# MATHEMATICAL EQUATIONS ON POSTAGE STAMPS

BILL ANKLAM

SRSC 3/5/19



# Mathematical Study Unit



## Information

The Mathematical Study Unit (MSU) is a philatelic study unit whose purpose is to acquire and disseminate knowledge of philatelic materials related to mathematics, mathematicians, and computers. Since its creation in 1979, the unit has registered more than 365 members from 25 countries.

Click here to complete an online application form or print out an application to mail in.

### PHILAMATH

The MSU publishes a newsletter, Philamath, four times per year. The newsletter contains a broad spectrum of articles, including short biographies of some of the more obscure mathematicians (e.g. Napoleon, President Garfield, Kant, etc.). You can see the table of contents for recent issues and access an index to all complete volumes to date on the Philamath page of this site. Philamath has been distributed as a full-color print edition since October 2011. You may view this sample issue by clicking on the image to the right. You will need a PDF viewer, either built-in to your browser or as a separate application. Use your browser's back button to return to this page.


### DUES and PAYPAL

Annual dues are $12 per year for residents of North America and $15 per year for overseas residents. The year runs from July 1 to June 30. Please make a check payable to Mathematical Study Unit and send it to:


## Euler's Formula

$$e^{i\varphi} = \cos\varphi + i\ \sin\varphi$$

establishes the fundamental relationship between the **trigonometric** functions, the **complex exponential** function, and the complex plane.

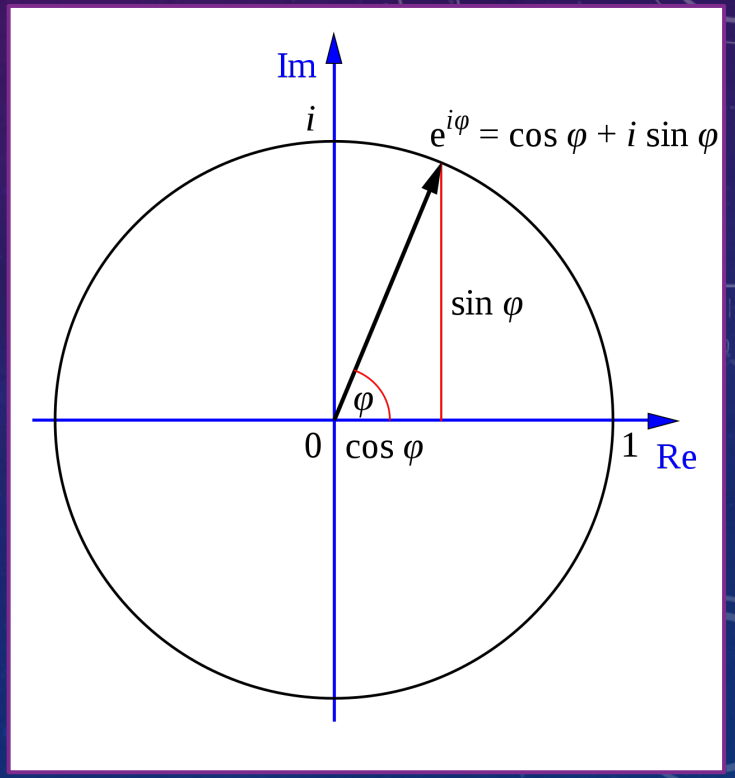
$$e^{i\pi} = -1$$

$$\sqrt{e^{i\pi}} = \sqrt{-1}$$

$$\left(e^{i\pi}\right)^{1/2} = \sqrt{-1}$$

$$e^{i\pi/2} = \sqrt{-1}$$

$$i = \sqrt{-1}$$



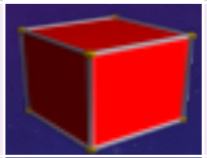
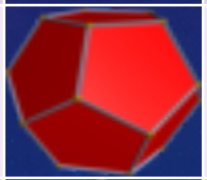

The Euler characteristic χ is classically defined for the surfaces of polyhedra, according to the formula

$$\chi = V - E + F$$

where $V$, $E$, and $F$ are respectively the numbers of vertices (corners), edges and faces in the given polyhedron. Any **convex polyhedron's** surface has Euler characteristic

$$V - E + F = 2$$

This equation is known as Euler's polyhedron formula. It corresponds to the Euler characteristic of the sphere (i.e. χ = 2), and applies identically to spherical polyhedra.

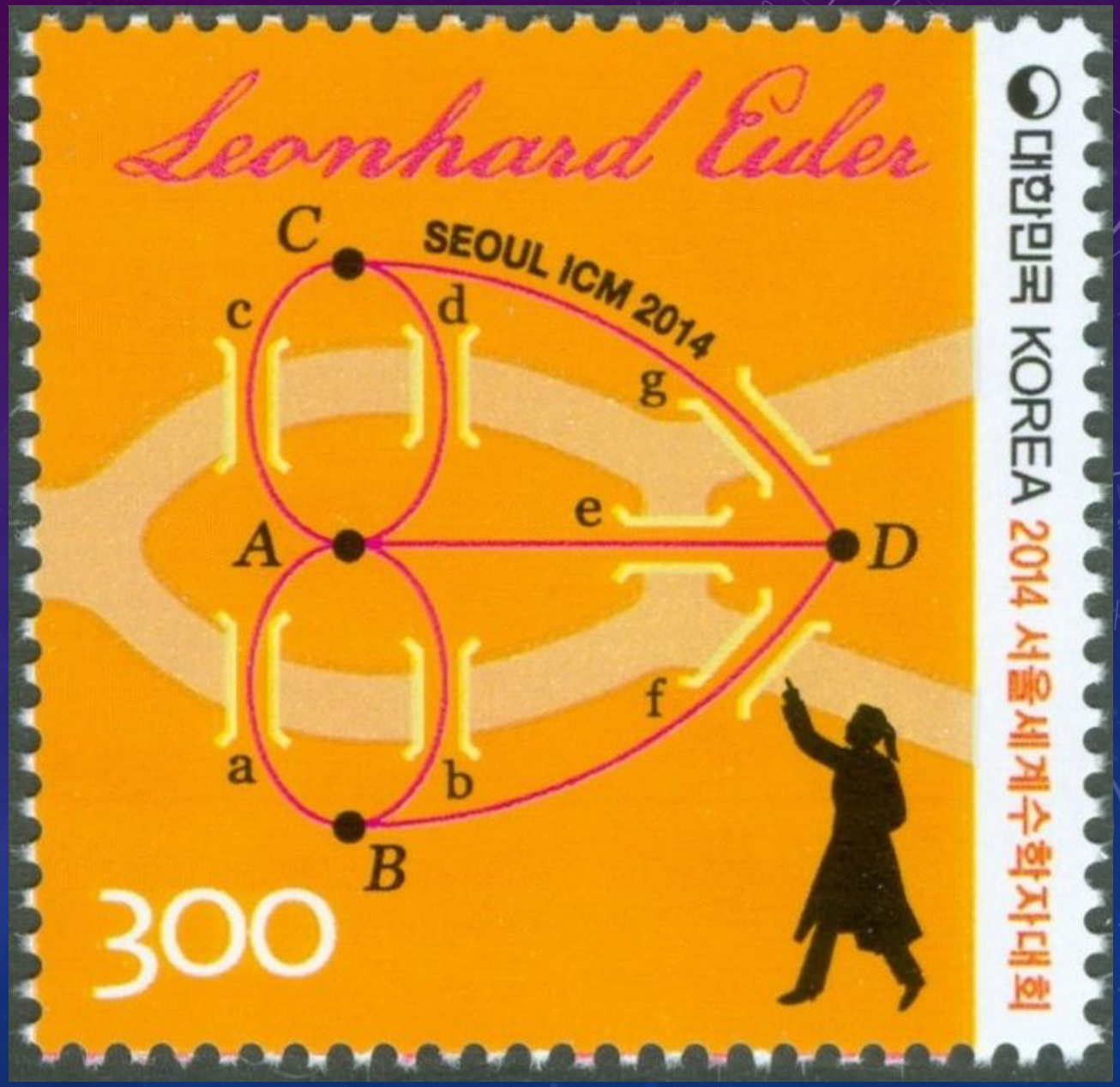
| Name | Image | Vertices *V* | Edges *E* | Faces *F* |
|---|---|---|---|---|
| tetrahedron |  | 4 | 6 | 4 |
| cube |  | 8 | 12 | 6 |
| octahedron |  | 6 | 12 | 8 |
| dodecahedron |  | 20 | 30 | 12 |
| icosahedron |  | 12 | 30 | 20 |

## The Seven Bridges of Königsberg

Devise a walk through the city that crosses each of the bridges once and only once.

Euler proved that the problem has no solution.

Its solution by Leonhard Euler in 1736 laid the foundations of **graph theory** and prefigured the idea of **topology**.



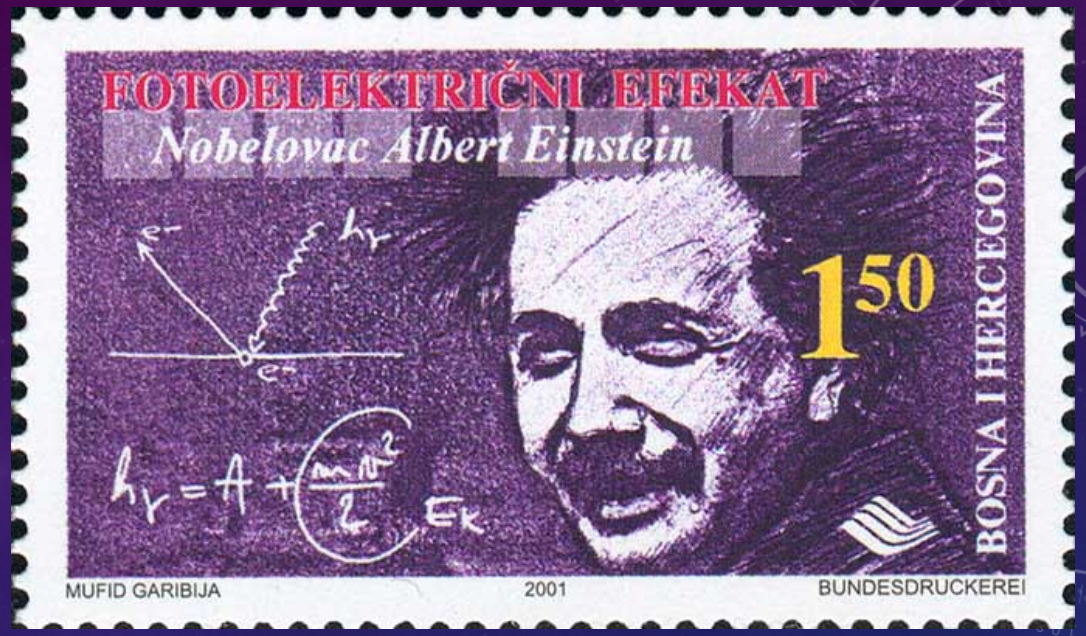
## Photoelectric Effect

The emission of electrons or other free carriers when light (photon) falls on a material.

Published on 9 June 1905, the kinetic energy $E_k$ of an ejected electron is

$$E_k = \frac{mv^2}{2} = h\gamma - W$$

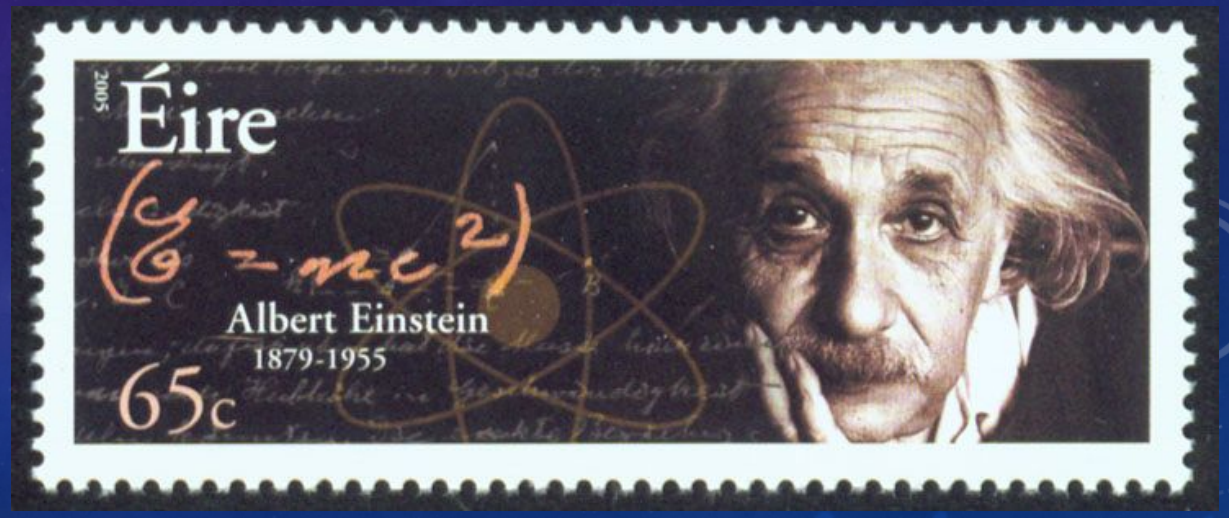
$h$ = Planck's constant, $\gamma$ = frequency

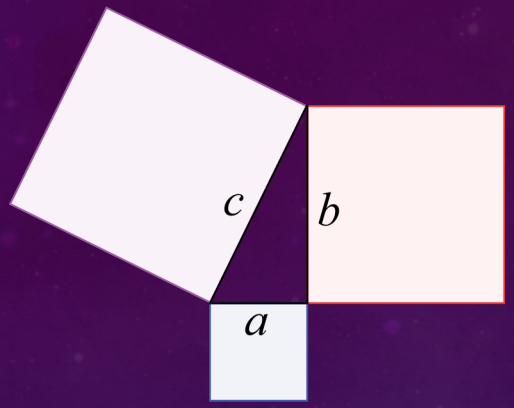



## Energy-Mass Equivalence

$$E = mc^2$$

Published on 21 November 1905, Einstein was the first to propose that the equivalence of mass and energy is a general principle and a consequence of the symmetries of space and time.








**Pythagorean Theorem**

$$a^2 + b^2 = c^2$$

**Fermat's Conjecture (1637)**

$$x^n + y^n \neq z^n$$

when integer $n > 2$, stimulated the development of algebraic number theory.

Formally proved by Andrew Wiles in 1995.

## Newton's 2nd Law of Motion (1687)

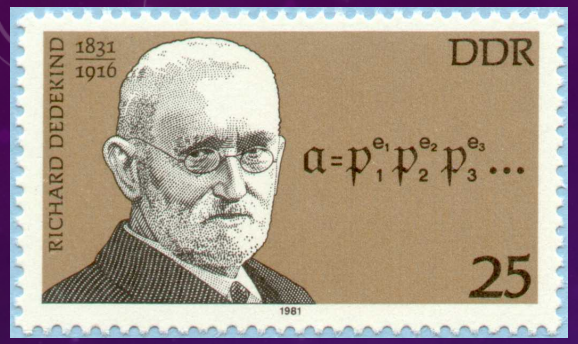
$$\Delta(mv) = F\Delta t$$

$$m\frac{\Delta v}{\Delta t} = ma = F$$

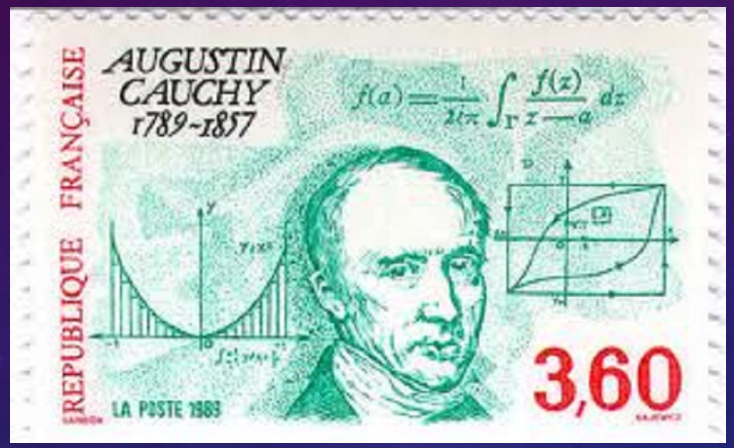
## Optical Prism and Color Theory

Isaac Newton's 1666 experiments in bending white light through a prism demonstrated that all the colors already existed in the light, with the different colors fanning out and traveling with different speeds through the prism.

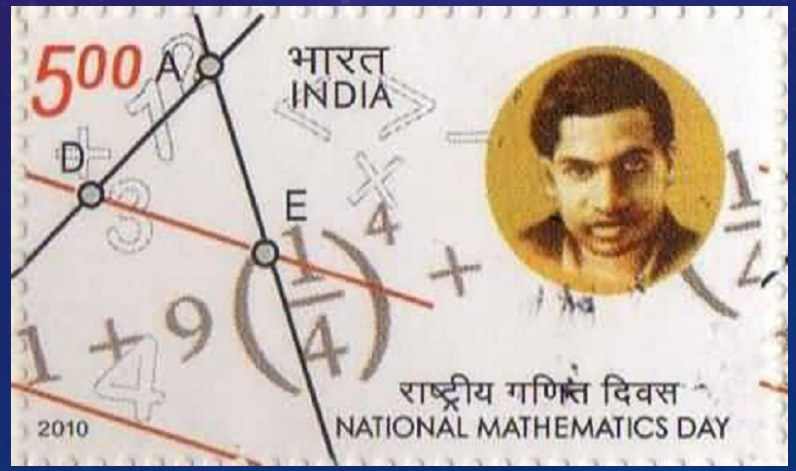

哥德巴赫猜想的最佳结果
$P_x(1,2) \geq \frac{0.67xC_x}{(\log x)^2}$
中国邮政 CHINA
80分
1999 – 16
(4 – 3) T


RICHARD DEDEKIND
1831
1916
DDR
$a=p_1^{e_1}p_2^{e_2}p_3^{e_3}\ldots$
25
1981


ВЕЛИКИЙ РУССКИЙ МАТЕМАТИК
А.М. ЛЯПУНОВ
1857
1957
$\frac{\Psi^2}{2}(x^2+y^2)+f\rho\int\frac{dx'}{D}=\text{const.}$
40
КОП. ПОЧТА СССР
nederland
70c
$\left(p+\frac{a}{V^2}\right)(V-b)=RT$
J.D. VAN DER WAALS
NOBELPRIJS 1910
NATUURKUNDE


AUGUSTIN
CAUCHY
1789-1857
$f(a)=\frac{1}{2\pi i}\int_\Gamma\frac{f(z)}{z-a}dz$
REPUBLIQUE FRANÇAISE
LA POSTE 1989
3,60


GUSTAV ROBERT KIRCHHOFF
1824
1887
$\sum_\nu I_\nu=0$
$\sum_\nu U_\nu=0$
30
DEUTSCHE BUNDESPOST BERLIN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भारत
INDIA
राष्ट्रीय गणित दिवस
NATIONAL MATHEMATICS DAY
2010


Э.Х. Ленц 1804-1865
$Q=I^2Rt$
РОССИЯ ROSSIJA 2004
4.25