If I were beginning my studies, I would follow the advice of Plato, & start with mathematics

Galileo Galilei

$$S = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} \cdots\cdots$$

Madhava (1350–1425) Kerala

$$f(x) = x - \frac{x^3}{3} + \frac{x^5}{5} - \frac{x^7}{7} \cdots\cdots$$

$$\frac{df}{dx} = 1 - x^2 + x^4 - x^6 + \cdots\cdots$$

$$= \frac{1}{1+x^2}$$

$$f(x) = \int \frac{1}{1+x^2}\,dx = \tan^{-1} x$$

$$\tan^{-1} x = x - \frac{x^3}{3} + \frac{x^5}{5} - \frac{x^7}{7} \cdots$$

$$\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} \cdots\cdots$$

Pi - π Perimeter

W. Jones in 1706

EULER - 1737

LEONHARD EULER

1. $\boxed{e^{i\pi}+1=0}$ EULER

2. $\boxed{V+F=E+2}$ EULER

BASEL Problem

1644 $S = 1+\frac{1}{2^2}+\frac{1}{3^2}+\frac{1}{4^2}+\cdots$

28 yrs 1738 $S=\frac{\pi^2}{6}$

$$\boxed{e^{i\theta} = \cos\theta + i\sin\theta}$$

GEROLAMO CARDANO (1501-1576)

Italian

$$x^3 + px + q = 0$$

$$x = \sqrt[3]{-\frac{q}{2} + \sqrt{\frac{q^2}{4} + \frac{p^3}{27}}} + \sqrt[3]{-\frac{q}{2} - \sqrt{\frac{q^2}{4} + \frac{p^3}{27}}}$$

$$x^3 - 15x - 4 = 0$$

$$x = \sqrt[3]{2 + \sqrt{-121}} + \sqrt[3]{2 - \sqrt{-121}}$$

NIELS ABEL (1802-1829)

EVARISTE GALOIS (1811-1832)

GROUP THEORY

Jacob BERNOUILLI

$$\lim_{n \to \infty} \left(1 + \frac{1}{n}\right)^n$$

\$100 @ 100% $\longrightarrow$ 200

50%/6 mon $\rightarrow$ 227

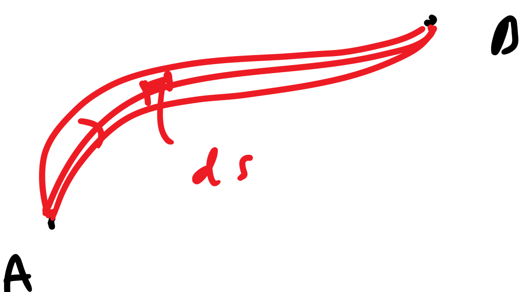
25% 4 mon $\rightarrow$ 244

$$e = \lim_{n \to \infty} \left(1 + \frac{1}{n}\right)^n$$

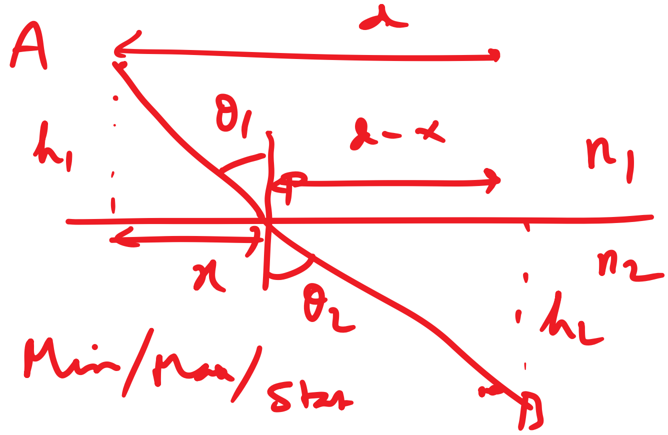
P. FERMAT

$$x^n + y^n = z^n \qquad n > 2$$

Fermat's principle of least time



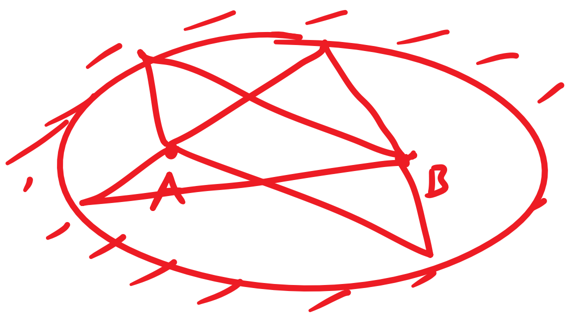
$$\delta \int_A^B dt = 0 \Rightarrow \delta \int_A^B \frac{ds}{v} = 0$$

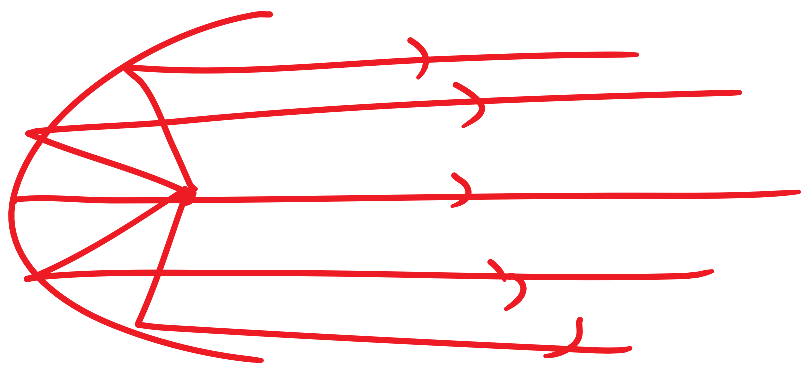


$$t = \frac{AP}{c/n_1} + \frac{PB}{c/n_2} \to \text{Min/max/}_{\text{Stat}}$$

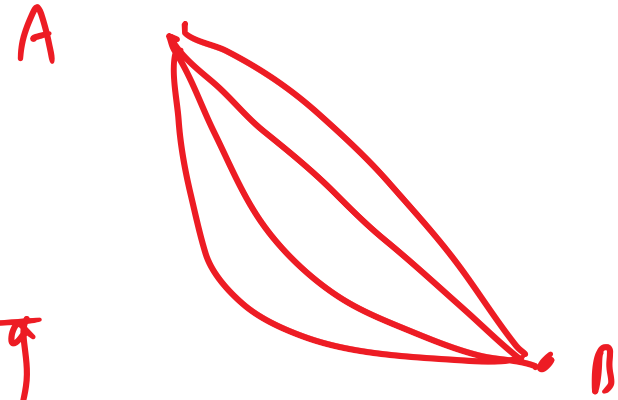
$$f(x) = n_1\sqrt{x^2+h_1^2} + n_2\sqrt{(d-x)^2+h_2^2}$$

$$\frac{df}{dx} = 0 \qquad \boxed{n_1 \sin\theta_1 = n_2 \sin\theta_2}$$





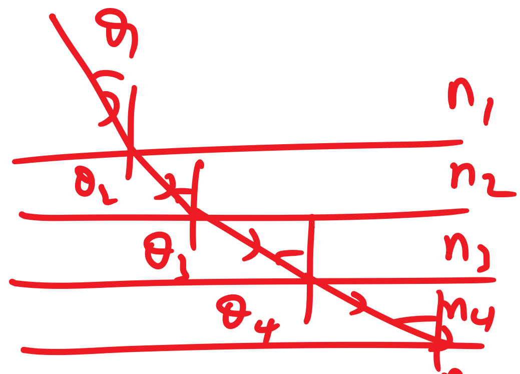
BRACHISOCHRONE



$$\frac{1}{2}mv^2 = mgy$$

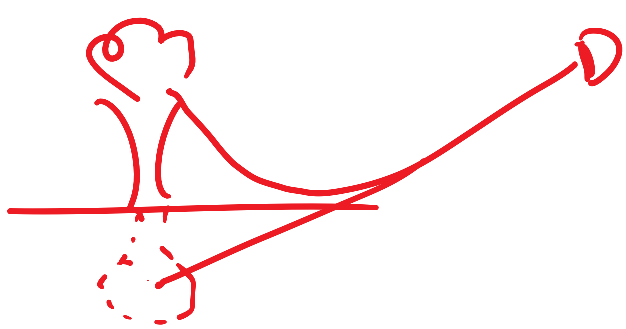
$$\boxed{v(y) = \sqrt{2gy}}$$

$$n(y) = c\sqrt{y}$$



$$n_1 \sin\theta_1 = n_2 \sin\theta_2$$
$$= n_3 \sin\theta_3 \cdots$$

$n(y)\sin\theta(y) =$ Constant



$$\frac{c}{v(y)} \sin\theta(y) = \text{Const}$$

$$\boxed{\frac{\sin\theta(y)}{\sqrt{y}} = \text{Const}}$$