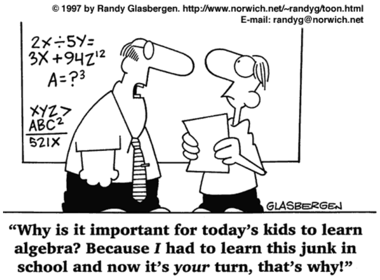
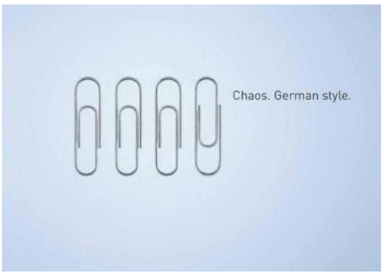
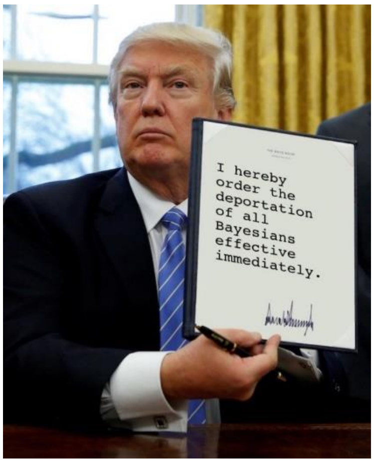
Hanc Marginis Exiguitas Non Caperet

Rudi Mathematici

$$x^3 - 6'156x^2 + 12'631'328x - 8'638'755'840 = 0$$







1	1	M	(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	RM240
			(1905) Lev Genrichovich Shnirelman	
			(1938) Anatoly Samoilenko	
	3	W	(1777) Louis Poinsot	
			(1917) Yuri Alexeievich Mitropolsky	
	4	T	(1643) Isaac Newton	RM071
	5	F	(1723) Nicole-Reine Étable de Labrière Lepaute	RM288
			(1838) Marie Ennemond Camille Jordan	RM276
			(1871) Federigo Enriques	RM084
			(1871) Gino Fano	
	6	S	(1807) Jozeph Mitza Petzval	
			(1841) Rudolf Sturm	
	7	S	(1871) Felix Edouard Justin Émile Borel	
			(1907) Raymond Edward Alan Christopher Paley	
			(1925) Walter Noll	
2	8	M	(1888) Richard Courant	RM156
			(1924) Paul Moritz Cohn	
			(1942) Stephen William Hawking	
	9	T	(1864) Vladimir Adreievich Steklov	
			(1882) Pavel Aleksandrovitch Florenskij	RM252
			(1915) Mollie Orshansky	
	10	W	(1875) Issai Schur	
			(1905) Ruth Moufang	
	11	T	(1545) Guidobaldo del Monte	RM120
			(1707) Vincenzo Riccati	
			(1734) Achille Pierre Dionis du Sejour	
	12	F	(1853) Gregorio Ricci-Curbastro	
			(1906) Kurt August Hirsch	
			(1915) Herbert Ellis Robbins	RM156
	13	S	(1864) Wilhelm Karl Werner Otto Fritz Franz Wien	
			(1876) Luther Pfahler Eisenhart	
			(1876) Erhard Schmidt	
			(1902) Karl Menger	
	14	S	(1901) Alfred Tarski	RM096
3	15	M	(1704) Johann Castillon	
			(1717) Mattew Stewart	
			(1850) Sofia Vasilievna Kovalevskaya	RM144
	16	T	(1801) Thomas Klausen	
	17	W	(1647) Catherina Elisabetha Koopman Hevelius	RM264
			(1847) Nikolay Egorovich Zukowsky	
			(1858) Gabriel Koenigs	
	18	T	(1856) Luigi Bianchi	
			(1880) Paul Ehrenfest	RM204
	19	F	(1813) Rudolf Friedrich Alfred Clebsch	
			(1879) Guido Fubini	
			(1908) Aleksandr Gennadievich Kurosh	
	20	S	(1775) André Marie Ampère	
			(1895) Gabor Szegő	
			(1904) Renato Caccioppoli	RM072
	21	S	(1846) Pieter Hendrik Schoute	
			(1882) Pavel Aleksandrovitch Florenskij	RM252
			(1915) Yuri Vladimirovich Linnik	
4	22	M	(1561) Francis Bacon	
			(1592) Pierre Gassendi	
			(1886) John William Navin Sullivan	
			(1908) Lev Davidovich Landau	RM228
	23	T	(1840) Ernst Abbe	
			(1862) David Hilbert	RM060
	24	W	(1891) Abram Samoilovitch Besicovitch	
			(1902) Oskar Morgenstern	
			(1914) Vladimir Petrovich Potapov	
	25	T	(1627) Robert Boyle	
			(1736) Joseph-Louis Lagrange	RM048
			(1843) Karl Hermann Amandus Schwarz	
	26	F	(1799) Benoît Paul Émile Clapeyron	
			(1849) Francesco Flores D'Arcais	
			(1862) Eliakim Hastings Moore	
	27	S	(1832) Charles Lutwidge Dodgson	RM108
	28	S	(1611) Johannes Hevelius	RM264
			(1701) Charles Marie de La Condamine	
			(1888) Louis Joel Mordell	
			(1892) Carlo Emilio Bonferroni	
5	29	M	(1817) William Ferrel	
			(1888) Sidney Chapman	
	30	T	(1619) Michelangelo Ricci	RM216
	31	W	(1715) Giovanni Francesco Fagnano dei Toschi	
			(1841) Samuel Loyd	RM192
			(1896) Sofia Alexandrovna Janowskaja	

January

Putnam 2009, A1

Let f be a real-valued function on the plane such that for every square $ABCD$ in the plane, $f(A) + f(B) + f(C) + f(D) = 0$. Does it follow that $f(P) = 0$ for all points P in the plane?

How to put an elephant into a refrigerator

Analysis

Method 1: Differentiate the elephant, put it in the refrigerator, and then integrate it into the refrigerator domain.

Method 2: Redefine the refrigerator metric.

Method 3: Apply the Banach-Tarsky Theorem.

Murphy's Laws applied to Math Students

When you solve a problem, it always helps to know the answer.

For many parts of Nature can neither be invented with sufficient subtlety, nor demonstrated with sufficient perspicuity, nor accommodated unto use with sufficient dexterity, without the aid and intervening of the mathematics, of which sort are perspective, music, astronomy, cosmography, architecture, engineery, and divers others.

Francis Bacon

Treat nature by the cylinder, the sphere, the cone, everything in proper perspective so that each side of an object or a plane is directed towards a central point.

Paul Cézanne

It is therefore with the study of mathematics, and only through it, that one can form a correct and in-depth idea of what a science is.

Auguste Comte

The straight line is not a thing, but our concept of reality. And if we cannot reveal the concrete content of this concept, if the extent of its application is equal to zero, then this concept does not exist.

Pavel Aleksandrovitch Florenskij

Since the mathematical sciences are so vast and varied, it is necessary to limit their practice and teaching, since every human activity is linked to places and people.

David Hilbert

To speak algebraically, Mr. M. is execrable, but Mr. G. is $(x + 1)$*-ecrable.*
[Discussing fellow writers Cornelius Mathews and William Ellery Channing.].

Edgar Allan Poe

If a body previously at rest begin to move, we may be certain that this is only in virtue of some extraneous cause acting upon it. This cause, whatever it may be, and which is known to us only by its effects, we call Force. Force then is any cause whatever of motion.

Louis Poinsot

	1	T	(1900) John Charles Burkill	
	2	F	(1522) Lodovico Ferrari	
			(1893) Cornelius Lanczos	
			(1897) Gertrude Blanch	RM229
	3	S	(1893) Gaston Maurice Julia	RM073
	4	S	(1905) Eric Cristopher Zeeman	RM241
6	5	M	(1757) Jean Marie Constant Duhamel	
	6	T	(1465) Scipione del Ferro	RM064
			(1612) Antoine Arnauld	
			(1695) Nicolaus (II) Bernoulli	RM093
	7	W	(1877) Godfried Harold Hardy	RM049
			(1883) Eric Temple Bell	
	8	T	(1700) Daniel Bernoulli	RM093
			(1875) Francis Ysidro Edgeworth	
			(1928) Ennio de Giorgi	RM133
	9	F	(1775) Farkas Wolfgang Bolyai	
			(1907) Harold Scott Macdonald Coxeter	RM097
	10	S	(1747) Aida Yasuaki	RM121
			(1932) Vivienne Malone-Mayes	
	11	S	(1657) Bernard Le Bovier de Fontenelle	
			(1800) William Henry Fox Talbot	RM205
			(1839) Josiah Willard Gibbs	
			(1915) Richard Wesley Hamming	
7	12	M	(1914) Hanna Caemmerer Neumann	
			(1921) Kathleen Rita Mcnulty Mauchly Antonelli	
	13	T	(1805) Johann Peter Gustav Lejeune Dirichlet	RM145
	14	W	(1468) Johann Werner	RM253
			(1849) Hermann Hankel	
			(1877) Edmund Georg Hermann Landau	RM063
			(1896) Edward Artur Milne	
			(1932) Maurice Audin	RM194
	15	T	(1564) Galileo Galilei	RM085
			(1850) Sophie Willock Bryant	
			(1861) Alfred North Whitehead	
			(1946) Douglas Hofstadter	
	16	F	(1822) Francis Galton	
			(1903) Beniamino Segre	
	17	S	(1890) Sir Ronald Aylmer Fisher	
			(1891) Adolf Abraham Halevi Fraenkel	
			(1905) Rózsa Péter	
	18	S	(1404) Leon Battista Alberti	RM157
			(1919) Clifford Ambrose Truesdell III	
8	19	M	(1473) Nicolaus Copernicus	RM181
	20	T	(1844) Ludwig Boltzmann	RM061
	21	W	(1591) Girard Desargues	
			(1915) Evgeny Michailovich Lifshitz	
	22	T	(1857) Heinrich Rudolf Hertz	
			(1903) Frank Plumpton Ramsey	RM217
	23	F	(1561) Henry Briggs	RM169
			(1583) Jean-Baptiste Morin	
			(1730) Giulio Giuseppe Mozzi del Garbo	RM277
			(1905) Derrick Henry Lehmer	RM215
			(1922) Anneli Cahn Lax	RM289
			(1951) Shigefumi Mori	
	24	S	(1871) Felix Bernstein	
	25	S	(1827) Henry Watson	
9	26	M	(1786) Dominique Francois Jean Arago	RM193
	27	T	(1881) Luitzen Egbertus Jan Brouwer	
	28	W	(1735) Alexandre Théophile Vandermonde	RM265
	29	T	(1860) Herman Hollerith	RM109

Hanc Marginis Exiguitas Non Caperet

Rudi Mathematici

February

Putnam 2009, A2

Functions f, g, h are differentiable on some open interval around 0 and satisfy the equations and initial conditions

$$f' = 2f^2gh + \frac{1}{gh}, \quad f(0) = 1,$$
$$g' = fg^2h + \frac{4}{fh} \quad g(0) = 1,$$
$$h' = 3fgh^2 + \frac{1}{fg} \quad h(0) = 1.$$

Find an explicit formula for $f(x)$, valid in some open interval around 0.

How to put an elephant into a refrigerator

Number Theory

Method 1: Factor the elephant, put the factors in the refrigerator, multiply them together inside the refrigerator.

Method 2: Use induction: if the n^{th} piece fit, the $(n+1)^{th}$ piece will also fit.

Murphy's Laws applied to Math Students

An expression can be made equal to any other expression if you juggle it enough.

Epur si muove (And yet it does move).
[Apocryphal words to himself after making his abjuration of heliocentricity.].

Galileo Galilei

A science is said to be useful if its development tends to accentuate the existing inequalities in the distribution of wealth, or more directly promotes the destruction of human life.

Godfried Harold Hardy

It is well known that the man who first made public the theory of irrationals perished in a shipwreck in order that the inexpressible and unimaginable should ever remain veiled. And so the guilty man, who fortuitously touched on and revealed this aspect of living things, was taken to the place where he began and there is for ever beaten by the waves.

Proclo Diadoco

It is a profoundly erroneous truism, repeated by all copy books and by eminent people when they are making speeches, that we should cultivate the habit of thinking of what we are doing. The precise opposite is the case. Civilization advances by extending the number of important operations which we can perform without thinking about them.

Alfred North Whitehead

	1	F	(1611) John Pell (1879) Robert Daniel Carmichael	
	2	S	(1836) Julius Weingarten	
	3	S	(1838) George William Hill (1845) Georg Cantor (1916) Paul Richard Halmos	 RM062
10	4	M	(1822) Jules Antoine Lissajous	
	5	T	(1512) Gerardus Mercator (1759) Benjamin Gompertz (1817) Angelo Genocchi (1885) Pauline Sperry (1915) Laurent Schwartz (1931) Vera Pless	 RM230 RM194
	6	W	(1866) Ettore Bortolotti	
	7	T	(1792) William Herschel (1824) Delfino Codazzi (1922) Olga Alexandrovna Ladyzhenskaya	RM146
	8	F	(1851) George Chrystal	
	9	S	(1818) Ferdinand Joachimsthal (1900) Howard Hathaway Aiken	
	10	S	(1864) William Fogg Osgood (1872) Mary Ann Elizabeth Stephansen	
11	11	M	(1811) Urbain Jean Joseph Le Verrier (1853) Salvatore Pincherle (1870) Louis Bachelier	 RM158
	12	T	(1685) George Berkeley (1824) Gustav Robert Kirchhoff (1859) Ernesto Cesaro	
	13	W	(1861) Jules Joseph Drach (1957) Rudy D'Alembert	 RM278
	14	T	(1864) Jozef Kurschak (1879) Albert Einstein (1882) Wacław Sierpiński (1904) Lyudmila Vsevolodovna Keldysh	 RM074 RM271 RM266
	15	F	(1860) Walter Frank Raphael Weldon (1868) Grace Chisolm Young	
	16	S	(1750) Caroline Herschel (1789) Georg Simon Ohm (1846) Magnus Gosta Mittag-Leffler	RM146
	17	S	(1876) Ernest Benjamin Esclangon (1897) Charles Fox (1915) Wolfgang (Vincent) Döblin (Doblin)	 RM254
12	18	M	(1640) Philippe de La Hire (1690) Christian Goldbach (1796) Jacob Steiner (1870) Agnes Sime Baxter	 RM122
	19	T	(1862) Adolf Kneser (1910) Jacob Wolfowitz	
	20	W	(1840) Franz Mertens (1884) Philip Franck (1938) Sergei Petrovich Novikov	
	21	T	(1768) Jean Baptiste Joseph Fourier (1884) George David Birkhoff	RM242
	22	F	(1394) Ulugh Beg (1891) Lorna Mary Swain (1917) Irving Kaplansky (1944) Margaret Hilary Ashworth Millington	RM206
	23	S	(1749) Pierre-Simon de Laplace (1754) Georg Freiherr von Vega (1882) Emmy Amalie Noether (1897) John Lighton Synge	 RM050
	24	S	(1809) Joseph Liouville (1948) Sun-Yung (Alice) Chang (1966) Gigliola Staffilani	 RM142
13	25	M	(1538) Christopher Clausius	RM290
	26	T	(1848) Konstantin Andreev (1913) Paul Erdős	 RM110
	27	W	(1857) Karl Pearson	
	28	T	(1928) Alexander Grothendieck	RM086
	29	F	(1825) Francesco Faà Di Bruno (1873) Tullio Levi-Civita (1896) Wilhelm Ackermann	RM170 RM098
	30	S	(1892) Stefan Banach (1921) Alfréd Rényi	RM134
	31	S	(1596) René Descartes	RM218

March

Putnam 2009, A3

Let d_n be the determinant of the $n \times n$ matrix whose entries, from left to right and then from top to bottom, are cos 1, cos 2, …, cos n^2. (For example,

$$d_3 = \begin{vmatrix} \cos 1 & \cos 2 & \cos 3 \\ \cos 4 & \cos 5 & \cos 6 \\ \cos 7 & \cos 8 & \cos 9 \end{vmatrix}$$

The argument of cos is always in radians, not degrees.) Evaluate $\lim_{n\to\infty} d_n$.

How to put an elephant into a refrigerator

Algebra

Method 1: Prove that the elephant parts can be placed in the refrigerator, then prove that the refrigerator is closed with respect to addition.

Method 2: Generalize the refrigerator and define a surjection of the refrigerator on the elephant.

Murphy's Laws applied to Math Students

Proofs don't convince anybody of anything.

For example, when I imagine a triangle, although perhaps there is no such figure anywhere in the world outside of my thoughts, and there never has been, nevertheless there does not cease to be a certain nature, or shape or form of this figure. determinate essence, which is immutable and eternal; neither did I invent it, nor does it depend on my spirit in any way; as is clear from the fact that different properties of this triangle can be demonstrated, namely that its three angles are equal to two nets, that the larger angle is subtended by the larger side, and other similar ones, which now, let whether I like it or not, I recognize with all clarity and evidence that I am in it, although I had not previously thought of it in any way, when I first imagined a triangle; and therefore it cannot be said that I composed and invented them.

René Descartes

God does not care about our mathematical difficulties. He integrates empirically.

Albert Einstein

God is a child; and when he started playing, he cultivated mathematics. He is the most divine of human games.

Vinzenz Erath

Regular combinations occur more rarely only because they are fewer in number. If we look for a cause where we perceive a symmetry it is not because we consider that a symmetrical event is less possible than the others, but because this event must be the effect of a regular cause or chance, and the first of these suppositions is more probable than the second.

Pierre-Simon De Laplace

When you place a bet at less than the correct odds, which always happens against any organized betting agency, you are paying the operator a percentage fee for the privilege of placing a bet. The probability of winning will be what mathematicians call a "negative expected value." When you follow a system, you make a series of bets, each of which has a negative expected value. There is no way to add minuses to get a plus...

John Scarne

14	1	M	(1640) Georg Mohr	
			(1776) Marie-Sophie Germain	RM219
			(1895) Alexander Craig Aitken	
	2	T	(1878) Edward Kasner	
			(1934) Paul Joseph Cohen	
			(1984) Alessio Figalli	RM243
	3	W	(1835) John Howard Van Amringe	
			(1892) Hans Rademacher	
			(1900) Albert Edward Ingham	
			(1971) Alice Riddle	
	4	T	(1809) Benjamin Peirce	RM123
			(1842) François Édouard Anatole Lucas	RM279
			(1949) Shing-Tung Yau	
	5	F	(1588) Thomas Hobbes	
			(1607) Honoré Fabri	
			(1622) Vincenzo Viviani	
			(1869) Sergei Alexeievich Chaplygin	
	6	S	(1801) William Hallowes Miller	
	7	S	(1768) François-Joseph Français	
15	8	M	(1903) Marshall Harvey Stone	
	9	T	(1791) George Peacock	
			(1816) Charles Eugene Delaunay	
			(1865) Karl August Rudolph Steinmetz	RM291
			(1894) Cypra Cecilia Krieger Dunaij	
			(1919) John Presper Heckert	
	10	W	(1857) Henry Ernest Dudeney	RM183
	11	T	(1953) Andrew John Wiles	RM207
	12	F	(1794) Germinal Pierre Dandelin	
			(1852) Carl Louis Ferdinand von Lindemann	RM267
			(1903) Jan Tinbergen	
	13	S	(1728) Paolo Frisi	
			(1813) Duncan Farquharson Gregory	
			(1869) Ada Isabel Maddison	
			(1879) Francesco Severi	
			(1909) Stanislaw Marcin Ulam	RM171
	14	S	(1629) Christiaan Huygens	RM135
16	15	M	(1452) Leonardo da Vinci	
			(1548) Pietro Antonio Cataldi	
			(1707) Leonhard Euler	RM051
			(1809) Herman Gunther Grassmann	
	16	T	(1682) John Hadley	
			(1823) Ferdinand Gotthold Max Eisenstein	
	17	W	(1798) Étienne Bobillier	
			(1853) Arthur Moritz Schonflies	
			(1863) Augustus Edward Hough Love	
	18	T	(1791) Ottaviano Fabrizio Mossotti	RM150
			(1907) Lars Valerian Ahlfors	
			(1918) Hsien Chung Wang	
			(1949) Charles Louis Fefferman	
	19	F	(1880) Evgeny Evgenievich Slutsky	
			(1883) Richard von Mises	
			(1901) Kiyoshi Oka	
			(1905) Charles Ehresmann	
	20	S	(1839) Francesco Siacci	
	21	S	(1652) Michel Rolle	
			(1774) Jean Baptiste Biot	
			(1875) Teiji Takagi	RM231
17	22	M	(1811) Otto Ludwig Hesse	
			(1887) Harald August Bohr	RM063
			(1935) Bhama Srinivasan	
			(1939) Sir Michael Francis Atiyah	
	23	T	(1858) Max Karl Ernst Ludwig Planck	
			(1910) Sheila Scott Macintyre	
	24	W	(1863) Giovanni Vailati	
			(1899) Oscar Zariski	RM099
	25	T	(1849) Felix Christian Klein	RM255
			(1900) Wolfgang Pauli	
			(1903) Andrei Nicolayevich Kolmogorov	RM159
	26	F	(1889) Ludwig Josef Johan Wittgenstein	
	27	S	(1755) Marc-Antoine Parseval des Chenes	
			(1932) Gian-Carlo Rota	RM195
	28	S	(1906) Kurt Gödel	RM087
18	29	M	(1854) Jules Henri Poincaré	RM075
	30	T	(1777) Johann Carl Friedrich Gauss	RM147
			(1916) Claude Elwood Shannon	RM111

Rudi Mathematici

April

Putnam 2009, A4

Let S be a set of rational numbers such that
(a) $0 \in S$;
(b) If $x \in S$ then $x + 1 \in S$ and $x - 1 \in S$; and
(c) If $x \in S$ and $x \notin \{0; 1\}$, then $1/(x(x-1)) \in S$.
Must S contain all rational numbers?

How to put an elephant into a refrigerator

Topology
Method 1: Given the elephant outside the refrigerator, reverse the refrigerator topologically.
Method 2: Use a Klein bottle as a refrigerator.
Method 3: The elephant is compact, so it can be placed in a finite set of refrigerators.
Method 4: Prove that the property of being in the refrigerator is hereditary, then put the elephant's mother in the refrigerator.

Murphy's Laws applied to Math Students

Notes you understood perfectly in class transform themselves into hieroglyphics at home.

In short, Gödel's theorem establishes the impossibility of guaranteeing the non-contradiction of mathematics while remaining within mathematics itself. It seems like a paradox, but the strength of mathematics which should have consisted in its ability to prove every statement logically, now comes to simply demonstrate its own inability to prove. An atmosphere of tragedy, with Gödel in the role of Euripides.

Vittorino Andreoli

In pure mathematics we contemplate absolute truths which existed in the divine mind before the morning stars sang together, and which will continue to exist there when the last of their rays has fallen from heaven.

Edward Everett

The real traditional donut has the topology of a sphere. It is a matter of taste to consider it with separate internal and external surfaces. What is important is that the internal space must be filled with good raspberry jam. This is also a matter of taste.

Peter B. Fellgett

Pauca sed matura [His motto:] Few, but ripe.

Johann Carl Friedrich Gauss

The science of mathematics presents the most brilliant example of how pure reason can successfully expand its domain without the aid of experience.

Immanuel Kant

Mathematical discoveries, small or great are never born of spontaneous generation They always presuppose a soil seeded with preliminary knowledge and well prepared by labour, both conscious and subconscious.

Jules Henri Poincarè

Anyone who knows a mathematical proposition does not necessarily know something.

Ludwig Josef Johan Wittgenstein

May

	1	W	(1825) Johann Jacob Balmer	RM122
			(1908) Morris Kline	
			(1926) Peter Lax	RM289
			(1977) Maryam Mirzakhani	RM189
	2	T	(1860) D'Arcy Wentworth Thompson	RM138
			(1905) Kazimierz Zarankiewitz	
	3	F	(1842) Otto Stolz	
			(1860) Vito Volterra	RM136
			(1892) George Paget Thomson	RM161
	4	S	(1845) William Kingdon Clifford	
	5	S	(1833) Lazarus Emmanuel Fuchs	
			(1883) Anna Johnson Pell Wheeler	
			(1889) René Eugène Gateaux	RM196
			(1897) Francesco Giacomo Tricomi	RM256
			(1923) Cathleen Synge Morawetz	
19	6	M	(1872) Willem de Sitter	
			(1906) André Weil	RM088
	7	T	(1854) Giuseppe Veronese	RM220
			(1881) Ebenezer Cunningham	
			(1896) Pavel Sergieievich Alexandrov	
			(1926) Alexis Claude Clairaut	
	8	W	(1859) Johan Ludwig William Valdemar Jensen	
			(1905) Winifred Lydia Caunden Sargent	
	9	T	(1746) Gaspard Monge	RM208
			(1876) Gilbert Ames Bliss	
			(1965) Karen Ellen Smith	
	10	F	(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
	12	S	(1820) Florence Nightingale	RM104
			(1845) Pierre René Jean Baptiste Henry Brocard	
			(1902) Frank Yates	
20	13	M	(1750) Lorenzo Mascheroni	
			(1899) Pelageia Yakovlevna Polubarinova Kochina	
	14	T	(1832) Rudolf Otto Sigismund Lipschitz	
			(1863) John Charles Fields	RM100
	15	W	(1939) Brian Hartley	
			(1964) Sijue Wu	
	16	T	(1718) Maria Gaetana Agnesi	RM112
			(1821) Pafnuti Lvovi Chebyshev	
			(1911) John (Jack) Todd	RM139
	17	F	(1940) Alan Kay	
	18	S	(1850) Oliver Heaviside	RM160
			(1892) Bertrand Arthur William Russell	RM052
	19	S	(1865) Flora Philip	
			(1919) Georgii Dimitirievich Suvorov	
21	20	M	(1861) Henry Seely White	
	21	T	(1471) Albrecht Dürer	RM124
			(1792) Gustave Gaspard de Coriolis	
	22	W	(1865) Alfred Cardew Dixon	
	23	T	(1914) Lipa Bers	RM148
	24	F	(1544) William Gilbert	
	25	S	(1838) Karl Mikailovich Peterson	
			(1979) Elena Tosato	RM268
	26	S	(1667) Abraham de Moivre	RM280
			(1896) Yuri Dimitrievich Sokolov	
22	27	M	(1862) John Edward Campbell	
	28	T	(1676) Jacopo Francesco Riccati	RM232
			(1710) Johann (II) Bernoulli	RM093
	29	W	(1882) Harry Bateman	
	30	T	(1814) Eugene Charles Catalan	RM184
	31	F	(1912) Wu Chien Shiung (Madame Wu)	RM292
			(1926) John Kemeny	

Putnam 2009, A5

Is there a finite abelian group G such that the product of the orders of all its elements is 2^{2009}?

How to put an elephant into a refrigerator

Algebraic Topology

Replace the inside of the refrigerator with its universal cover ($\mathbb{R}^3$).

Murphy's Laws applied to Math Students

Textbooks are written for those who already know the subject.

Deduction, which takes us from the general proposition to facts again – teaches us, if I may so say, to anticipate from the ticket what is inside the bundle.

Thomas Henry Huxley

"But," you might say, "none of this shakes my belief that 2 and 2 are 4." You are quite right, except in marginal cases – and it is only in marginal cases that you are doubtful whether a certain animal is a dog or a certain length is less than a meter. Two must be two of something, and the proposition "2 and 2 are 4" is useless unless it can be applied. Two dogs and two dogs are certainly four dogs, but cases arise in which you are doubtful whether two of them are dogs. "Well, at any rate there are four animals", you may say. But there are microorganisms concerning which it is doubtful whether they are animals or plants. "Well, then living organisms", you say. But there are things of which it is doubtful whether they are living organisms or not. You will be driven into saying: "Two entities and two entities are four entities." When you have told me what you mean by "entity", we will resume the argument.

Bertrand Arthur William Russell

Some people think that, within mathematics, arithmetic, algebra and geometry are separate subjects: this is a serious mistake. Instead, they all collaborate with each other, help each other, and are sometimes interchangeable.

Malba Tahan

When I heard the cultured astronomer,
When demonstrations and figures were lined up before me,
when they showed me maps and diagrams to add, divide and measure them,
when I sat down to listen to the astronomer's seminar amidst a thousand applause in the room,
oh, how soon I got tired and fed up,
until I got up and slipped away, running away,
in the mystical misty night air, and from time to time
I gazed at the stars in perfect silence.

Walt Whitman

	1	S	(1796) Sadi Leonard Nicolas Carnot	
			(1851) Edward Bailey Elliott	
			(1899) Edward Charles Titchmarsh	
	2	S	(1895) Tibor Radó	
23	3	M	(1659) David Gregory	
			(1954) Susan Landau	
	4	T	(1809) John Henry Pratt	
			(1966) Svetlana Yakovlevna Jitomirskaya	RM197
	5	W	(1814) Pierre Laurent Wantzel	RM065
			(1819) John Couch Adams	RM281
			(1883) John Maynard Keynes	RM269
			(1941) Nikolai Vladimirovic Krylov	RM286
	6	T	(1436) Johann Müller Regiomontanus	RM185
			(1857) Aleksandr Michailovitch Lyapunov	RM077
			(1906) Max August Zorn	
	7	F	(1863) Edward Burr Van Vleck	
	8	S	(1625) Giovanni Domenico Cassini	RM245
			(1858) Charlotte Angas Scott	
			(1860) Alicia Boole Stott	
			(1896) Eleanor Pairman	RM209
			(1923) Gloria Olive	
			(1924) Samuel Karlin	
	9	S	(1885) John Edensor Littlewood	RM049
24	10	M	(940) Mohammad Abu'L Wafa Al-Buzjani	RM257
			(1887) Vladimir Ivanovich Smirnov	RM101
	11	T	(1881) Hilda Phoebe Hudson	
			(1937) David Bryant Mumford	
	12	W	(1888) Zygmunt Janyszewski	
			(1937) Vladimir Igorevich Arnold	RM221
	13	T	(1831) James Clerk Maxwell	RM113
			(1872) Jessie Chrystal Macmillan	
			(1876) William Sealey Gosset (Student)	
			(1928) John Forbes Nash	RM149
	14	F	(1736) Charles Augustin de Coulomb	
			(1856) Andrei Andreyevich Markov	RM125
			(1903) Alonzo Church	RM233
	15	S	(1640) Bernard Lamy	
			(1894) Nikolai Gregorievich Chebotaryov	
	16	S	(1915) John Wilder Tukey	
25	17	M	(1898) Maurits Cornelius Escher	RM097
	18	T	(1858) Andrew Russell Forsyth	
			(1884) Charles Ernest Weatherburn	
			(1884) Frieda Nugel	
			(1913) Paul Teichmüller	RM148
			(1915) Alice Turner Schafer	
	19	W	(1623) Blaise Pascal	RM053
			(1902) Wallace John Eckert	
	20	T	(1873) Alfred Loewy	
			(1917) Helena Rasiowa	
	21	F	(1781) Simeon Denis Poisson	RM293
			(1828) Giuseppe Bruno	
			(1870) Clara Immerwahr	RM182
	22	S	(1822) Mario Pieri	
			(1864) Hermann Minkowsky	
			(1910) Konrad Zuse	
			(1932) Mary Wynne Warner	
	23	S	(1912) Alan Mathison Turing	RM089
26	24	M	(1880) Oswald Veblen	
	25	T	(1908) William Van Orman Quine	
	26	W	(1824) William Thomson, Lord Kelvin	RM161
			(1918) Yudell Leo Luke	
	27	T	(1806) Augustus de Morgan	
	28	F	(1875) Henri Léon Lebesgue	RM173
	29	S	(1888) Aleksandr Aleksandrovich Friedmann	RM101
			(1979) Artur Avila Cordeiro de Melo	RM189
	30	S	(1791) Felix Savart	
			(1958) Abigail Thompson	

Rudi Mathematici

June

Putnam 2009, A6

Let f: $[0;1]^2 \to \mathbb{R}$ be a continuous function on the closed unit square such that $\frac{\partial f}{\partial x}$ and $\frac{\partial f}{\partial y}$ exist and are continuous on the interior $(0, 1)^2$. Let $a = \int_0^1 f(0,y)dy$, $b = \int_0^1 f(1,y)dy$, $c = \int_0^1 f(x,0)dx$, $d = \int_0^1 f(x,1)dx$. Prove or disprove: There must be a point $(x_0; y_0)$ in $(0; 1)^2$ such that

$$\frac{\partial f}{\partial x}(x_0, y_0) = b - a \text{ and } \frac{\partial f}{\partial y}(x_0, y_0) = d - c.$$

How to put an elephant into a refrigerator

Linear Algebra

Method 1: Define an orthonormal basis for the elephant and place the basis in the refrigerator.

Method 2: Show that part of the elephant can fit into the refrigerator; if the operator is linear, all parts can fit into the refrigerator.

Murphy's Laws applied to Math Students

Any simple idea can be expressed in incomprehensible terms.

If you add 3 and 5, you get 8; the three-ity of 3 and the five-ity of 5 have merged and lost in the eight-ity of 8, like two drops of water coming together. However, if you add 3 to 5i, you get the complex number 3+5i, a drop of water and a drop of oil – linear independence.

John Derbyshire

Mathematics seems ever to teach us two lessons: there is no limit to our mind's ingenuity; and there is even less of a limit to the intransigence of the world.

Robert & Ellen Kaplan

Unfortunately, as soon as people talk about huge numbers, they seem to go crazy. They seem to be under the impression that since zero equals nothing, they can add any number of zeros to a number without any practical consequences.

E. Kasner, J.R. Newman

A precisian professor had the habit of saying: "... quartic polynomial $ax^4 + bx^3 + cx^2 + dx + e$, where e need not be the base of the natural logarithms.".

John Edensor Littlewood

Words differently arranged have a different meaning and meanings differently arranged have a different effect.

Blaise Pascal

Sometimes a proof introduces the mathematicians into a whole new world of mathematical ideas that would never have been known without that proof.

Igor Rostislavovich Shafarevich

27	**1**	**M**	(1643) Gottfried Wilhelm von Leibniz	RM054
			(1788) Jean-Victor Poncelet	
			(1906) Jean Alexandre Eugène Dieudonné	RM246
	2	**T**	(1820) William John Racquorn Rankine	
			(1852) William Burnside	
			(1925) Olga Arsen'evna Oleinik	
	3	**W**	(1807) Ernest Jean Philippe Fauque de Jonquières	RM162
			(1897) Jesse Douglas	
	4	**T**	(1906) Daniel Edwin Rutherford	
			(1917) Michail Samoilovich Livsic	
	5	**F**	(1936) James Mirrlees	
	6	**S**	(1849) Alfred Bray Kempe	
	7	**S**	(1816) Johann Rudolf Wolf	
			(1906) William Feller	
			(1922) Vladimir Aleksandrovich Marchenko	
28	**8**	**M**	(1760) Christian Kramp	
			(1904) Henri Paul Cartan	RM126
	9	**T**	(1845) George Howard Darwin	RM138
			(1931) Valentina Mikhailovna Borok	RM197
	10	**W**	(1856) Nikola Tesla	RM174
			(1862) Roger Cotes	
			(1868) Oliver Dimon Kellogg	
	11	**T**	(1857) Sir Joseph Larmor	
			(1888) Jacob David Tamarkin	RM101
			(1890) Giacomo Albanese	
	12	**F**	(1875) Ernest Sigismund Fischer	
			(1895) Richard Buckminster Fuller	RM066
			(1935) Nicolas Bourbaki	RM126
	13	**S**	(1527) John Dee	RM234
			(1741) Karl Friedrich Hindenburg	
	14	**S**	(1671) Jacques D'Allonville	
			(1793) George Green	RM078
29	**15**	**M**	(1865) Wilhelm Wirtinger	
			(1898) Mary Taylor Slow	
			(1906) Adolph Andrej Pavlovich Yushkevich	
	16	**T**	(1678) Jakob Hermann	
			(1903) Irmgard Flugge-Lotz	
	17	**W**	(1831) Victor Mayer Amédeé Mannheim	
			(1837) Wilhelm Lexis	
			(1944) Krystyna Maria Trybulec Kuperberg	
	18	**T**	(1013) Hermann von Reichenau	RM282
			(1635) Robert Hooke	RM114
			(1853) Hendrik Antoon Lorentz	RM161
	19	**F**	(1768) Francois Joseph Servois	
	20	**S**	(1876) Otto Blumenthal	RM258
			(1947) Gerd Binnig	RM222
	21	**S**	(1620) Jean Picard	
			(1848) Emil Weyr	
			(1849) Robert Simpson Woodward	
			(1861) Herbert Ellsworth Slaught	
30	**22**	**M**	(1784) Friedrich Wilhelm Bessel	RM198
	23	**T**	(1775) Étienne-Louis Malus	
			(1854) Ivan Slezynsky	
	24	**W**	(1851) Friedrich Hermann Schottky	
			(1871) Paul Epstein	
			(1923) Christine Mary Hamill	
	25	**T**	(1808) Johann Benedict Listing	
	26	**F**	(1903) Kurt Mahler	
	27	**S**	(1667) Johann Bernoulli	RM093
			(1801) George Biddel Airy	
			(1848) Lorand Baron von Eötvös	RM210
			(1867) Derrick Norman Lehmer	RM215
			(1871) Ernst Friedrich Ferdinand Zermelo	RM090
	28	**S**	(1954) Gerd Faltings	RM222
31	**29**	**M**	(1898) Isidor Isaac Rabi	RM294
	30	**T**	(1889) Vladimir Kosma Zworkyn	
	31	**W**	(1704) Gabriel Cramer	RM186
			(1712) Johann Samuel Koenig	
			(1926) Hilary Putnam	

Rudi Mathematici

July

Putnam 2009, B1

Show that every positive rational number can be written as a quotient of products of factorials of (not necessarily distinct) primes. For example,

$$\frac{10}{9} = \frac{2!\cdot 5!}{3!\cdot 3!\cdot 3!}.$$

How to put an elephant into a refrigerator

Affine geometry

There is a similar transformation that puts the elephant into the refrigerator.

Murphy's Laws applied to Math Students

The answers you need are not at the back of the book.

An anagram, an acrostic (only in part), a palindrome, a crossword puzzle function like so many mathematical equations: the solver who faces them knows that in his resolution he will be helped by the necessity that every element present on one side of the equal sign must also be present on the other, and that given the unknowns the final account must be zero-sum. In these cases, puzzles are a language subjected to the litmus test.

Claudio Bartocci

There will come a time when the proper education of children, by a glorified system of spontaneous education of choice, similar to the Montessori System, will be made possible. Children, as well as grown-ups, in their individual, glorified, drudgery-proof homes of Labrador, the tropics, the Orient, or where you will, to which they can pass with pleasure and expedition by means of ever-improving transportation, will be able to tune in their television and radio to the moving picture lecture of, let us say, President Lowell of Harvard; the professor of Mathematics of Oxford; of the doctor of Indian antiquities of Delhi, etc. Education by choice, with its marvelous motivating psychology of desire for truth, will make life ever cleaner and happier, more rhythmical and artistic.

Richard Buckminster Fuller

By the help of microscopes, there is nothing so small, as to escape our inquiry; hence there is a new visible world discovered to the understanding.

Robert Hooke

A person's aesthetic and intellectual life cannot be complete unless it includes an appreciation for the power and beauty of mathematics. To put it simply, aesthetic and intellectual fulfilment requires knowing a little math.

Jerry P. King

I do not think there is any thrill that can go through the human heart like that felt by the inventor as he sees some creation of the brain unfolding to success... Such emotions make a man forget food, sleep, friends, love, everything.

Nikola Tesla

	1	T	(1861) Ivar Otto Bendixson	
			(1881) Otto Toeplitz	
			(1955) Bernadette Perrin-Riou	
	2	F	(1856) Ferdinand Rudio	
			(1902) Mina Spiegel Rees	
	3	S	(1914) Mark Kac	RM115
	4	S	(1805) Sir William Rowan Hamilton	RM079
			(1838) John Venn	
32	5	M	(1802) Niels Henrik Abel	RM055
			(1941) Alexander Keewatin Dewdney	
	6	T	(1638) Nicolas Malebranche	RM283
			(1741) John Wilson	
	7	W	(1868) Ladislaus Josephowitsch Bortkiewitz	
	8	T	(1902) Paul Adrien Maurice Dirac	RM103
			(1931) Sir Roger Penrose	
			(1974) Manjul Bhargava	RM189
	9	F	(1537) Francesco Barozzi (Franciscus Barocius)	RM223
			(1940) Linda Goldway Keen	
	10	S	(1602) Gilles Personne de Roberval	
			(1901) Franco Dino Rasetti	RM235
			(1917) Nikolai Sergeevitc Krylov	RM286
			(1926) Carol Ruth Karp	
	11	S	(1730) Charles Bossut	
			(1842) Enrico D'Ovidio	RM259
33	12	M	(1882) Jules Antoine Richard	
			(1887) Erwin Rudolf Josef Alexander Schrödinger	RM103
	13	T	(1625) Erasmus Bartholin	
			(1819) George Gabriel Stokes	
			(1861) Cesare Burali-Forti	RM187
	14	W	(1530) Giovanni Battista Benedetti	
			(1842) Jean Gaston Darboux	
			(1865) Guido Castelnuovo	
			(1866) Charles Gustave Nicolas de La Vallée-Poussin	
	15	T	(1863) Aleksei Nikolaevich Krylov	RM286
			(1892) Louis Pierre Victor Duc de Broglie	RM175
			(1901) Piotr Sergeevich Novikov	
	16	F	(1773) Louis-Benjamin Francoeur	
			(1821) Arthur Cayley	
	17	S	(1601) Pierre de Fermat	RM091
	18	S	(1685) Brook Taylor	
34	19	M	(1646) John Flamsteed	
			(1739) Georg Simon Klügel	
	20	T	(1710) Thomas Simpson	RM247
			(1863) Corrado Segre	
	21	W	(1789) Augustin-Louis Cauchy	RM127
	22	T	(1647) Denis Papin	
	23	F	(1683) Giovanni Poleni	
			(1829) Moritz Benedikt Cantor	
			(1842) Osborne Reynolds	
	24	S	(1561) Bartholomeo Pitiscus	
			(1942) Karen Keskulla Uhlenbeck	RM163
	25	S	(1561) Philip Van Lansberge	
			(1844) Thomas Muir	RM199
35	26	M	(1728) Johann Heinrich Lambert	
			(1875) Giuseppe Vitali	
			(1965) Marcus Peter Francis du Sautoy	
	27	T	(1858) Giuseppe Peano	RM067
	28	W	(1796) Irénée Jules Bienaymé	
			(1862) Roberto Marcolongo	RM187
	29	T	(1904) Leonard Roth	
	30	F	(1703) Giovanni Ludovico Calandrini	RM186
			(1856) Carle David Tolmé Runge	
			(1906) Olga Taussky-Todd	RM139
	31	S	(1821) Hermann Ludwig Ferdinand von Helmholtz	RM211
			(1885) Herbert Westren Turnbull	

August

Putnam 2009, B2

A game involves jumping to the right on the real number line. If a and b are real numbers and $b > a$, the cost of jumping from a to b is $b^3 - ab^2$. For what real numbers c can one travel from 0 to 1 in a finite number of jumps with total cost exactly c?

How to put an elephant into a refrigerator

Set Theory

Since {Refrigerator}={Elephant}, the elephant and the refrigerator have the same cardinality.

Murphy's Laws applied to Math Students

No matter how much you studied for any exams, it will never be enough.

I shall devote all my efforts to bring light into the immense obscurity that today reigns in Analysis. It so lacks any plan or system, that one is really astonished that there are so many people who devote themselves to it – and, still worse, it is absolutely devoid of any rigor.

Niels Henrik Abel

...the certitude of mathematics is contained in the syntactic rigour of demonstrations.

Francesco Barozzi

This is the main fault of the doctrinaire spirit that invades our school. We teach to be wary of approximation, which is reality, to adopt the idol of a perfection which is illusory.
[...] if for the sake of culture, we suffocate the practical sense and spirit of initiative in these disciples, we are failing in the greatest of our duties.

Guido Castelnuovo

God is a mathematician of a very high order and He used advanced mathematics in constructing the universe.

Paul Adrien Maurice Dirac

Mathematics is the most tolerant of disciplines, it is based on a single certainty: if two people discuss for long enough in the end they must agree, perhaps on which hypotheses to assume, and they will find an agreement that they will both be ready to defend with the same determination towards others.

Furio Honsell

Games are among the most interesting creations of the human mind, and the analysis of their structure is full of adventure and surprises. Unfortunately, there is never a lack of mathematicians for the job of transforming delectable ingredients into a dish that tastes like a damp blanket.

James R. Newman

September

	1	S	(1647) Giovanni Ceva (1659) Joseph Saurin (1835) William Stanley Jevons	RM203
36	2	M	(1878) Mauriche René Frechet (1923) René Thom	RM080
	3	T	(1814) James Joseph Sylvester (1884) Solomon Lefschetz (1908) Lev Semenovich Pontryagin	RM104
	4	W	(1809) Luigi Federico Menabrea	RM150
	5	T	(1667) Giovanni Girolamo Saccheri (1725) Jean-Étienne Montucla	RM128
	6	F	(1859) Boris Jakovlevich Bukreev (1863) Dimitri Aleksandrovich Grave	
	7	S	(1707) George Louis Leclerc Comte de Buffon (1948) Cheryl Elisabeth Praeger (1955) Efim Zelmanov	
	8	S	(1584) Gregorius Saint-Vincent (1588) Marin Mersenne	RM092
37	9	M	(1860) Frank Morley (1914) Marjorie Lee Browne	
	10	T	(1839) Charles Sanders Peirce	RM123
	11	W	(1623) Stefano degli Angeli (1798) Franz Ernst Neumann (1877) Sir James Hopwood Jeans	RM224
	12	T	(1891) Antoine André Louis Reynaud (1894) Dorothy Maud Wrinch (1900) Haskell Brooks Curry	RM260 RM212
	13	F	(1873) Constantin Carathéodory (1885) Wilhelm Johann Eugen Blaschke	
	14	S	(1858) Henry Burchard Fine (1891) Ivan Matveevich Vinogradov	
	15	S	(973) Abu Arrayhan Muhammad Ibn Ahmad Al'Biruni (1886) Paul Pierre Levy	RM164
38	16	M	(1494) Francisco Maurolico (1736) Johann Nikolaus Tetens	RM296
	17	T	(1743) Marie Jean Antoine Nicolas de Caritat de Condorcet (1826) Georg Friedrich Bernhard Riemann	RM176 RM068
	18	W	(1752) Adrien-Marie Legendre	RM140
	19	T	(1749) Jean-Baptiste Delambre	
	20	F	(1842) Alexander Wilhelm von Brill (1861) Frank Nelson Cole	
	21	S	(1899) Juliusz Pawel Schauder (1917) Phyllis Nicolson	
	22	S	(1765) Paolo Ruffini (1769) Louis Puissant (1803) Jaques Charles Francois Sturm	RM116
39	23	M	(1768) William Wallace (1900) David Van Dantzig	
	24	T	(1501) Girolamo Cardano (1625) Johan de Witt (1801) Michail Vasilevich Ostrogradski (1862) Winifred Edgerton Merrill (1945) Ian Nicholas Stewart	RM064 RM188 RM056 RM236
	25	W	(1819) George Salmon (1888) Stefan Mazurkiewicz	
	26	T	(1688) Willem Jakob 's Gravesande (1854) Percy Alexander Macmahon (1891) Hans Reichenbach	
	27	F	(1855) Paul Émile Appell (1876) Earle Raymond Hedrick (1919) James Hardy Wilkinson	
	28	S	(1698) Pierre Louis Moreau de Maupertuis (1761) Ferdinand François Desiré Budan de Boislaurent (1873) Julian Lowell Coolidge	RM152
	29	S	(1540) François Viète (1561) Adriaan Van Roomen (1812) Adolph Gopel	RM200 RM200
40	30	M	(1775) Robert Adrain (1829) Joseph Wolstenholme (1883) Ernst Hellinger (1891) Otto Yulyevich Schmidt	RM248

Putnam 2009, B3

Call a subset S of $\{1, 2, \ldots, n\}$ *mediocre* if it has the following property: Whenever a and b are elements of S whose average is an integer, that average is also an element of S. Let $A(n)$ be the number of mediocre subsets of $\{1, 2, \ldots, n\}$. [For instance, every subset of $\{1, 2, 3\}$ except $\{1, 3\}$ is mediocre, so $A(3) = 7$.] Find all positive integers n such that $A(n+2)-2A(n+1)+A(n) = 1$.

How to put an elephant into a refrigerator

Geometry
Axiom: An elephant can be put in the refrigerator.

Murphy's Laws applied to Math Students

The problems you know how to solve never come up in the exam.

There is a difficulty connected to infinity that concerns the mathematician. If infinity is not actual and the size of the universe is finite, his theorems on numbers will not be true for all numbers, but only for a finite number of them; and the mathematician will not be able to extend his lines and planes indefinitely to demonstrate certain geometric theorems.

Aristotle

Shouting at the monkeys in the tree opposite. That's what brains evolved into. Not math or physics.

Jack Cohen, Terry Pratchett, Ian Stewart

Enraged, the Beast twisted its double and triple integrals to counter the polynomials with which the king tried to hit it, slipped into an infinite series of indeterminate terms, then rose again, raising itself to a power, but the king attacked it with a series of partial derivations and totals to zero all its coefficients (see Riemann's Lemma), and in the ensuing confusion the builders completely lost sight of the king and the beast.

Stanislaw Lem

Despite all the experience I may have gained in music from having associated myself so much with it, I must confess that only with the help of mathematics have my ideas become clear.

Jean-Philippe Rameau

No discipline is more suited than mathematics to giving the sense, to those who possess it, of an indestructible spiritual treasure, a set of solid knowledge that can never prove to be incorrect.

Gaetano Scorza

Since Hardy's time the world has also changed. A typical day for the great Cambridge scholar consisted of a maximum of four hours of intense reflection on research problems while the rest of the time was spent playing cricket, Hardy's great passion in addition to mathematics, and reading newspapers. There probably remained space for some sporadic meetings with students, but Hardy was reticent on personal matters.

Ian Nicholas Stewart

	1	T	(1671) Luigi Guido Grandi	RM177
			(1898) Bela Kerekjarto'	
			(1912) Kathleen Timpson Ollerenshaw	
	2	W	(1825) John James Walker	
			(1908) Arthur Erdélyi	
	3	T	(1944) Pierre René Deligne	
	4	F	(1759) Louis Francois Antoine Arbogast	
			(1797) Jerome Savary	
	5	S	(1732) Nevil Maskelyne	
			(1781) Bernhard Placidus Johann Nepomuk Bolzano	RM117
			(1861) Thomas Little Heath	
	6	S	(1552) Matteo Ricci	RM141
			(1831) Julius Wilhelm Richard Dedekind	RM081
			(1908) Sergei Lvovich Sobolev	
41	7	M	(1885) Niels Bohr	RM063
	8	T	(1908) Hans Arnold Heilbronn	
	9	W	(1581) Claude Gaspard Bachet de Meziriac	RM201
			(1704) Johann Andrea von Segner	
			(1854) Mihajlo Idvorski Pupin	RM297
			(1873) Karl Schwarzschild	RM153
			(1949) Fan Rong K Chung Graham	RM110
	10	T	(1731) Henry Cavendish	RM273
			(1861) Heinrich Friedrich Karl Ludwig Burkhardt	
	11	F	(1675) Samuel Clarke	
			(1777) Barnabè Brisson	
			(1881) Lewis Fry Richardson	
			(1885) Alfred Haar	
			(1910) Cahit Arf	RM261
	12	S	(1860) Elmer Sperry	
	13	S	(1890) Georg Feigl	
			(1893) Kurt Werner Friedrich Reidemeister	
			(1932) John Griggs Thomson	
42	14	M	(1687) Robert Simson	
			(1801) Joseph Antoine Ferdinand Plateau	
			(1868) Alessandro Padoa	
	15	T	(1608) Evangelista Torricelli	RM165
			(1735) Jesse Ramsden	
			(1776) Peter Barlow	
			(1931) Eléna Wexler-Kreindler	
	16	W	(1879) Philip Edward Bertrand Jourdain	
	17	T	(1759) Jacob (II) Bernoulli	RM093
			(1888) Paul Isaac Bernays	
	18	F	(1945) Margaret Dusa Waddington Mcduff	RM249
	19	S	(1903) Jean Frédéric Auguste Delsarte	
			(1910) Subrahmanyan Chandrasekhar	RM153
	20	S	(1632) Sir Christopher Wren	RM105
			(1863) William Henry Young	
			(1865) Aleksandr Petrovich Kotelnikov	
43	21	M	(1677) Nicolaus (I) Bernoulli	RM093
			(1823) Enrico Betti	RM150
			(1855) Giovan Battista Guccia	RM129
			(1893) William Leonard Ferrar	
			(1914) Martin Gardner	RM137
	22	T	(1587) Joachim Jungius	RM285
			(1895) Rolf Herman Nevanlinna	
			(1907) Sarvadaman Chowla	
	23	W	(1865) Piers Bohl	
	24	T	(1804) Wilhelm Eduard Weber	
			(1873) Edmund Taylor Whittaker	
	25	F	(1811) Évariste Galois	RM069
	26	S	(1849) Ferdinand Georg Frobenius	
			(1857) Charles Max Mason	
			(1911) Shiing-Shen Chern	
	27	S	(1678) Pierre Remond de Montmort	
			(1856) Ernest William Hobson	
44	28	M	(1804) Pierre François Verhulst	
	29	T	(1925) Klaus Roth	
	30	W	(1906) Andrej Nikolaevich Tichonov	
			(1946) William Paul Thurston	RM237
	31	T	(1711) Laura Maria Caterina Bassi	RM189
			(1815) Karl Theodor Wilhelm Weierstrass	RM057
			(1935) Ronald Lewis Graham	RM110

Hanc Marginis Exiguitas Non Caperet

Rudi Mathematici

October

Putnam 2009, B4

Say that a polynomial with real coefficients in two variables, x, y is *balanced* if the average value of the polynomial on each circle centered at the origin is 0. The balanced polynomials of degree at most 2009 form a vector space V over $\mathbb{R}$. Find the dimension of V.

How to put an elephant into a refrigerator

Complex Analysis

Put the refrigerator at the origin and the elephant outside the unit circle, then you get the image by inversion.

Murphy's Laws applied to Math Students

The problem that definitely won't come up on the exam, will come up on the exam.

One may ask the question as to the extent to which the quest for beauty is an aim in the pursuit of science.... It is, indeed, an incredible fact that what the human mind, at its deepest and most profound, perceives as beautiful finds its realization in external nature. What is intelligible is also beautiful.

Subrahmanyan Chandrasekhar

[From the preface to his final manuscript.] Since the beginning of the century, computational procedures have become so complicated that any progress by those means has become impossible, without the elegance which modern mathematicians have brought to bear on their research, and by means of which the spirit comprehends quickly and in one step a great many computations.
It is clear that elegance, so vaunted and so aptly named, can have no other purpose. ...
Go to the roots, of these calculations! Group the operations. Classify them according to their complexities rather than their appearances! This, I believe, is the mission of future mathematicians. This is the road on which I am embarking in this work.

Évariste Galois

Well, as you know, there are 24 hours in every day. And if that's not enough, you've always got the nights!

Ronald Lewis Graham

What is brought to light by the intellect cannot condescend to falsehood.

Matteo Ricci

Geometry alone, among the liberal disciplines, exercises and sharpens the ingenuity and makes it suitable to be an ornament of the city in peace and to defend it in war [...] other things being equal, in fact, the ingenuity that is exercised in geometric gymnastics he possesses a very particular and virile strength.

Evangelista Torricelli

	1	F	(1535) Giambattista della Porta	RM226
	2	S	(1815) George Boole	RM094
			(1826) Henry John Stephen Smith	
	3	S	(1867) Martin Wilhelm Kutta	
			(1878) Arthur Byron Coble	
			(1896) Raymond Louis Wilder	
			(1906) Carl Benjamin Boyer	
45	4	M	(1744) Johann (III) Bernoulli	RM093
			(1865) Pierre Simon Girard	
	5	T	(1848) James Whitbread Lee Glaisher	
			(1930) John Frank Adams	
	6	W	(1906) Emma Markovna Trotskaia Lehmer	RM215
	7	T	(1660) Thomas Fantet de Lagny	
			(1799) Karl Heinrich Graffe	
			(1867) Maria Skłodowska Curie	RM182
			(1878) Lise Meitner	RM238
			(1898) Raphael Salem	
	8	F	(1656) Edmond Halley	RM190
			(1781) Giovanni Antonio Amedeo Plana	RM154
			(1846) Eugenio Bertini	
			(1848) Friedrich Ludwig Gottlob Frege	RM274
			(1854) Johannes Robert Rydberg	
			(1869) Felix Hausdorff	RM178
	9	S	(1847) Carlo Alberto Castigliano	RM202
			(1885) Theodor Franz Eduard Kaluza	
			(1885) Hermann Klaus Hugo Weyl	RM082
			(1906) Jaroslav Borisovich Lopatynsky	
			(1913) Hedwig Eva Maria Kiesler (Hedy Lamarr)	RM144
			(1922) Imre Lakatos	
	10	S	(1829) Helwin Bruno Christoffel	
46	11	M	(1904) John Henry Constantine Whitehead	
	12	T	(1825) Michail Egorovich Vashchenko-Zakharchenko	
			(1842) John William Strutt Lord Rayleigh	
			(1927) Yutaka Taniyama	
	13	W	(1876) Ernest Julius Wilkzynsky	
			(1878) Max Wilhelm Dehn	
	14	T	(1845) Ulisse Dini	
			(1919) Paulette Libermann	
			(1975) Martin Hairer	RM189
	15	F	(1688) Louis Bertrand Castel	
			(1793) Michel Chasles	
			(1794) Franz Adolph Taurinus	
	16	S	(1835) Eugenio Beltrami	RM262
	17	S	(1597) Henry Gellibrand	
			(1717) Jean-Baptiste Le Rond D'Alembert	RM166
			(1790) August Ferdinand Möbius	RM118
			(1902) Eugene Wigner	RM298
47	18	M	(1872) Giovanni Enrico Eugenio Vacca	
			(1927) Jon Leslie Britton	
	19	T	(1894) Heinz Hopf	
			(1900) Michail Alekseevich Lavrentev	
			(1901) Nina Karlovna Bari	RM214
	20	W	(1889) Edwin Powell Hubble	
			(1924) Benoît Mandelbrot	
			(1963) William Timothy Gowers	
	21	T	(1867) Dimitri Sintsov	
	22	F	(1803) Giusto Bellavitis	
			(1840) Émile Michel Hyacinthe Lemoine	
	23	S	(1616) John Wallis	RM070
			(1820) Issac Todhunter	
			(1917) Elizabeth Leonard Scott	RM106
	24	S	(1549) Duncan Maclaren Young Sommerville	
			(1909) Gerhard Gentzen	
48	25	M	(1841) Fredrich Wilhelm Karl Ernst Schröder	
			(1873) Claude Louis Mathieu	
			(1943) Evelyn Merle Roden Nelson	
	26	T	(1894) Norbert Wiener	RM172
			(1946) Enrico Bombieri	
	27	W	(1867) Arthur Lee Dixon	
	28	T	(1898) John Wishart	
	29	F	(1803) Christian Andreas Doppler	RM250
			(1849) Sir Horace Lamb	
			(1879) Nikolay Mitrofanovich Krylov	RM286
	30	S	(1549) Sir Henry Savile	
			(1969) Matilde Marcolli	RM142

Hanc Marginis Exiguitas Non Caperet

Rudi Mathematici

November

Putnam 2009, B5

Let f: $(1, \infty) \to \mathbb{R}$ be a differentiable function such that

$$f'(x) = \frac{x^2 - (f(x))^2}{x^2((f(x))^2 + 1)} \text{ for all } x > 1.$$

Prove that $\lim_{x\to\infty} f(x) = \infty$.

How to put an elephant into a refrigerator

Numerical Analysis

Place the elephant's trunk in the refrigerator and define the rest of the elephant as a rounding error.

Murphy's Laws applied to Math Students

The answer to the problem you couldn't solve during the exam will become obvious after you hand in your paper.

The fact that its arguments can in principle be resolved makes mathematics unique. There is no mathematical equivalent of astronomers who still believe in the steady-state cosmological theory, or of biologists who with great conviction hold very different ideas about what can be explained by natural selection, or of philosophers who fundamentally disagree about the relationship between awareness and the physical world, or of economists who follow different schools of thought such as monetarism and neo-Keynesianism.

William Timothy Gowers

Every spiritual audacity today rests on the exact sciences. We do not learn from Goethe, Hebbel, Hölderlin, but from Mach, Lorentz, Einstein, Minkowski, from Couturat, Russell, Peano [...] The program of every single work of art can be this: mathematical audacity, dissolution of consciousness in the elements, unlimited permutation of these elements; everything is related to everything else, and develops from this.

Robert Musil

Man is confined within the narrow limits of the body, as in a prison, but mathematics frees him, and makes him greater than the entire universe. [...] Tossed here and there, aimlessly, by the storm of passions, mathematics restores his inner peace, harmoniously resolving the opposing movements of the soul, and bringing it back, under the guidance of reason, to agreement and harmony.

Petrus Ramus

The superstitious masses hold it as an axiom that God's judgments far transcend human intellect. Such a doctrine could be enough to hide the truth from the human race for all eternity, if mathematics had not provided us with another comparison of truth, considering only the essences and properties of things without taking into account their final causes.

Baruch Spinoza

Anyone who has heard the same thing said by 12,000 eyewitnesses has only 12,000 probabilities, which are equal to a strong probability, which in turn is far from certainty.

Voltaire

	1	S	(1792) Nikolay Yvanovich Lobachevsky	RM083
			(1847) Christine Ladd-Franklin	
49	2	M	(1831) Paul David Gustav du Bois-Reymond	
			(1901) George Frederick James Temple	
	3	T	(1903) Sidney Goldstein	
			(1924) John Backus	
	4	W	(1795) Thomas Carlyle	
	5	T	(1868) Arnold Johannes Wilhelm Sommerfeld	RM275
			(1901) Werner Karl Heisenberg	RM155
			(1907) Giuseppe Occhialini	RM122
	6	F	(1682) Giulio Carlo Fagnano dei Toschi	
	7	S	(1823) Leopold Kronecker	RM239
			(1830) Antonio Luigi Gaudenzio Giuseppe Cremona	RM150
			(1924) Mary Ellen Rudin	
	8	S	(1508) Regnier Gemma Frisius	
			(1865) Jaques Salomon Hadamard	RM263
			(1919) Julia Bowman Robinson	RM227
50	9	M	(1883) Nikolai Nikolaievich Luzin	RM214
			(1906) Grace Brewster Murray Hopper	
			(1917) Sergei Vasilovich Fomin	
	10	T	(1804) Karl Gustav Jacob Jacobi	RM251
			(1815) Augusta Ada King Countess Of Lovelace	RM059
	11	W	(1882) Max Born	RM155
	12	T	(1832) Peter Ludwig Mejdell Sylow	
			(1913) Emma Castelnuovo	RM191
	13	F	(1724) Franz Ulrich Theodosius Aepinus	
			(1887) George Pólya	RM131
	14	S	(1546) Tycho Brahe	
	15	S	(1802) János Bolyai	RM083
			(1923) Freeman John Dyson	
51	16	M	(1804) Wiktor Yakovievich Bunyakowsky	
	17	T	(1706) Gabrielle Émilie Le Tonnelier de Breteuil du Châtelet	
			(1835) Felice Casorati	RM299
			(1842) Marius Sophus Lie	
			(1900) Dame Mary Lucy Cartwright	
	18	W	(1856) Joseph John Thomson	RM161
			(1917) Roger Lyndon	
			(1942) Lenore Blum	
	19	T	(1783) Charles Julien Brianchon	
			(1854) Marcel Louis Brillouin	
			(1887) Charles Galton Darwin	RM138
	20	F	(1494) Oronce Fine	
			(1648) Tommaso Ceva	RM203
			(1737) Tommaso Valperga di Caluso	RM287
			(1875) Francesco Paolo Cantelli	
	21	S	(1878) Jan Łukasiewicz	
			(1921) Edith Hirsch Luchins	
			(1932) John Robert Ringrose	
	22	S	(1824) Francesco Brioschi	RM150
			(1859) Otto Ludwig Hölder	
			(1869) Dimitri Fedorovich Egorov	RM214
			(1877) Tommaso Boggio	
			(1887) Srinivasa Aiyangar Ramanujan	
52	23	M	(1872) Georgii Yurii Pfeiffer	
	24	T	(1822) Charles Hermite	RM095
			(1868) Emmanuel Lasker	RM167
	25	W	(1642) Isaac Newton	RM071
			(1900) Antoni Zygmund	
	26	T	(1780) Mary Fairfax Greig Somerville	
			(1791) Charles Babbage	RM059
			(1937) John Horton Conway	RM119
	27	F	(1571) Johannes Kepler	
			(1654) Jacob (Jacques) Bernoulli	RM093
	28	S	(1808) Louis Victoire Athanase Dupré	
			(1882) Arthur Stanley Eddington	RM179
			(1903) John von Neumann	RM107
	29	S	(1856) Thomas Jan Stieltjes	
53	30	M	(1897) Stanislaw Saks	
	31	T	(1872) Volodymyr Levitsky	
			(1896) Carl Ludwig Siegel	
			(1945) Leonard Adleman	RM143
			(1952) Vaughan Frederick Randall Jones	

Rudi Mathematici

December

Putnam 2009, B6

Prove that for every positive integer n, there is a sequence of integers $a_0, a_1, \ldots, a_{2009}$ with $a_0=0$ and $a_{2009}=n$ such that each term after a_0 is either an earlier term plus 2^k for some nonnegative integer k, or of the form $b \bmod c$ for some earlier positive terms b and c.
[Here $b \bmod c$ denotes the remainder when b is divided by c, so $0 \leq (b \bmod c) < c$.].

How to put an elephant into a refrigerator

Statistics
Cut off the elephant's tail, place it in the refrigerator, and consider it a representative sample of the entire elephant.

Murphy's Laws applied to Math Students

Every problem is harder than it looks and takes longer than you expected.

Although for most of us [the law of universal gravitation] is of no practical use, we can all appreciate its elegant conciseness. A couple of small multiplications, a simple division and there you go: wherever you are, you can know your gravitational position.

Bill Bryson

It is true that Fourier was of the opinion that the main purpose of mathematics was public utility and the explanation of natural phenomena; but a philosopher like him should have known that the only purpose of science is to honor the human mind, and in this regard a question about number theory is as valid as a question about how the world is made.

Karl Gustav Jacob Jacobi

The ability to do mathematics has supported and fuelled trust in human reason, and at the same time rooted a superhuman vision of mathematics.

Gabriele Lolli

Numero pondere et mensura Deus omnia condidit
God created everything by number, weight and measure.

Isaac Newton

There are many questions fools can ask, that wise men cannot answer.

George Polya

Einstein: "You know, Henri, I used to study mathematics, but I left it for physics."
Poincaré: "Oh, really, Albert? But why?"
Einstein: "Because although I could distinguish true statements from false ones, I could not determine which facts were important."
Poincaré: "This is very interesting, Albert, because originally I studied physics, but I left it for mathematics."
Einstein: "Really? Why?"
Poincaré: "Because I was unable to say which of the important facts were true."

David Singmaster