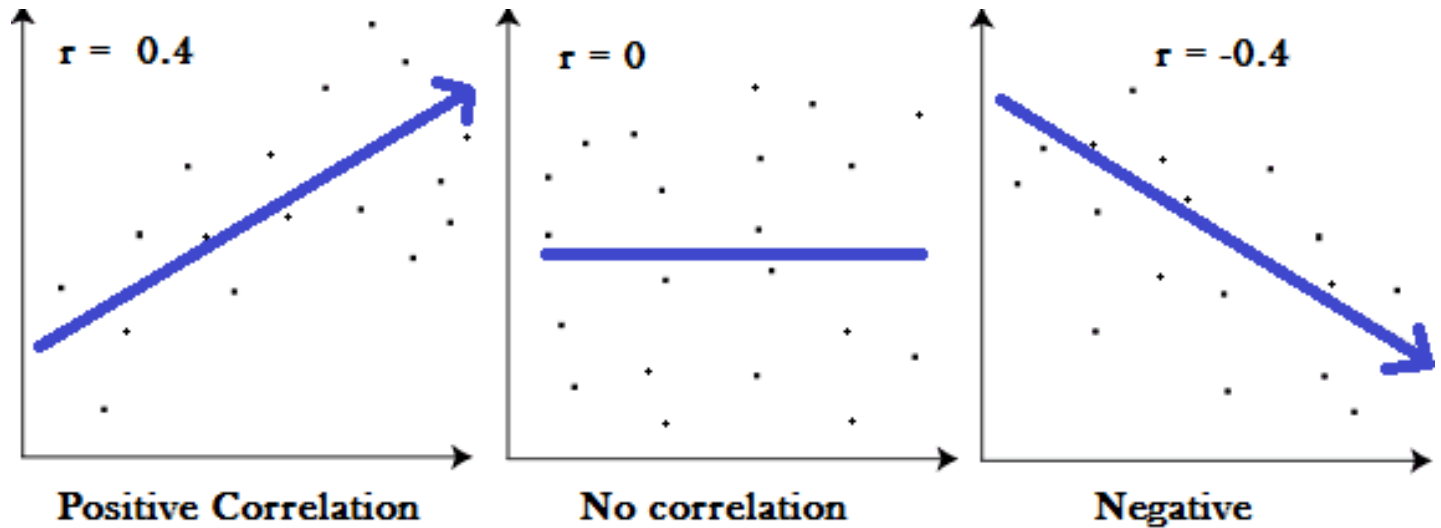
Effect size, omnibus test

Rules of Thumb

5. Determining sample SD

$$\frac{Range}{\sqrt{2(n-1)}} \leq S \leq \frac{n}{n-1}\frac{Range}{2}$$

Rules of Thumb

▸ 6.Correlation coefficient

▸ $|r| < \dfrac{2}{\sqrt{n}}$

r = 0.4
Positive Correlation

r = 0
No correlation

r = -0.4
Negative

Books to Refer

▶ How to Measure Anything: Finding the Value of Intangibles in Business-Douglas W. Hubbard

▶ Statistical Rules of Thumb - Gerald van Belle

Thank You