

$$x^4 - 8224x^3 + 25360856x^2 - 34775906944x + 17860393921680 = 0$$



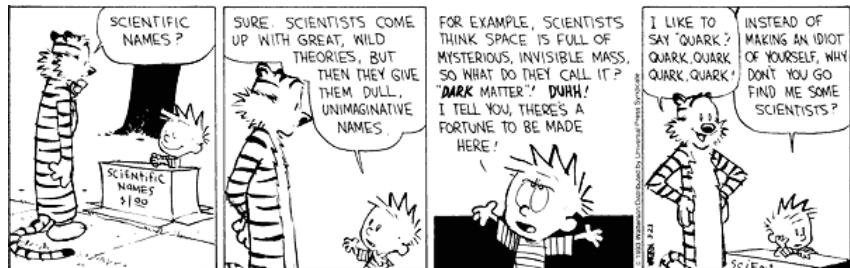
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$$\sqrt{\frac{2}{2}} = \sqrt{1} = 1$$

Frank and Ernest



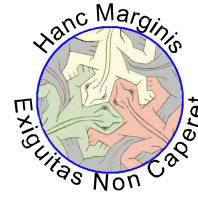
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DILBERT By SCOTT ADAMS



1	W	(1803) Guglielmo Libri Carucci dalla Sommaja	RM132	
		(1878) Agner Krarup Erlang		
		(1894) Satyendranath Bose	RM168	
		(1912) Boris Gnedenko		
2	T	(1822) Rudolf Julius Emmanuel Clausius		
		(1905) Lev Genrichovich Shnirelman		
		(1938) Anatoly Samoilenko		
3	F	(1917) Yuri Alexeievich Mitropolsky		
4	S	(1643) Isaac Newton	RM071	
5	S	(1723) Nicole-Reine Etable de Labrière Lepaute		
		(1838) Marie Ennemond Camille Jordan		
		(1871) Federigo Enriques	RM084	
		(1871) Gino Fano		
2	6	M	(1807) Jozeph Mitza Petzval	
			(1841) Rudolf Sturm	
7	T	(1871) Felix Edouard Justin Emile Borel		
		(1907) Raymond Edward Alan Christopher Paley		
8	W	(1888) Richard Courant	RM156	
		(1924) Paul Moritz Cohn		
		(1942) Stephen William Hawking		
9	T	(1864) Vladimir Adreievich Steklov		
10	F	(1915) Mollie Orshansky		
		(1875) Issai Schur		
11	S	(1905) Ruth Moufang		
		(1545) Guidobaldo del Monte	RM120	
		(1707) Vincenzo Riccati		
12	S	(1734) Achille Pierre Dionis du Sejour		
		(1906) Kurt August Hirsch		
		(1915) Herbert Ellis Robbins	RM156	
3	13	M	(1864) Wilhelm Karl Werner Otto Fritz Franz Wien	
			(1876) Luther Pfahler Eisenhart	
			(1876) Erhard Schmidt	
			(1902) Karl Menger	
			(1902) Alfred Tarski	RM096
14	T	(1704) Johann Castillon		
		(1717) Matthew Stewart		
15	W	(1850) Sofia Vasilievna Kovalevskaja	RM144	
		(1801) Thomas Klausen		
		(1647) Catherina Elisabetha Koopman Hevelius		
17	F	(1847) Nikolay Egorovich Zukowsky		
		(1858) Gabriel Koenigs		
		(1856) Luigi Bianchi		
18	S	(1880) Paul Ehrenfest		
		(1813) Rudolf Friedrich Alfred Clebsch		
19	S	(1879) Guido Fubini		
		(1908) Aleksandr Gennadievich Kurosh		
		(1775) André Marie Ampère		
4	20	M	(1895) Gabor Szegő	
			(1904) Renato Caccioppoli	RM072
			(1846) Pieter Hendrik Schoute	
			(1915) Yuri Vladimirovich Linnik	
22	W	(1592) Pierre Gassendi		
		(1886) John William Navin Sullivan		
		(1908) Lev Davidovich Landau	RM063	
23	T	(1840) Ernst Abbe		
		(1862) David Hilbert	RM060	
24	F	(1891) Abram Samoilovitch Besicovitch		
		(1914) Vladimir Petrovich Potapov		
25	S	(1627) Robert Boyle		
		(1736) Joseph-Louis Lagrange	RM048	
		(1843) Karl Hermann Amandus Schwarz		
26	S	(1799) Benoît Paul Émile Clapeyron		
		(1862) Eliakim Hastings Moore		
5	27	M	(1832) Charles Lutwidge Dodgson	RM108
			(1701) Charles Marie de La Condamine	
28	T	(1888) Louis Joel Mordell		
		(1892) Carlo Emilio Bonferroni		
		(1817) William Ferrel		
29	W	(1888) Sidney Chapman		
		(1619) Michelangelo Ricci		
30	T	(1715) Giovanni Francesco Fagnano dei Toschi		
		(1841) Samuel Loyd		
		(1896) Sofia Alexandrovna Janovskaja		
		(1945) Persi Warren Diaconis		
		(1900) John Charles Burkill		
31	F	(1522) Lodovico Ferrari		



Putnam 1999, A1

Find polynomials $f(x)$, $g(x)$ and $h(x)$, if they exist, such that for all x :

$$|f(x)| - |g(x)| + h(x) = \begin{cases} -1 & \text{if } x < -1 \\ 3x+2 & \text{if } -1 \leq x \leq 0 \\ -2x+2 & \text{if } x > 0 \end{cases}$$

The Amazing U

“Has anyone had problems with the computer accounts?”

“Yes, I don’t have one.”

“Okay, you can send mail to one of the tutors...”

- E. D’Azevedo Computer Science 372

Weird, but true

The First Law of Applied Mathematics: All infinite series converge, and moreover converge to the first term.

Wir müssen wissen. Wir werden wissen. (We must know. We will know).

[Speech in Königsberg in 1930, now on his tomb in Göttingen]

David Hilbert

Galileo was no idiot. Only an idiot could believe that science requires martyrdom – that may be necessary in religion, but in time a scientific result will establish itself.

David Hilbert

The reader will find no figures in this work. The methods which I set forth do not require either constructions or geometrical or mechanical reasonings: but only algebraic operations, subject to a regular and uniform rule of procedure.

Joseph-Louis Lagrange

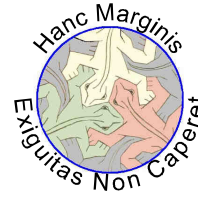
We lay down a fundamental principle of generalization by abstraction: “The existence of analogies between central features of various theories implies the existence of a general theory which underlies the particular theories and unifies them with respect to those central features....”

Eliakim Hastings Moore

Mathematical study and research are very suggestive of mountaineering. Whymper made several efforts before he climbed the Matterhorn in the 1860’s and even then it cost the life of four of his party. Now, however, any tourist can be hauled up for a small cost, and perhaps does not appreciate the difficulty of the original ascent. So in mathematics, it may be found hard to realise the great initial difficulty of making a little step which now seems so natural and obvious, and it may not be surprising if such a step has been found and lost again.

Louis Joel Mordell

1	S	(1900) John Charles Burkill	
2	S	(1522) Lodovico Ferrari (1893) Cornelius Lanczos (1897) Gertrude Blanch	
6	3	M	(1893) Gaston Maurice Julia RM073
4	T	(1905) Eric Christopher Zeeman	
5	W	(1757) Jean Marie Constant Duhamel	
6	T	(1465) Scipione del Ferro (1612) Antoine Arnauld (1695) Nicolaus (II) Bernoulli	RM064 RM093
7	F	(1877) Godfried Harold Hardy (1883) Eric Temple Bell	RM049
8	S	(1700) Daniel Bernoulli (1875) Francis Ysidro Edgeworth (1928) Ennio de Giorgi	RM093 RM133
9	S	(1775) Farkas Wolfgang Bolyai (1907) Harold Scott Macdonald Coxeter	RM097
7	10	M	(1747) Aida Yasuaki (1932) Vivienne Malone-Mayes RM121
11	T	(1657) Bernard Le Bovier de Fontenelle (1800) William Henry Fox Talbot (1839) Josiah Willard Gibbs (1915) Richard Wesley Hamming	
12	W	(1914) Hanna Caemmerer Neumann (1921) Kathleen Rita McNulty Mauchly Antonelli	
13	T	(1805) Johann Peter Gustav Lejeune Dirichlet	RM145
14	F	(1468) Johann Werner (1849) Hermann Hankel (1877) Edmund Georg Hermann Landau (1896) Edward Artur Milne	RM063
15	S	(1564) Galileo Galilei (1850) Sophie Willock Bryant (1861) Alfred North Whitehead (1946) Douglas Hofstadter	RM085
16	S	(1822) Francis Galton (1853) Gregorio Ricci-Curbastro (1903) Beniamino Segre	
8	17	M	(1890) Sir Ronald Aylmer Fisher (1891) Adolf Abraham Halevi Fraenkel (1905) Rózsa Péter
18	T	(1404) Leon Battista Alberti (1919) Clifford Truesdell	RM157
19	W	(1473) Nicolaus Copernicus	
20	T	(1844) Ludwig Boltzmann	RM061
21	F	(1591) Girard Desargues (1915) Evgeny Michailovich Lifshitz	
22	S	(1857) Heinrich Rudolf Hertz (1903) Frank Plumpton Ramsey	
23	S	(1583) Jean-Baptiste Morin (1922) Anneli Cahn Lax (1951) Shigefumi Mori (1561) Henry Briggs	RM169
9	24	M	(1871) Felix Bernstein
25	T	(1827) Henry Watson	
26	W	(1786) Dominique Francois Jean Arago	
27	T	(1881) Luitzen Egbertus Jan Brouwer	
28	F	(1735) Alexandre Theophile Vandermonde	
29		(1860) Herman Hollerith	RM109



Putnam 1999, A2

Let $p(x)$ be a polynomial that is nonnegative for all real x . Prove that for some k , there are polynomials $f_1(x), \dots, f_k(x)$ such that:

$$p(x) = \sum_{j=1}^k (f_j(x))^2$$

The Amazing U

“If that makes any sense to you, you have a big problem.”

- C. Durance Computer Science 234

Weird, but true

There are two groups of people in the world: those who believe that the world can be divided into two groups of people, and those who don't.

It is the perennial youthfulness of mathematics itself which marks it off with a disconcerting immortality from the other sciences.

Eric Temple Bell

“Obvious” is the most dangerous word in mathematics.

Eric Temple Bell

Finally we shall place the Sun himself at the center of the Universe. All this is suggested by the systematic procession of events and the harmony of the whole Universe, if only we face the facts, as they say, ‘with both eyes open’.

Nicolaus Copernicus

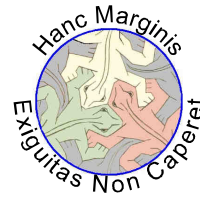
Mathematicians are like lovers. Grant a mathematician the least principle, and he will draw from it a consequence which you must also grant him, and from this consequence another.

Bernard Le Bovier De Fontenelle

Does anyone believe that the difference between the Lebesgue and Riemann integrals can have physical significance, and that whether say, an airplane would or would not fly could depend on this difference? If such were claimed, I should not care to fly in that plane.

Richard Wesley Hamming

1	S	(1611) John Pell (1879) Robert Daniel Carmichael		
2	S	(1836) Julius Weingarten		
10	3	M	(1838) George William Hill (1845) Georg Cantor (1916) Paul Richard Halmos	RM062
4	T	(1822) Jules Antoine Lissajous		
5	W	(1512) Gerardus Mercator (1759) Benjamin Gompertz (1817) Angelo Genocchi (1885) Pauline Sperry (1915) Laurent Schwartz (1931) Vera Pless		
6	T	(1866) Ettore Bortolotti		
7	F	(1792) William Herschel (1824) Delfino Codazzi (1922) Olga Alexandrovna Ladyzhenskaya	RM146	
8	S	(1851) George Chrystal		
9	S	(1818) Ferdinand Joachimsthal (1900) Howard Hathaway Aiken		
11	10	M	(1864) William Fogg Osgood (1872) Mary Ann Elizabeth Stephansen	
11	T	(1811) Urbain Jean Joseph Le Verrier (1853) Salvatore Pincherle (1870) Louis Bachelier	RM158	
12	W	(1685) George Berkeley (1824) Gustav Robert Kirchhoff (1859) Ernesto Cesaro		
13	T	(1861) Jules Joseph Drach (1957) Rudy D'Alembert		
14	F	(1864) Jozef Kurschak (1879) Albert Einstein (1904) Lyudmila Vsevolodovna Keldysh	RM074	
15	S	(1860) Walter Frank Raphael Weldon (1868) Grace Chisolm Young		
16	S	(1750) Caroline Herschel (1789) Georg Simon Ohm (1846) Magnus Gosta Mittag-Leffler	RM146	
12	17	M	(1876) Ernest Benjamin Esclangon (1897) Charles Fox	
18	T	(1640) Philippe de La Hire (1690) Christian Goldbach (1796) Jacob Steiner (1870) Agnes Sime Baxter	RM122	
19	W	(1862) Adolf Kneser (1910) Jacob Wolfowitz		
20	T	(1840) Franz Mertens (1884) Philip Franck (1938) Sergi Petrovich Novikov		
21	F	(1768) Jean Baptiste Joseph Fourier (1884) George David Birkhoff		
22	S	(1891) Lorna Mary Swain (1917) Irving Kaplansky (1944) Margaret Hilary Ashworth Millington		
23	S	(1754) Georg Freiherr von Vega (1882) Emmy Amalie Noether (1897) John Lighton Synge	RM050	
13	24	M	(1809) Joseph Liouville (1948) Sun-Yung (Alice) Chang (1966) Gigliola Staffilani	RM142
25	T	(1538) Christopher Clausius		
26	W	(1848) Konstantin Andreev (1913) Paul Erdős	RM110	
27	T	(1857) Karl Pearson		
28	F	(1749) Pierre-Simon de Laplace (1928) Alexander Grothendieck	RM086	
29	S	(1825) Francesco Faà Di Bruno (1873) Tullio Levi-Civita (1896) Wilhelm Ackerman	RM170 RM098	
30	S	(1892) Stefan Banach (1921) Alfréd Rényi	RM134	
14	31	M	(1596) René Descartes	



Putnam 1999, A3

Consider the power series expansion:

$$\frac{1}{1-2x-x^2} = \sum_{n=0}^{\infty} a_n x^n$$

Prove that, for each integer $n \geq 0$, there is an integer m such that $a_n^2 + a_{n+1}^2 = a_m$.

The Amazing U

“Let’s make ethanol green this afternoon.”

- R. Friesen Chemistry 124

Weird, but true

Theorem: All the numbers are boring Proof (by contradiction): Suppose x is the first non-boring number. Who cares?

He who can digest a second or third fluxion, a second or third difference, need not, we think, be squeamish about any point of divinity.

George Berkeley

If I found any new truths in the sciences, I can say that they follow from, or depend on, five or six principal problems which I succeeded in solving and which I regard as so many battles where the fortunes of war were on my side.

René Descartes

(During a lecture) This has been done elegantly by Minkowski; but chalk is cheaper than grey matter, and we will do it as it comes. [Attributed by Pólya.]

Albert Einstein

I remember one occasion when I tried to add a little seasoning to a review, but I wasn’t allowed to. The paper was by Dorothy Maharam, and it was a perfectly sound contribution to abstract measure theory. The domains of the underlying measures were not sets but elements of more general Boolean algebras, and their range consisted not of positive numbers but of certain abstract equivalence classes. My proposed first sentence was: “The author discusses valueless measures in pointless spaces.”

Paul Richard Halmos

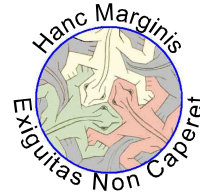
Read Euler: he is our master in everything.

Pierre-Simon De Laplace

If one proves the equality of two numbers a and b by showing first that ‘ a is less than or equal to b ’ and then ‘ a is greater than or equal to b ’, it is unfair, one should instead show that they are really equal by disclosing the inner ground for their equality.

Emmy Amalie Noether

1	T	(1640) Georg Mohr (1776) Marie-Sophie Germain (1895) Alexander Craig Aitken	
2	W	(1878) Edward Kasner (1934) Paul Joseph Cohen	
3	T	(1835) John Howard Van Amringe (1892) Hans Rademacher (1900) Albert Edward Ingham (1909) Stanislaw Marcin Ulam (1971) Alice Riddle	RM171
4	F	(1809) Benjamin Peirce (1842) Francois Edouard Anatole Lucas (1949) Shing-Tung Yau	RM123
5	S	(1588) Thomas Hobbes (1607) Honoré Fabri (1622) Vincenzo Viviani (1869) Sergi Alexeievich Chaplygin	
6	S	(1801) William Hallowes Miller	
15	7	M	(1768) François-Joseph Français
8	T	(1903) Marshall Harvey Stone	
9	W	(1791) George Peacock (1816) Charles Eugene Delaunay (1894) Cypra Cecilia Krieger Dunaij (1919) John Presper Heckert	
10	T	(1857) Henry Ernest Dudeney	
11	F	(1953) Andrew John Wiles	
12	S	(1794) Germain Pierre Dandelin (1852) Carl Louis Ferdinand von Lindemann (1903) Jan Tinbergen	
13	S	(1728) Paolo Frisi (1813) Duncan Farquharson Gregory (1869) Ada Isabel Maddison (1879) Francesco Severi	
16	14	M	(1629) Christiaan Huygens RM135
15	T	(1452) Leonardo da Vinci (1548) Pietro Antonio Cataldi (1707) Leonhard Euler (1809) Herman Gunther Grassmann	RM051
16	W	(1682) John Hadley (1823) Ferdinand Gotthold Max Eisenstein	
17	T	(1798) Etienne Bobillier (1853) Arthur Moritz Schonflies (1863) Augustus Edward Hough Love	
18	F	(1791) Ottaviano Fabrizio Mossotti (1907) Lars Valerian Ahlfors (1918) Hsien Chung Wang (1949) Charles Louis Fefferman	RM150
19	S	(1880) Evgeny Evgenievich Slutsky (1883) Richard von Mises (1901) Kiyoshi Oka (1905) Charles Ehresmann	
20	S	(1839) Francesco Siacci	
17	21	M	(1652) Michel Rolle (1774) Jean Baptiste Biot (1875) Teiji Takagi
22	T	(1811) Otto Ludwig Hesse (1887) Harald August Bohr (1935) Bhami Srinivasan (1939) Sir Michael Francis Atiyah	RM063
23	W	(1858) Max Karl Ernst Ludwig Planck (1910) Sheila Scott Macintyre	
24	T	(1863) Giovanni Vailati (1899) Oscar Zariski	RM099
25	F	(1849) Felix Christian Klein (1900) Wolfgang Pauli (1903) Andrei Nicolayevich Kolmogorov	RM159
26	S	(1889) Ludwig Josef Johan Wittgenstein	
27	S	(1755) Marc-Antoine Parseval des Chenes (1932) Gian-Carlo Rota	
18	28	M	(1906) Kurt Godel RM087
29	T	(1854) Jules Henri Poincaré	RM075
30	W	(1777) Johann Carl Friedrich Gauss (1916) Claude Elwood Shannon	RM147 RM111



Putnam 1999, A4

Sum the series:

$$\sum_{m=1}^{\infty} \sum_{n=1}^{\infty} \frac{m^2 n}{3^m (n3^m + m3^n)}$$

The Amazing U

“You can write a small letter to Grandma in the filename.”

- Forbes Burkowski Computer Science 454

Weird, but true

It is proven that celebration of birthdays is healthy. Statistics show that those people that celebrate the most birthdays become the oldest.

Mathematicians have tried in vain to this day to discover some order in the sequence of prime numbers, and we have reason to believe that it is a mystery into which the human mind will never penetrate.

Leonhard Euler

[numbers as the square root of minus one] are neither nothing nor something less than nothing, which makes them necessarily imaginary, or impossible.

Leonhard Euler

We must admit with humility that, while number is purely a product of our minds, space has a reality outside our minds, so that we cannot completely prescribe its properties a priori.

Johann Carl Friedrich Gauss

I have had my results for a long time: but I do not yet know how I am to arrive at them.

Johann Carl Friedrich Gauss

There is no certainty in sciences where one of the mathematical sciences cannot be applied, or which are not in relation with these mathematics..

Leonardo Da Vinci

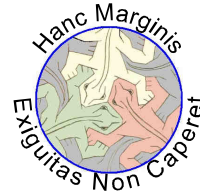
Mathematics is the science which draws necessary conclusions.

Benjamin Peirce

The riddle does not exist. If a question can be put at all, then it can also be answered.

Ludwig Josef Johan Wittgenstein

1	T	(1825) Johann Jacob Balmer (1908) Morris Kline	RM122
2	F	(1860) D'Arcy Wentworth Thompson (1905) Kazimierz Zarankiewicz	RM138
3	S	(1842) Otto Stolz (1860) Vito Volterra (1892) George Paget Thomson	RM136 RM161
4	S	(1845) William Kingdon Clifford	
19	5	M	(1833) Lazarus Emmanuel Fuchs (1883) Anna Johnson Pell Wheeler (1897) Francesco Giacomo Tricomi (1923) Cathleen Synge Morawetz
6	T	(1872) Willem de Sitter (1906) André Weil	RM088
7	W	(1854) Giuseppe Veronese (1881) Ebenezer Cunningham (1896) Pavel Sergieievich Alexandrov (1926) Alexis Claude Clairaut	
8	T	(1859) Johan Ludwig William Valdemar Jensen (1905) Winifred Lydia Caunden Sargent	
9	F	(1746) Gaspard Monge (1876) Gilbert Ames Bliss (1965) Karen Ellen Smith	
10	S	(1788) Augustin Jean Fresnel (1847) William Karl Joseph Killing (1904) Edward James Mcshane (1958) Piotr Rezierovich Silverbrahms	
11	S	(1902) Edna Ernestine Kramer Lassar (1918) Richard Phillips Feynman	RM076
20	12	M	(1820) Florence Nightingale (1845) Pierre René Jean Baptiste Henry Brocard (1902) Frank Yates
13	T	(1750) Lorenzo Mascheroni (1899) Pelageia Yakovlevna Polubarinova Kochina	
14	W	(1832) Rudolf Otto Sigismund Lipschitz (1863) John Charles Fields	RM100
15	T	(1939) Brian Hartley (1964) Sijue Wu	
16	F	(1718) Maria Gaetana Agnesi (1821) Pafnuti Lvovi Chebyshev (1911) John (Jack) Todd	RM112 RM139
17	S	(1940) Alan Kay	
18	S	(1850) Oliver Heaviside (1892) Bertrand Arthur William Russell	RM160 RM052
21	19	M	(1865) Flora Philip (1919) Georgii Dimitirievich Suvorov
20	T	(1861) Henry Seely White	
21	W	(1471) Albrecht Dürer (1792) Gustave Gaspard de Coriolis	RM124
22	T	(1865) Alfred Cardew Dixon	
23	F	(1914) Lipa Bers	RM148
24	S	(1544) William Gilbert	
25	S	(1838) Karl Mikailovich Peterson	
22	26	M	(1667) Abraham de Moivre (1896) Yuri Dimitrievich Sokolov
27	T	(1862) John Edward Campbell	
28	W	(1676) Jacopo Francesco Riccati (1710) Johann (II) Bernoulli	RM093
29	T	(1882) Harry Bateman	
30	F	(1814) Eugene Charles Catalan	
31	S	(1926) John Kemeny	



Putnam 1999, A5

Prove that there is a constant C such that, if $p(x)$ is a polynomial of degree 1999, then:

$$p(0) \leq C \int_{-1}^1 |p(x)| dx$$

The Amazing U

“What I’ve done, of course, is total garbage.”

- R. Willard Pure Math 430a.

Weird, but true

Statistics are like a bikini. What is revealed is interesting, what is concealed is crucial.

The trouble with maths is that you believe you know what you're aiming for: however - when you get there - not only you don't know where 'there' is, but you're not even anymore sure of where you started in the first place.

Maurizio Codogno, Dotmaudot

I think that I can safely say that nobody understands quantum mechanics.

Richard Phillips Feynman

A proof tells us where to concentrate our doubts.

Morris Kline

Logic is the art of going wrong with confidence.

Morris Kline

Mathematics takes us into the region of absolute necessity, to which not only the actual word, but every possible word, must conform.

Bertrand Arthur William Russell

Every mathematician worthy of the name has experienced... the state of lucid exaltation in which one thought succeeds another as if miraculously... this feeling may last for hours at a time, even for days. Once you have experienced it, you are eager to repeat it but unable to do it at will, unless perhaps by dogged work....

André Weil



1	S	(1796) Sadi Leonard Nicolas Carnot (1851) Edward Bailey Elliott (1899) Edward Charles Titchmarsh		
23	2	M	(1895) Tibor Radó	
	3	T	(1659) David Gregory	
	4	W	(1809) John Henry Pratt (1966) Svetlana Yakovlevna Jitomirskaya	
	5	T	(1814) Pierre Laurent Wantzel (1819) John Couch Adams (1883) John Maynard Keynes	RM065
	6	F	(1436) Johann Muller Regiomontanus (1857) Aleksandr Michailovitch Lyapunov (1906) Max Zorn	RM077
	7	S	(1863) Edward Burr Van Vleck	
	8	S	(1625) Giovanni Domenico Cassini (1858) Charlotte Angas Scott (1860) Alicia Boole Stott (1896) Eleanor Pairman (1923) Gloria Olive (1924) Samuel Karlin	
24	9	M	(1885) John Edensor Littlewood	RM049
	10	T	(940) Mohammad Abu'L Wafa Al-Buzjani (1887) Vladimir Ivanovich Smirnov	RM101
	11	W	(1881) Hilda Phoebe Hudson (1937) David Bryant Mumford	
	12	T	(1888) Zygmunt Janyszewski (1937) Vladimir Igorevich Arnold	
	13	F	(1831) James Clerk Maxwell (1872) Jessie Chrystal Macmillan (1876) William Sealey Gosset (Student) (1928) John Forbes Nash	RM113 RM149
	14	S	(1736) Charles Augustin de Coulomb (1856) Andrei Andreyevich Markov (1903) Alonzo Church	RM125
	15	S	(1640) Bernard Lamy (1894) Nikolai Gregorievich Chebotaryov	
25	16	M	(1915) John Wilder Tukey	
	17	T	(1898) Maurits Cornelius Escher	RM097
	18	W	(1858) Andrew Russell Forsyth (1884) Charles Ernest Weatherburn (1884) Frieda Nugel (1913) Paul Teichmueller (1915) Alice Turner Schafer	RM148
	19	T	(1623) Blaise Pascal (1902) Wallace John Eckert	RM053
	20	F	(1873) Alfred Loewy (1917) Helena Rasiowa	
	21	S	(1781) Simeon Denis Poisson (1828) Giuseppe Bruno	
	22	S	(1822) Mario Pieri (1864) Hermann Minkowsky (1910) Konrad Zuse (1932) Mary Wynne Warner	
26	23	M	(1912) Alan Mathison Turing	RM089
	24	T	(1880) Oswald Veblen	
	25	W	(1908) William Van Orman Quine	
	26	T	(1823) William Thomson, Lord Kelvin (1918) Yudell Leo Luke	RM161
	27	F	(1806) Augustus de Morgan	
	28	S	(1875) Henri Leon Lebesgue	RM173
	29	S	(1888) Aleksandr Aleksandrovich Friedmann	RM101
27	30	M	(1791) Felix Savart (1958) Abigail A Thompson	

Putnam 1999, A6

The sequence $(a_n)_{n \geq 1}$ is defined by $a_1=1$, $a_2=2$, $a_3=24$ and, for $n \geq 4$:

$$a_n = \frac{6a_{n-1}^2 a_{n-3} - 8a_{n-1} a_{n-2}^2}{a_{n-2} a_{n-3}}$$

Show that, for all n , a_n is an integer multiple of n .

The Amazing U

“The algorithm to do that is extremely nasty. You might want to mug someone with it?”

- M. Devine Computer Science 340

Weird, but true

What's the question the Cauchy distribution hates the most?

Got a moment?

[When asked about his age.] *I was x years old in the year x^2 .*

Augustus De Morgan

The purpose of models is not to fit the data but to sharpen the questions.

Samuel Karlin

I recall once saying that when I had given the same lecture several times I couldn't help feeling that they really ought to know it by now.

John Edensor Littlewood

Our notion of symmetry is derived from the human face. Hence, we demand symmetry horizontally and in breadth only, not vertically nor in depth.

Blaise Pascal

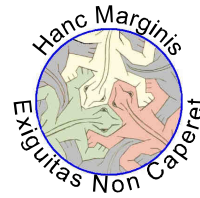
It can be of no practical use to know that π is irrational, but if we can know, it surely would be intolerable not to know.

Edward Charles Titchmarsh

This new integral of Lebesgue is proving itself a wonderful tool. I might compare it with a modern Krupp gun, so easily does it penetrate barriers which were impregnable.

Edward Burr Van Vleck

1	T	(1643) Gottfried Wilhelm von Leibniz (1788) Jean Victor Poncelet (1906) Jean Alexandre Eugène Dieudonné	RM054	
2	W	(1820) William John Rankine (1852) William Burnside (1925) Olga Arsen'evna Oleinik		
3	T	(1807) Ernest Jean Philippe Fauque de Jonquiere (1897) Jesse Douglas	RM162	
4	F	(1906) Daniel Edwin Rutherford (1917) Michail Samoilovich Livsic		
5	S	(1936) James Mirrlees		
6	S	(1849) Alfred Bray Kempe		
28	7	M	(1816) Johann Rudolf Wolf (1906) William Feller (1922) Vladimir Aleksandrovich Marchenko	
	8	T	(1760) Christian Kramp (1904) Henri Paul Cartan	RM126
	9	W	(1845) George Howard Darwin (1931) Valentina Mikhailovna Borok	RM138
	10	T	(1856) Nikola Tesla (1862) Roger Cotes (1868) Oliver Dimon Kellogg	RM174
	11	F	(1857) Sir Joseph Larmor (1888) Jacob David Tamarkin (1890) Giacomo Albanese	RM101
	12	S	(1875) Ernest Sigismund Fischer (1895) Richard Buckminster Fuller (1935) Nicolas Bourbaki	RM066 RM126
	13	S	(1527) John Dee (1741) Karl Friedrich Hindenburg	
29	14	M	(1671) Jacques D'Allonville (1793) George Green	RM078
	15	T	(1865) Wilhelm Wirtinger (1898) Mary Taylor Slow (1906) Adolph Andrej Pavlovich Yushkevich	
	16	W	(1678) Jakob Hermann (1903) Irmgard Flugge-Lotz	
	17	T	(1831) Victor Mayer Amedèe Mannheim (1837) Wilhelm Lexis (1944) Krystyna Maria Trybulec Kuperberg	
	18	F	(1013) Hermann von Reichenau (1635) Robert Hooke (1853) Hendrik Antoon Lorentz	RM114 RM161
	19	S	(1768) Francois Joseph Servois	
	20	S	(1876) Otto Blumenthal (1947) Gerd Binnig	
30	21	M	(1620) Jean Picard (1848) Emil Weyr (1849) Robert Simpson Woodward (1861) Herbert Ellsworth Slaught	
	22	T	(1784) Friedrich Wilhelm Bessel	
	23	W	(1775) Etienne Louis Malus (1854) Ivan Slezynsky	
	24	T	(1851) Friedrich Herman Schottky (1871) Paul Epstein (1923) Christine Mary Hamill	
	25	F	(1808) Johann Benedict Listing	
	26	S	(1903) Kurt Mahler	
	27	S	(1667) Johann Bernoulli (1801) George Biddel Airy (1848) Lorand Baron von Eötvös (1871) Ernst Friedrich Ferdinand Zermelo	RM093 RM090
31	28	M	(1954) Gerd Faltings	
	29	T	(1898) Isidor Isaac Rabi	
	30	W	(1889) Vladimir Kosma Zworkyn	
	31	T	(1704) Gabriel Cramer (1712) Johann Samuel Koenig (1926) Hilary Putnam	



Putnam 1999, B1

Right triangle ABC has right angle in C and $ABC = \theta$; the point D is chosen on AB so that $|AC| = |AD| = 1$; the point E is chosen on BC so that $CDE = \theta$. The perpendicular to BC at E meets AB at F . Evaluate $\lim_{\theta \rightarrow 0} |EF|$.

The Amazing U

"Is it a really good acid, or just a half-acid?"

- R. Friesen Chemistry 124

Weird, but true

Arguing with a statistician is a lot like wrestling with a pig. After a few hours you begin to realize the pig likes it.

Structures are the weapons of the mathematician.

Nicolas Bourbaki

There is (gentle reader) nothing (the works of God only set apart) which so much beautifies and adorns the soul and mind of man as does knowledge of the good arts and sciences. ... Many ... arts there are which beautify the mind of man; but of all none do more garnish and beautify it than those arts which are called mathematical, unto the knowledge of which no man can attain, without perfect knowledge and instruction of the principles, grounds, and Elements of Geometry.

John Dee

All possible definitions of probability fall short of the actual practice.

William Feller

Nothing is more important than to see the sources of invention which are, in my opinion more interesting than the inventions themselves.

Gottfried Wilhelm von Leibniz

Miracles are not to be multiplied beyond necessity.

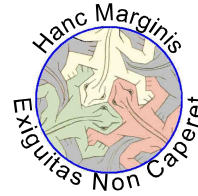
Gottfried Wilhelm von Leibniz

Statistics: The only science that enables different experts using the same figures to draw different conclusions.

Evan Esar

I have hardly ever known a mathematician who was capable of reasoning.

Plato



1	F	(1861) Ivar Otto Bendixson (1881) Otto Toeplitz (1955) Bernadette Perrin-Riou		
2	S	(1856) Ferdinand Rudio (1902) Mina Spiegel Rees		
3	S	(1914) Mark Kac	RM115	
32	4	M	(1805) Sir William Rowan Hamilton (1838) John Venn	RM079
	5	T	(1802) Niels Henrik Abel (1941) Alexander Keewatin Dewdney	RM055
	6	W	(1638) Nicolas Malebranche (1741) John Wilson	
	7	T	(1868) Ladislaus Josephowitsch Bortkiewicz	
	8	F	(1902) Paul Adrien Maurice Dirac (1931) Sir Roger Penrose	RM103
	9	S	(1537) Francesco Barozzi (Franciscus Barocius) (1940) Linda Goldway Keen	
	10	S	(1602) Gilles Personne de Roberval (1926) Carol Ruth Karp	
33	11	M	(1730) Charles Bossut (1842) Enrico D'Ovidio	
	12	T	(1882) Jules Antoine Richard (1887) Erwin Rudolf Josef Alexander Schrödinger	RM103
	13	W	(1625) Erasmus Bartholin (1819) George Gabriel Stokes (1861) Cesare Burali-Forti	
	14	T	(1530) Giovanni Battista Benedetti (1842) Jean Gaston Darboux (1865) Guido Castelnuovo (1866) Charles Gustave Nicolas de La Vallée-Poussin	
	15	F	(1863) Aleksei Nikolaevich Krylov (1892) Louis Pierre Victor Duc de Broglie (1901) Piotr Sergeevich Novikov	RM175
	16	S	(1773) Louis-Benjamin Francoeur (1821) Arthur Cayley	
	17	S	(1601) Pierre de Fermat	RM091
34	18	M	(1685) Brook Taylor	
	19	T	(1646) John Flamsteed (1739) Georg Simon Klugel	
	20	W	(1710) Thomas Simpson (1863) Corrado Segre (1882) Waclav Sierpiński	
	21	T	(1789) Augustin Louis Cauchy	RM127
	22	F	(1647) Denis Papin	
	23	S	(1683) Giovanni Poleni (1829) Moritz Benedikt Cantor (1842) Osborne Reynolds	
	24	S	(1561) Bartholomeo Pitiscus (1942) Karen Keskulla Uhlenbeck	RM163
35	25	M	(1561) Philip Van Lansberge (1844) Thomas Muir	
	26	T	(1728) Johann Heinrich Lambert (1875) Giuseppe Vitali (1965) Marcus Peter Francis du Sautoy	
	27	W	(1858) Giuseppe Peano	RM067
	28	T	(1796) Irénée Jules Bienaymé	
	29	F	(1904) Leonard Roth	
	30	S	(1856) Carle David Tolmé Runge (1906) Olga Taussky-Todd	RM139
	31	S	(1821) Hermann Ludwig Ferdinand von Helmholtz (1885) Herbert Westren Turnbull	

Putnam 1999, B2

Let $P(x)$ be a polynomial of degree n such that $P(x)=Q(x) \cdot P'(x)$, where $Q(x)$ is a quadratic polynomial and $P'(x)$ is the second derivative of $P(x)$. Show that if $P(x)$ has at least two distinct roots then it must have n distinct roots.

The Amazing U

“You can do this in a number of ways. IBM chose to do all of them. Why do you find that funny?”
- D. Taylor Computer Science 350

Weird, but true

A lottery is a tax on people who don't understand statistics.

Who would not rather have the fame of Archimedes than that of his conqueror Marcellus?

Sir William Rowan Hamilton

Absolutely fundamental to the structure of quantum mechanics, complex numbers are so basic to the functioning of the world in which we live. They are also one of the great miracles of mathematics.

Sir Roger Penrose

Newton is, of course, the greatest of all teachers of Cambridge, but is also the biggest disaster ever happened not only to mathematicians at Cambridge in particular, but the whole British mathematical science.

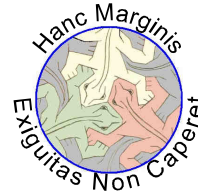
Leonard Roth

Any form of mathematical thinking was created by Euler. It is only with great difficulty that you can follow the writings of any author preceding Euler, because you did not yet know how to make formulas talk for themselves. This art was taught first by Euler.

Ferdinand Rudio

Attaching significance to invariants is an effort to recognize what, because of its form or colour or meaning or otherwise, is important or significant and what is only trivial or ephemeral. A simple instance of failing in this is provided by the poll-man at Cambridge, who learned perfectly how to factorize $a^2 - b^2$ but was floored because the examiner unkindly asked for the factors of $p^2 - q^2$.

H.W. Turnbull



35	1	M	(1659) Joseph Saurin (1835) William Stanley Jevons	
	2	T	(1878) Mauriche René Frechet (1923) René Thom	RM080
	3	W	(1814) James Joseph Sylvester (1884) Solomon Lefschetz (1908) Lev Semenovich Pontryagin	RM104
	4	T	(1809) Luigi Federico Menabrea	RM150
	5	F	(1667) Giovanni Girolamo Saccheri (1725) Jean Etienne Montucla	RM128
	6	S	(1859) Boris Jakovlevich Bukreev (1863) Dimitri Aleksandrovich Grave	
	7	S	(1707) George Louis Leclerc Comte de Buffon (1948) Cheryl Elisabeth Praeger (1955) Efim Zelmanov	
36	8	M	(1584) Gregorius Saint-Vincent (1588) Marin Mersenne	RM092
	9	T	(1860) Frank Morley (1914) Marjorie Lee Browne	
	10	W	(1839) Charles Sanders Peirce	RM123
	11	T	(1623) Stefano degli Angeli (1798) Franz Ernst Neumann (1877) Sir James Hopwood Jeans	
	12	F	(1891) Antoine André Louis Reynaud (1900) Haskell Brooks Curry (1894) Dorothy Maud Wrinch	
	13	S	(1873) Constantin Carathéodory (1885) Wilhelm Johann Eugen Blaschke	
	14	S	(1858) Henry Burchard Fine (1891) Ivan Matveevich Vinogradov	
37	15	M	(973) Abu Arrayhan Muhammad Ibn Ahmad Al'Biruni (1886) Paul Pierre Levy	RM164
	16	T	(1494) Francisco Maurolico (1736) Johann Nikolaus Tetens	
	17	W	(1743) Marie Jean Antoine Nicolas de Caritat de Condorcet (1826) Georg Friedrich Bernhard Riemann	RM176 RM068
	18	T	(1752) Adrien Marie Legendre	RM140
	19	F	(1749) Jean Baptiste Delambre	
	20	S	(1842) Alexander Wilhelm von Brill (1861) Frank Nelson Cole	
	21	S	(1899) Juliusz Pawel Schauder (1917) Phyllis Nicolson	
38	22	M	(1765) Paolo Ruffini (1769) Louis Puissant (1803) Jaques Charles Francois Sturm	RM116
	23	T	(1768) William Wallace (1900) David Van Dantzig	
	24	W	(1501) Girolamo Cardano (1625) Johan de Witt (1801) Michail Vasilevich Ostrogradski (1862) Winifred Edgerton Merrill (1945) Ian Nicholas Stewart	RM064 RM056
	25	T	(1819) George Salmon (1888) Stefan Mazurkiewicz	
	26	F	(1688) Willem Jakob 's Gravesande (1854) Percy Alexander Macmahon (1891) Hans Reichenbach	
	27	S	(1855) Paul Émile Appell (1876) Earle Raymond Hedrick (1919) James Hardy Wilkinson	
	28	S	(1698) Pierre Louis Moreau de Maupertuis (1761) Ferdinand Francois Desirè Budan de Boislaurent (1873) Julian Lowell Coolidge	RM152
39	29	M	(1561) Adriaan Van Roomen (1812) Adolph Gopel	
	30	T	(1775) Robert Adrain (1829) Joseph Wolstenholme (1883) Ernst Hellinger	

Putnam 1999, B3

Let $A = \{(x,y) : 0 \leq x, y < 1\}$. For $(x,y) \in A$, let

$$S(x,y) = \sum_{\substack{1 \leq m \leq 2 \\ 2 \leq n}} x^m y^n$$

where the sum ranges over all the pairs (m,n) of positive integers satisfying the indicated equalities. Evaluate

$$\lim_{\substack{(x,y) \rightarrow (1,1) \\ (x,y) \in A}} (1 - xy^2)(1 - x^2y)S(x,y)$$

The Amazing U

"This process can check if this value is zero, and if it is, it does something child-like."

- Forbes Burkowski Computer Science 454

Weird, but true

A statistician is someone who is skilled at drawing a precise line from an unwarranted assumption to a foregone conclusion.

To throw in a fair game at Hazards only three-spots, when something great is at stake, or some business is the hazard, is a natural occurrence and deserves to be so deemed; and even when they come up the same way for a second time if the throw be repeated. If the third and fourth plays are the same, surely there is occasion for suspicion on the part of a prudent man.

Girolamo Cardano

The essential fact is that all the pictures which science now draws of nature, and which alone seem capable of according with observational facts, are mathematical pictures.

Sir James Hopwood Jeans

The greatest reward lies in making the discovery; recognition can add little or nothing to that.

Franz Ernst Neumann

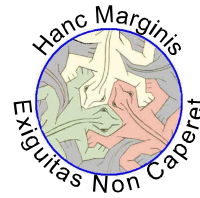
...mathematics is distinguished from all other sciences except only ethics, in standing in no need of ethics. Every other science, even logic, especially in its early stages in danger of evaporating into airy nothingness, degenerating, as the Germans say, into an arachnoid film, spun from the stuff that dreams are made of. There is no such danger for pure mathematics; for that is precisely what mathematics ought to be.

Charles Sanders Peirce

...there is no study in the world which brings into more harmonious action all the faculties of the mind than [mathematics], ... or, like this, seems to raise them, by successive steps of initiation, to higher and higher states of conscious intellectual being....

James Joseph Sylvester

1	W	(1671) Luigi Guido Grandi (1898) Bela Kerekjarto' (1912) Kathleen Timpson Ollerenshaw	RM177	
2	T	(1825) John James Walker (1908) Arthur Erdélyi		
3	F	(1944) Pierre René Deligne		
4	S	(1759) Louis Francois Antoine Arbogast (1797) Jerome Savary		
5	S	(1732) Nevil Maskelyne (1781) Bernhard Placidus Johann Nepomuk Bolzano (1861) Thomas Little Heath	RM117	
40	6	M	(1552) Matteo Ricci (1831) Julius Wilhelm Richard Dedekind (1908) Sergei Lvovich Sobolev	RM141 RM081
7	T	(1885) Niels Bohr	RM063	
8	W	(1908) Hans Arnold Heilbronn		
9	T	(1581) Claude Gaspard Bachet de Meziriac (1704) Johann Andrea von Segner (1873) Karl Schwarzschild (1949) Fan Rong K Chung Graham	RM153 RM110	
10	F	(1861) Heinrich Friedrich Karl Ludwig Burkhardt		
11	S	(1675) Samuel Clarke (1777) Barnabè Brisson (1881) Lewis Fry Richardson (1885) Alfred Haar (1910) Cahit Arf		
12	S	(1860) Elmer Sperry		
41	13	M	(1890) Georg Feigl (1893) Kurt Werner Friedrich Reidemeister (1932) John Griggs Thomson	
14	T	(1687) Robert Simson (1801) Joseph Antoine Ferdinand Plateau (1868) Alessandro Padoa		
15	W	(1608) Evangelista Torricelli (1735) Jesse Ramsden (1776) Peter Barlow (1931) Eléna Wexler-Kreindler	RM165	
16	T	(1879) Philip Edward Bertrand Jourdain		
17	F	(1759) Jacob (II) Bernoulli (1888) Paul Isaac Bernays	RM093	
18	S	(1741) John Wilson (1945) Margaret Dusa Waddington Mcduff		
19	S	(1903) Jean Frédéric Auguste Delsarte (1910) Subrahmanyan Chandrasekhar	RM153	
42	20	M	(1632) Sir Christopher Wren (1863) William Henry Young (1865) Aleksandr Petrovich Kotelnikov	RM105
21	T	(1677) Nicolaus (I) Bernoulli (1823) Enrico Betti (1855) Giovan Battista Guccia (1893) William Leonard Ferrar (1914) Martin Gardner	RM093 RM150 RM129 RM137	
22	W	(1587) Joachim Jungius (1895) Rolf Herman Nevanlinna (1907) Sarvadaman Chowla		
23	T	(1865) Piers Bohl		
24	F	(1804) Wilhelm Eduard Weber (1873) Edmund Taylor Whittaker		
25	S	(1811) Évariste Galois	RM069	
26	S	(1849) Ferdinand Georg Frobenius (1857) Charles Max Mason (1911) Shiing-Shen Chern		
43	27	M	(1678) Pierre Remond de Montmort (1856) Ernest William Hobson	
28	T	(1804) Pierre François Verhulst		
29	W	(1925) Klaus Roth		
30	T	(1906) Andrej Nikolaevich Tichonov (1946) William Paul Thurston		
31	F	(1711) Laura Maria Catarina Bassi (1815) Karl Theodor Wilhelm Weierstrass (1935) Ronald Lewis Graham	RM057 RM110	



Putnam 1999, B4

Let f be a real function with a continuous third derivative such that $f(x)$, $f'(x)$, $f''(x)$, $f'''(x)$ are positive for all x . Suppose that $f'''(x) \leq f(x)$ for all x . Show that $f'(x) < 2f(x)$ for all x .

The Amazing U

"I think it is true for all n . I was just playing it safe with $n \geq 3$ because I couldn't remember the proof."
- Baker Pure Math 351a

Weird, but true

A statistician always has something to say with numbers while a politician has to say something with numbers.

Numbers are the free creation of the human mind.
Julius Wilhelm Richard Dedekind

There is still a difference between something and nothing, but it is purely geometrical and there is nothing behind the geometry.

Martin Gardner

Gelfand amazed me by talking of mathematics as though it were poetry. He once said about a long paper bristling with formulas that it contained the vague beginnings of an idea which he could only hint at and which he had never managed to bring out more clearly. I had always thought of mathematics as being much more straightforward: a formula is a formula, and an algebra is an algebra, but Gelfand found hedgehogs lurking in the rows of his spectral sequences!

Margaret Dusa Waddington Mcduff

Another advantage of a mathematical statement is that it is so definite that it might be definitely wrong; and if it is found to be wrong, there is a plenteous choice of amendments ready in the mathematicians' stock of formulae. Some verbal statements have not this merit; they are so vague that they could hardly be wrong, and are correspondingly useless.

Lewis Fry Richardson

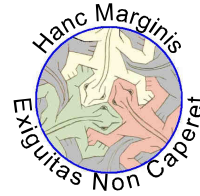
Numbers rule the universe.

Pitagoras

Mathematical demonstrations being built upon the impregnable Foundations of Geometry and Arithmetick are the only truths that can sink into the Mind of Man, void of all Uncertainty; and all other Discourses participate more or less of Truth according as their Subjects are more or less capable of Mathematical Demonstration.

Sir Christopher Wren

1	S	(1535) Giambattista della Porta		
2	S	(1815) George Boole (1826) Henry John Stephen Smith	RM094	
44	3	M	(1867) Martin Wilhelm Kutta (1878) Arthur Byron Coble (1896) Raymond Louis Wilder (1906) Carl Benjamin Boyer	
4	T	(1744) Johann (III) Bernoulli (1865) Pierre Simon Girard	RM093	
5	W	(1848) James Whitbread Lee Glaisher (1930) John Frank Adams		
6	T	(1781) Giovanni Antonio Amedeo Plana (1906) Emma Markovna Trotskaia Lehmer	RM154	
7	F	(1660) Thomas Fantet de Lagny (1799) Karl Heinrich Graffe (1898) Raphael Salem		
8	S	(1656) Edmond Halley (1846) Eugenio Bertini (1848) Fredrich Ludwig Gottlob Frege (1854) Johannes Robert Rydberg (1869) Felix Hausdorff	RM178	
9	S	(1847) Carlo Alberto Castigliano (1885) Theodor Franz Eduard Kaluza (1885) Hermann Klaus Hugo Weyl (1906) Jaroslav Borisovich Lopatynsky (1913) Hedwig Eva Maria Kiesler (Hedy Lamarr) (1922) Imre Lakatos	RM082 RM144	
45	10	M	(1829) Helwin Bruno Christoffel	
11	T	(1904) John Henry Constantine Whitehead		
12	W	(1825) Michail Egorovich Vashchenko-Zakharchenko (1842) John William Strutt Lord Rayleigh (1927) Yutaka Taniyama		
13	T	(1876) Ernest Julius Wilczynsky (1878) Max Wilhelm Dehn		
14	F	(1845) Ulisse Dini (1919) Paulette Libermann		
15	S	(1688) Louis Bertrand Castel (1793) Michel Chasles (1794) Franz Adolph Taurinus		
16	S	(1835) Eugenio Beltrami	RM150	
46	17	M	(1597) Henry Gellibrand (1717) Jean Le Rond D'Alembert (1790) August Ferdinand Möbius	RM166 RM118
18	T	(1872) Giovanni Enrico Eugenio Vacca (1927) Jon Leslie Britton		
19	W	(1894) Heinz Hopf (1900) Michail Alekseevich Lavrentev (1901) Nina Karlovna Bari		
20	T	(1889) Edwin Powell Hubble (1924) Benoît Mandelbrot (1963) William Timothy Gowers		
21	F	(1867) Dimitri Sintsov		
22	S	(1803) Giusto Bellavitis (1840) Émile Michel Hyacinthe Lemoine		
23	S	(1616) John Wallis (1820) Issac Todhunter (1917) Elizabeth Leonard Scott	RM070 RM106	
47	24	M	(1549) Duncan Maclaren Young Sommerville (1909) Gerhard Gentzen	
25	T	(1841) Fredrich Wilhelm Karl Ernst Schröder (1873) Claude Louis Mathieu (1943) Evelyn Merle Roden Nelson		
26	W	(1894) Norbert Wiener (1946) Enrico Bombieri	RM172	
27	T	(1867) Arthur Lee Dixon		
28	F	(1898) John Wishart		
29	S	(1803) Christian Andreas Doppler (1849) Horace Lamb (1879) Nikolay Mitrofanovich Krylov		
30	S	(1549) Sir Henry Savile (1969) Matilde Marcolli	RM142	



Putnam 1999, B5

For an integer $n \geq 3$, let $\theta = 2\pi/n$. Evaluate the determinant of the matrix $I_n + A_n$, where I_n is the identity matrix and A_n is the square matrix with entries:

$$a_{jk} = \cos(j\theta + k\theta).$$

The Amazing U

“Now this is a totally brain damaged algorithm. Gag me with a smurfette.”

- P. Buhr Computer Science 354.

Weird, but true

Statisticians are like the drunk leaning against the lamp pole: they are there for support, not illumination.

Whoever hates mathematics as a child will do for all his life. Nobody wakes up one day enlightened by love for such a discipline.

Enrico Bombieri

The mathematician may be compared to a designer of garments, who is utterly oblivious of the creatures whom his garments may fit. To be sure, his art originated in the necessity for clothing such creatures, but this was long ago; to this day a shape will occasionally appear which will fit into the garment as if the garment had been made for it. Then there is no end of surprise and delight.

George Dantzig

It is the peculiar beauty of this method, gentlemen, and one which endears it to the really scientific mind, that under no circumstance can it be of the smallest possible utility.

Henry John Stephen Smith

We are not very pleased when we are forced to accept a mathematical truth by virtue of a complicated chain of formal conclusions and computations, which we traverse blindly, link by link, feeling our way by touch. We want first an overview of the aim and of the road; we want to understand the idea of the proof, the deeper context.

Hermann Klaus Hugo Weyl

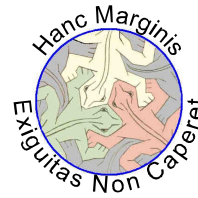
Progress imposes not only new possibilities for the future but new restrictions.

Norbert Wiener

There is nothing mysterious, as some have tried to maintain, about the applicability of mathematics. What we get by abstraction from something can be returned.

Raymond Louis Wilder

48	1	M	(1792) Nikolay Yvanovich Lobachevsky (1847) Christine Ladd-Franklin	RM083
	2	T	(1831) Paul David Gustav du Bois-Reymond (1901) George Frederick James Temple	
	3	W	(1903) Sidney Goldstein (1924) John Backus	
	4	T	(1795) Thomas Carlyle	
	5	F	(1868) Arnold Johannes Wilhelm Sommerfeld (1901) Werner Karl Heisenberg (1907) Giuseppe Occhialini	RM155 RM122
	6	S	(1682) Giulio Carlo Fagnano dei Toschi	
	7	S	(1647) Giovanni Ceva (1823) Leopold Kronecker (1830) Antonio Luigi Gaudenzio Giuseppe Cremona (1924) Mary Ellen Rudin	RM150
49	8	M	(1508) Regnier Gemma Frisius (1865) Jaques Salomon Hadamard (1919) Julia Bowman Robinson	
	9	T	(1883) Nikolai Nikolaievich Luzin (1906) Grace Brewster Murray Hopper (1917) Sergei Vasilovich Fomin	
	10	W	(1804) Karl Gustav Jacob Jacobi (1815) Augusta Ada King Countess Of Lovelace	RM059
	11	T	(1882) Max Born	RM155
	12	F	(1832) Peter Ludwig Mejdell Sylow	
	13	S	(1724) Franz Ulrich Theodosius Aepinus (1887) George Polya	RM131
	14	S	(1546) Tycho Brahe	
50	15	M	(1802) János Bolyai (1923) Freeman John Dyson	RM083
	16	T	(1804) Wiktor Yakovievich Bunyakowsky	
	17	W	(1706) Gabrielle Emile Le Tonnelier de Breteuil du Chatelet (1835) Felice Casorati (1842) Marius Sophus Lie (1900) Dame Mary Lucy Cartwright	
	18	T	(1856) Joseph John Thomson (1917) Roger Lyndon (1942) Lenore Blum	RM161
	19	F	(1783) Charles Julien Brianchon (1854) Marcel Louis Brillouin (1887) Charles Galton Darwin	RM138
	20	S	(1494) Oronce Fine (1648) Tommaso Ceva (1875) Francesco Paolo Cantelli	
	21	S	(1878) Jan Łukasiewicz (1921) Edith Hirsch Luchins (1932) John Robert Ringrose	
51	22	M	(1824) Francesco Brioschi (1859) Otto Ludwig Hölder (1877) Tommaso Boggio (1887) Srinivasa Aiyangar Ramanujan	RM150
	23	T	(1872) Georgii Yurii Pfeiffer	
	24	W	(1822) Charles Hermite (1868) Emmanuel Lasker	RM095 RM167
	25	T	(1642) Isaac Newton (1900) Antoni Zygmund	RM071
	26	F	(1780) Mary Fairfax Greig Somerville (1791) Charles Babbage (1937) John Horton Conway	RM059 RM119
	27	S	(1571) Johannes Kepler (1654) Jacob (Jacques) Bernoulli	RM093
	28	S	(1808) Athanase Louis Victoire Duprè (1882) Arthur Stanley Eddington (1903) John von Neumann	RM179 RM107
52	29	M	(1856) Thomas Jan Stieltjes	
	30	T	(1897) Stanislaw Saks	
	31	W	(1872) Volodymyr Levitsky (1896) Carl Ludwig Siegel (1945) Leonard Adleman (1952) Vaughan Frederick Randall Jones	RM143



Putnam 1999, B6

Let S be a finite set of integers, each greater than 1. Suppose that for each integer n there is some $s \in S$ such that $\text{MCD}(s, n) = 1$ or $\text{MCD}(s, n) = s$. Show that there exist $(s, t) \in S$ such that $\text{MCD}(s, t)$ is prime.

The Amazing U

“How do you find an isomorphism? You just find it. See? Graph theory is a lot of fun.”

- I. Goulden *Combinatorics and Optimization* 230

Weird, but true

Life, Math & Everything

Life is complex. It has real and imaginary components. To a Mathematician, real life is a special case.

If God has made the world a perfect mechanism, He has at least conceded so much to our imperfect intellect that in order to predict little parts of it, we need not solve innumerable differential equations, but can use dice with fair success.

Max Born

We have found a strange footprint on the shores of the unknown. We have devised profound theories, one after another, to account for its origins. At last, we have succeeded in reconstructing the creature that made the footprint. And lo! It is our own.

Arthur Stanley Eddington

Practical application is found by not looking for it, and one can say that the whole progress of civilization rests on that principle.

Jaques Salomon Hadamard

Abel has left mathematicians enough to keep them busy for 500 years.

Charles Hermite

Temporis filia veritas; cui me obstetricari non pudet. (Truth is the daughter of time, and I feel no shame in being her midwife.)

Johannes Kepler

What good your beautiful proof on [the transcendence of] π ? Why investigate such problems, given that irrational numbers do not even exist?

Leopold Kronecker

We can affirm that the Analytical Engine of Mr. Babbage weaves algebraic patterns, just as the Jacquard loom weaves flowers and leaves.

Augusta Ada King Countess Of Lovelace