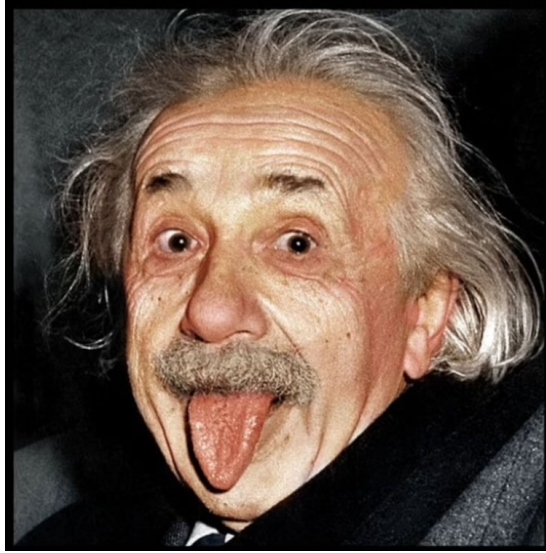
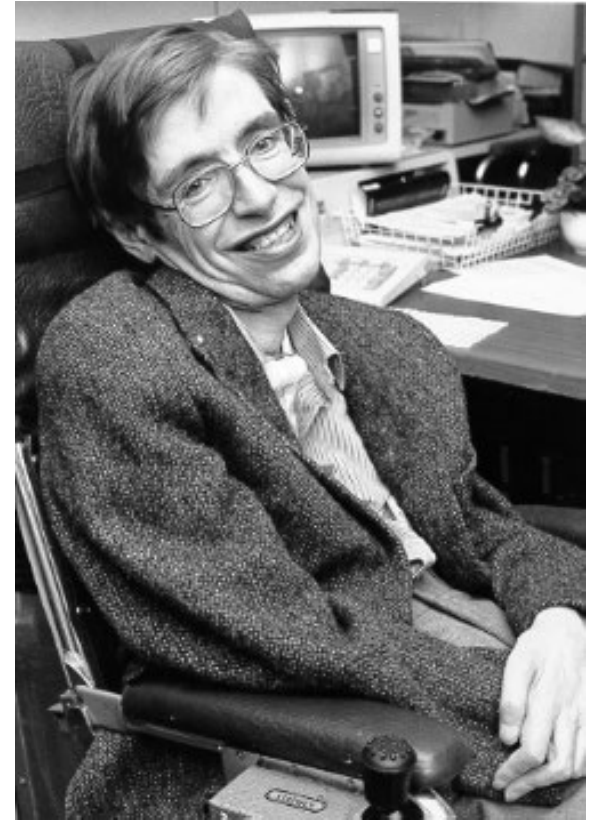


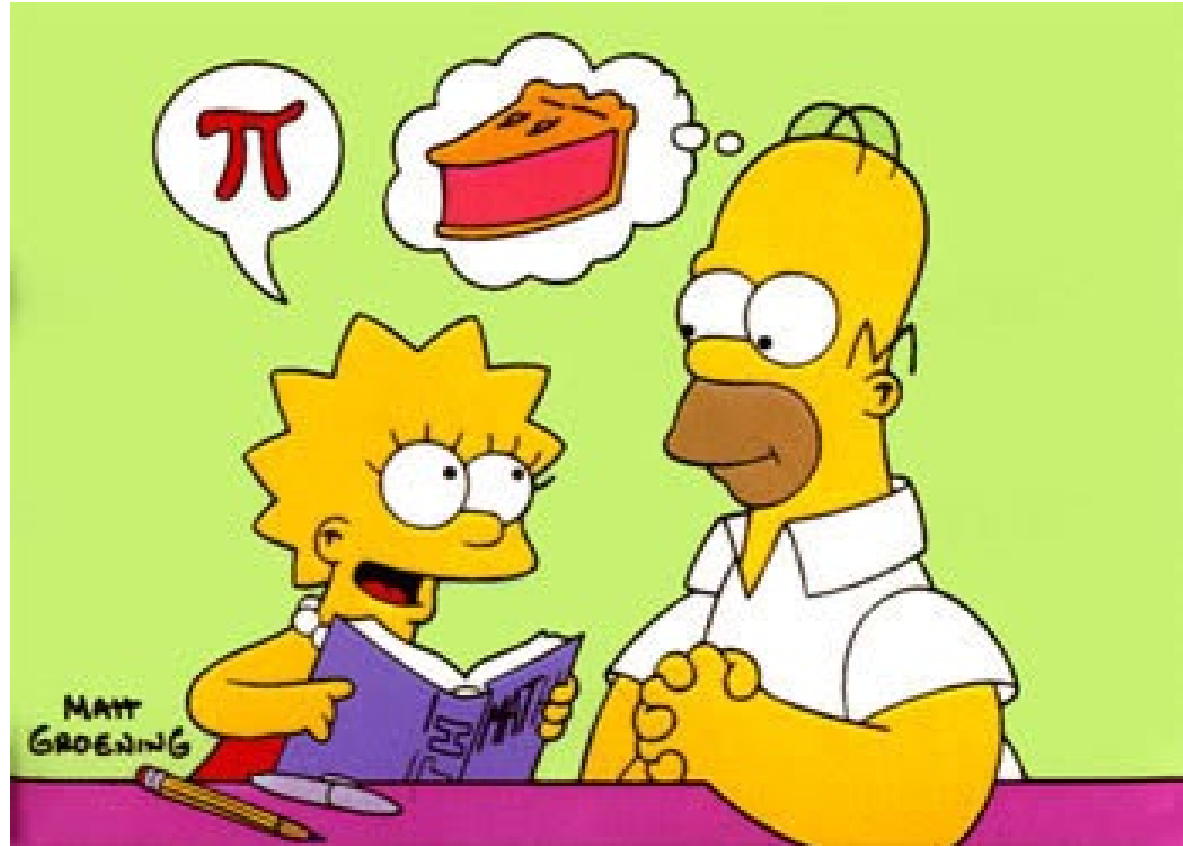
3,14159265358979...

Christian Côté



3/14



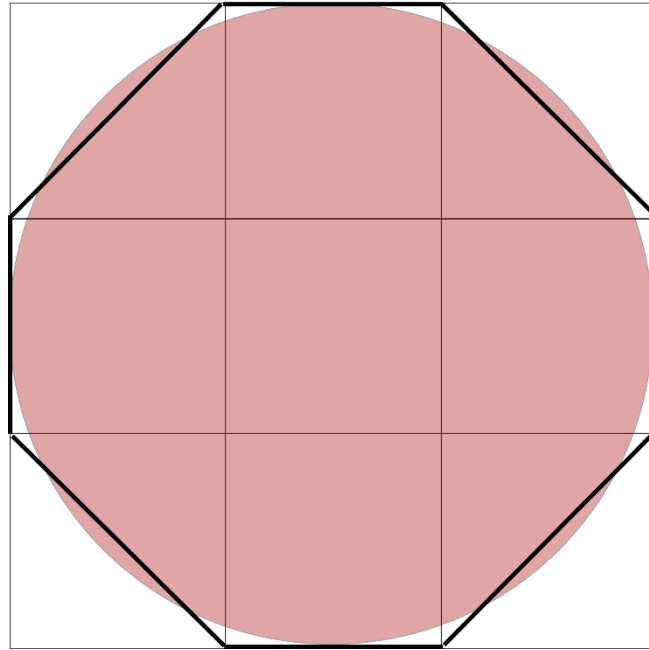


$$\pi = \frac{\text{circonférence}}{\text{diamètre}}$$

2000 av JC - Babyloniens

$$\pi \approx 3,125$$

1650 av JC - Égyptiens



$$\pi \approx 3,1604$$

1200 av JC

Chine



$$\pi \approx 3$$

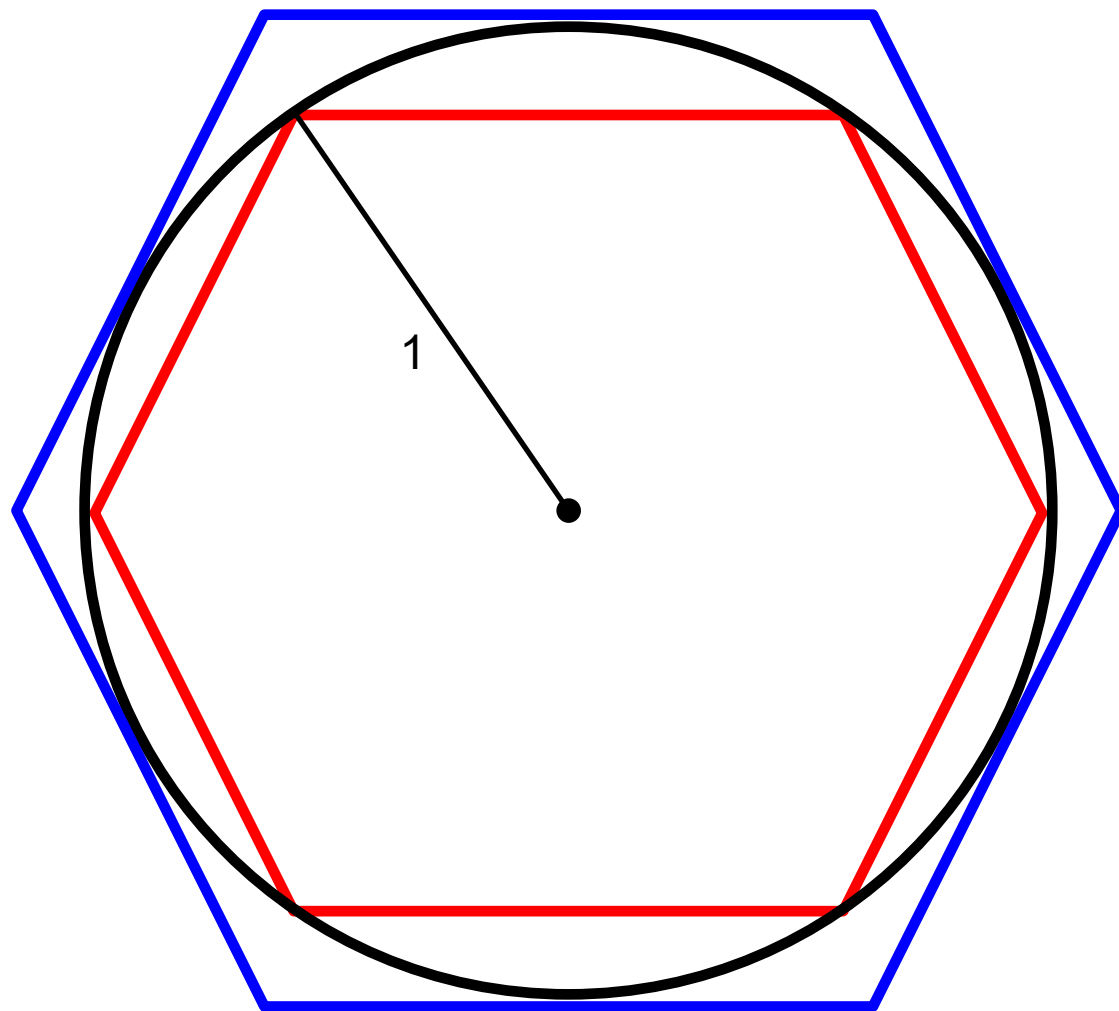


250 av JC

Archimède

$$3,14\textcolor{red}{084}\dots = \frac{223}{71} < \pi < \frac{22}{7} = 3,14\textcolor{red}{285}\dots$$

Polygone inscrit et circonscrit à $96=2^5 \times 3$ côtés



1596

Ludolph Van Ceulen



$$\pi \approx 3,14159265358979323846...$$

35 décimales





1674

Gregory et Leibniz

$$\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - \dots$$



1706

John Machin



$$\frac{\pi}{4} = 4 \cdot \arctan\left(\frac{1}{5}\right) - \arctan\left(\frac{1}{239}\right)$$

100 décimales correctes

$$\pi = 3,$$

14159265358979323846

26433832795028841971

69399375105820974944

59230781640628620899

86280348253421170679...

$$\pi = 3,$$

1	4	1	5	9	2	6	5	3	5	8	9	7	9	3	2	3	8	4	6
2	6	4	3	3	8	3	2	7	9	5	0	2	8	8	4	1	9	7	1
6	9	3	9	9	3	7	5	1	0	5	8	2	0	9	7	4	9	4	4
5	9	2	3	0	7	8	1	6	4	0	6	2	8	6	2	0	8	9	9
8	6	2	8	0	3	4	8	2	5	3	4	2	1	1	7	0	6	7	9
																			...

1736 - Euler

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



1761 – Johann Heinrich Lambert



π est irrationnel.

Nous allons montrer que π^2 est irrationnel.

(si $a \in \mathbb{Q}$ alors $a^2 \in \mathbb{Q}$)

Supposons que $\pi^2 = \frac{a}{b}$, où $a, b \in \mathbb{N}$,

et essayons d'arriver à une contradiction.

$$f_n(x) = \frac{x^n (1-x)^n}{n!}$$



$$G(x) = b^n \text{ (Expression pas belle avec } f_n(x) \text{ et } \pi)$$



$$H(x) = G'(x) \sin(\pi x) - \pi G(x) \cos(\pi x)$$



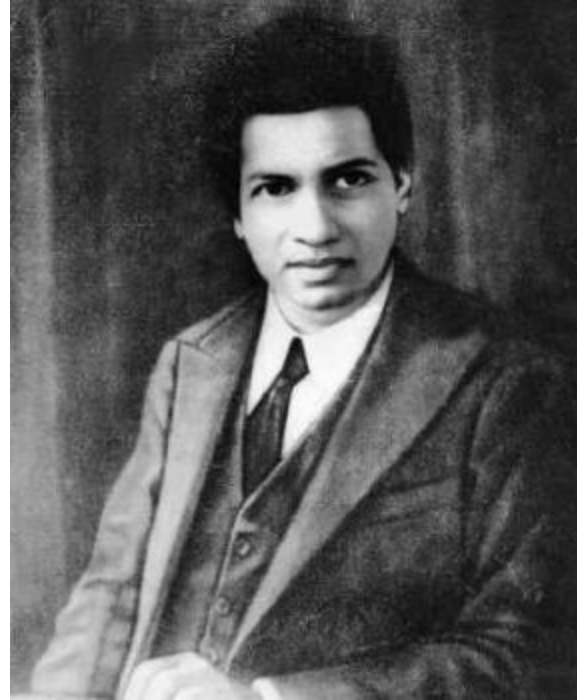
$$0 < \frac{1}{\pi} \int_0^1 H'(x) dx \in \mathbb{Z} < 1$$

$$\begin{aligned}
\int_0^1 \pi^2 a^n f_n(x) \sin(\pi x) \, dx &= \int_0^1 H'(x) \, dx \\
&= H(1) - H(0) \\
&= \left(G'(1) \sin(\pi) - \pi G(1) \cos(\pi) \right) \\
&\quad - \left(G'(0) \sin(0) - \pi G(0) \cos(0) \right) \\
&= \pi \left(G(0) - G(1) \right)
\end{aligned}$$

$$\int_0^1 \pi a^n f_n(x) \sin(\pi x) \, dx = G(0) - G(1) \in \mathbb{Z}$$

1910

Ramanujan



$$\pi = \frac{9801}{2\sqrt{2} \sum_{n=0}^{\infty} \frac{(4n)!(1103 + 26390n)}{(n!)^4 (396)^{4n}}}$$

$$\pi \approx \frac{9801}{2\sqrt{2} \sum_{n=0}^0 \frac{(4n)!(1103 + 26390n)}{(n!)^4 (396)^{4n}}}$$

$$\pi \approx \frac{9801}{2\sqrt{2} \cdot 1103} = 3,141592729...$$

1937 – Salle de pi



1995 – Plouffe et Borwein



$$\pi = \sum_{n=0}^{\infty} \frac{1}{16^n} \left(\frac{4}{8n+1} - \frac{2}{8n+4} - \frac{1}{8n+5} - \frac{1}{8n+6} \right)$$

2015 – Suresh Kumar Sharma



Mémorisation de 70 030 décimales

14 mars 2019 – Emma Haruka Iwao



Google

31 400 milliards de décimales