$$x^3 - 6'141x^2 + 12'569'843x - 8'575'752'975 = 0$$

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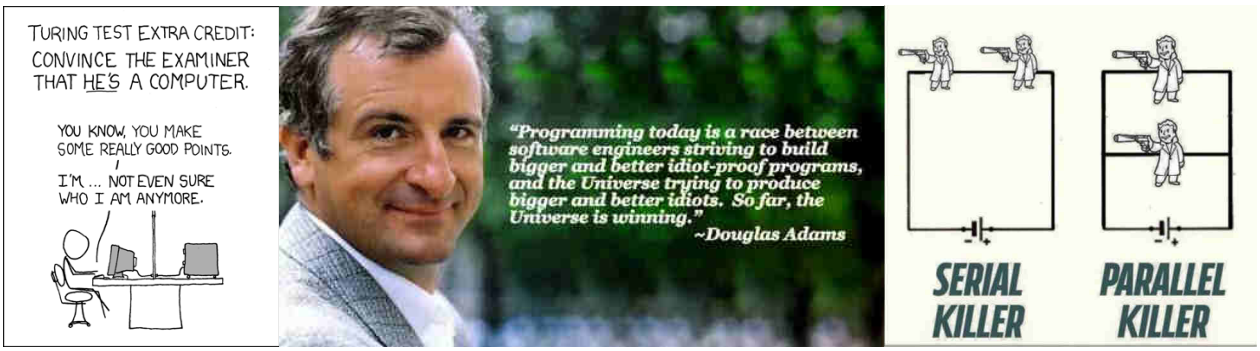

	1	T	(1803) Guglielmo Libri Carucci dalla Sommaja (1878) Agner Krarup Erlang (1894) Satyendranath Bose (1912) Boris Gnedenko	RM132 RM168
	2	W	(1822) Rudolf Julius Emmanuel Clausius (1905) Lev Genrichovich Shnirelman (1938) Anatoly Samoilenko	
	3	T	(1917) Yuri Alexeievich Mitropolsky	
	4	F	(1643) Isaac Newton	RM071
	5	S	(1723) Nicole-Reine Étable de Labrière Lepaute (1838) Marie Ennemond Camille Jordan (1871) Federigo Enriques (1871) Gino Fano	 RM084
	6	S	(1807) Jozeph Mitza Petzval (1841) Rudolf Sturm	
2	7	M	(1871) Felix Edouard Justin Émile Borel (1907) Raymond Edward Alan Christopher Paley	
	8	T	(1888) Richard Courant (1924) Paul Moritz Cohn (1942) Stephen William Hawking	RM156
	9	W	(1864) Vladimir Adreievich Steklov (1915) Mollie Orshansky	
	10	T	(1875) Issai Schur (1905) Ruth Moufang	
	11	F	(1545) Guidobaldo del Monte (1707) Vincenzo Riccati (1734) Achille Pierre Dionis du Sejour	RM120
	12	S	(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	
3	14	M	(1902) Alfred Tarski	RM096
	15	T	(1704) Johann Castillon (1717) Mattew Stewart (1850) Sofia Vasilievna Kovalevskaya	 RM144
	16	W	(1801) Thomas Klausen	
	17	T	(1647) Catherina Elisabetha Koopman Hevelius (1847) Nikolay Egorovich Zukowsky (1858) Gabriel Koenigs	
	18	F	(1856) Luigi Bianchi (1880) Paul Ehrenfest	 RM204
	19	S	(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
4	21	M	(1846) Pieter Hendrik Schoute (1915) Yuri Vladimirovich Linnik	
	22	T	(1592) Pierre Gassendi (1886) John William Navin Sullivan (1908) Lev Davidovich Landau	 RM228
	23	W	(1840) Ernst Abbe (1862) David Hilbert	 RM060
	24	T	(1891) Abram Samoilovitch Besicovitch (1902) Oskar Morgenstern (1914) Vladimir Petrovich Potapov	
	25	F	(1627) Robert Boyle (1736) Joseph-Louis Lagrange (1843) Karl Hermann Amandus Schwarz	 RM048
	26	S	(1799) Benoît Paul Émile Clapeyron (1862) Eliakim Hastings Moore	
	27	S	(1832) Charles Lutwidge Dodgson	RM108
5	28	M	(1701) Charles Marie de La Condamine (1888) Louis Joel Mordell (1892) Carlo Emilio Bonferroni	
	29	T	(1817) William Ferrel (1888) Sidney Chapman	
	30	W	(1619) Michelangelo Ricci	RM216
	31	T	(1715) Giovanni Francesco Fagnano dei Toschi (1841) Samuel Loyd (1896) Sofia Alexandrovna Janowskaja (1945) Persi Warren Diaconis	 RM192 RM180

Rudi Mathematici

January

Putnam 2004, A1
Basketball star Shanille O'Keal's team statistician keeps track of the number, S(N), of successful free throws she has made in her first N attempts of the season. Early in the season, S(N) was less than 80% of N, but by the end of the season, S(N) was more than 80% of N. Was there necessarily a moment in between when S(N) was exactly 80% of N?

Vintage computer definitions
Advanced User: A person who has managed to remove a computer from its packing materials.

Mathematical Jokes
In modern mathematics, algebra has become so important that numbers will soon only have symbolic meaning.

There is no national science, just as there is no national multiplication table; what is national is no longer science.

Anton Cechov

"It's very good jam," said the Queen.
"Well, I don't want any to-day, at any rate."
"You couldn't have it if you did want it," the Queen said.
"The rule is jam tomorrow and jam yesterday but never jam to-day."
"It must come sometimes to "jam to-day,"" Alice objected.
"No it can't," said the Queen. "It's jam every other day; to-day isn't any other day, you know."
"I don't understand you," said Alice. "It's dreadfully confusing."

Charles Lutwidge Dodgson

One is hard pressed to think of universal customs that man has successfully established on earth. There is one, however, of which he can boast the universal adoption of the Hindu-Arabic numerals to record numbers. In this we perhaps have man's unique worldwide victory of an idea.

Howard W. Eves

The numbers are a catalyst that can help turn raving madmen into polite humans.

Philip J. Davis

To your care and recommendation am I indebted for having replaced a half-blind mathematician with a mathematician with both eyes, which will especially please the anatomical members of my Academy. [To D'Alembert about Lagrange. Euler had vacated the post.]

Frederick the Great

The further a mathematical theory is developed, the more harmoniously and uniformly does its construction proceed, and unsuspected relations are disclosed between hitherto separated branches of the science.

David Hilbert

	1	F	(1900) John Charles Burkill	
	2	S	(1522) Lodovico Ferrari	
			(1893) Cornelius Lanczos	
			(1897) Gertrude Blanch	RM229
	3	S	(1893) Gaston Maurice Julia	RM073
6	4	M	(1905) Eric Cristopher Zeeman	
	5	T	(1757) Jean Marie Constant Duhamel	
	6	W	(1465) Scipione del Ferro	RM064
			(1612) Antoine Arnauld	
			(1695) Nicolaus (II) Bernoulli	RM093
	7	T	(1877) Godfried Harold Hardy	RM049
			(1883) Eric Temple Bell	
	8	F	(1700) Daniel Bernoulli	RM093
			(1875) Francis Ysidro Edgeworth	
			(1928) Ennio de Giorgi	RM133
	9	S	(1775) Farkas Wolfgang Bolyai	
			(1907) Harold Scott Macdonald Coxeter	RM097
	10	S	(1747) Aida Yasuaki	RM121
			(1932) Vivienne Malone-Mayes	
7	11	M	(1657) Bernard Le Bovier de Fontenelle	
			(1800) William Henry Fox Talbot	RM205
			(1839) Josiah Willard Gibbs	
			(1915) Richard Wesley Hamming	
	12	T	(1914) Hanna Caemmerer Neumann	
			(1921) Kathleen Rita Mcnulty Mauchly Antonelli	
	13	W	(1805) Johann Peter Gustav Lejeune Dirichlet	RM145
	14	T	(1468) Johann Werner	
			(1849) Hermann Hankel	
			(1877) Edmund Georg Hermann Landau	RM063
			(1896) Edward Artur Milne	
			(1932) Maurice Audin	RM194
	15	F	(1564) Galileo Galilei	RM085
			(1850) Sophie Willock Bryant	
			(1861) Alfred North Whitehead	
			(1946) Douglas Hofstadter	
	16	S	(1822) Francis Galton	
			(1853) Gregorio Ricci-Curbastro	
			(1903) Beniamino Segre	
	17	S	(1890) Sir Ronald Aylmer Fisher	
			(1891) Adolf Abraham Halevi Fraenkel	
			(1905) Rózsa Péter	
8	18	M	(1404) Leon Battista Alberti	RM157
			(1919) Clifford Truesdell	
	19	T	(1473) Nicolaus Copernicus	RM181
	20	W	(1844) Ludwig Boltzmann	RM061
	21	T	(1591) Girard Desargues	
			(1915) Evgeny Michailovich Lifshitz	
	22	F	(1857) Heinrich Rudolf Hertz	
			(1903) Frank Plumpton Ramsey	RM217
	23	S	(1561) Henry Briggs	RM169
			(1583) Jean-Baptiste Morin	
			(1905) Derrick Henry Lehmer	RM215
			(1922) Anneli Cahn Lax	
			(1951) Shigefumi Mori	
	24	S	(1871) Felix Bernstein	
9	25	M	(1827) Henry Watson	
	26	T	(1786) Dominique Francois Jean Arago	RM193
	27	W	(1881) Luitzen Egbertus Jan Brouwer	
	28	T	(1735) Alexandre Théophile Vandermonde	
	29		(1860) Herman Hollerith	RM109

Rudi Mathematici

February

Putnam 2004, A2

For $i = 1, 2$ let T_i be a triangle with side lengths a_i, b_i, c_i and area A_i. Suppose that $a_1 \le a_2$, $b_1 \le b_2$, $c_1 \le c_2$, and that T_2 is an acute triangle. Does it follow that $A_1 \le A_2$?

Vintage computer definitions

Power User: A person who has mastered the brightness and contrast controls on any computer monitor.

Mathematical Jokes

Theorem: Most prime numbers are even. Proof: pick up any math text and look for a prime number. The first one you find will probably be even.

In the company of friends, writers can discuss their books, economists the state of the economy, lawyers their latest cases, and businessmen their latest acquisitions, but mathematicians cannot discuss their mathematics at all. And the more profound their work, the less understandable it is.

Alfred W. Adler

The longer mathematics lives the more abstract – and therefore, possibly also the more practical – it becomes.

Eric Temple Bell

The effort of the economist is to "see," to picture the interplay of economic elements. The more clearly cut these elements appear in his vision, the better; the more elements he can grasp and hold in his mind at once, the better. The economic world is a misty region. The first explorers used unaided vision. Mathematics is the lantern by which what before was dimly visible now looms up in firm, bold outlines. The old phantasmagoria disappear. We see better. We also see further.

Irving Fisher

Whenever you can, count.

Francis Galton

In most sciences one generation tears down what another has built, and what one has established, another undoes. In mathematics alone each generation adds a new storey to the old structure.

Hermann Hankel

[On Ramanujan] I remember once going to see him when he was lying ill at Putney. I had ridden in taxi cab number 1729 and remarked that the number seemed to me rather a dull one, and that I hoped it was not an unfavorable omen. "No," he replied, "it is a very interesting number; it is the smallest number expressible as the sum of two cubes in two different ways."

Godfried Harold Hardy

It gives me the same pleasure when someone else proves a good theorem as when I do it myself.

Edmund Georg Hermann Landau

	1	F	(1611) John Pell (1879) Robert Daniel Carmichael
	2	S	(1836) Julius Weingarten
	3	S	(1838) George William Hill (1845) Georg Cantor RM062 (1916) Paul Richard Halmos
10	4	M	(1822) Jules Antoine Lissajous
	5	T	(1512) Gerardus Mercator (1759) Benjamin Gompertz (1817) Angelo Genocchi RM230 (1885) Pauline Sperry (1915) Laurent Schwartz RM194 (1931) Vera Pless
	6	W	(1866) Ettore Bortolotti
	7	T	(1792) William Herschel RM146 (1824) Delfino Codazzi (1922) Olga Alexandrovna Ladyzhenskaya
	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
	14	T	(1864) Jozef Kurschak (1879) Albert Einstein RM074 (1904) Lyudmila Vsevolodovna Keldysh
	15	F	(1860) Walter Frank Raphael Weldon (1868) Grace Chisolm Young
	16	S	(1750) Caroline Herschel RM146 (1789) Georg Simon Ohm (1846) Magnus Gosta Mittag-Leffler
	17	S	(1876) Ernest Benjamin Esclangon (1897) Charles Fox
12	18	M	(1640) Philippe de La Hire (1690) Christian Goldbach RM122 (1796) Jacob Steiner (1870) Agnes Sime Baxter
	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
	22	F	(1394) Ulugh Beg RM206 (1891) Lorna Mary Swain (1917) Irving Kaplansky (1944) Margaret Hilary Ashworth Millington
	23	S	(1749) Pierre-Simon de Laplace (1754) Georg Freiherr von Vega (1882) Emmy Amalie Noether RM050 (1897) John Lighton Synge
	24	S	(1809) Joseph Liouville (1948) Sun-Yung (Alice) Chang (1966) Gigliola Staffilani RM142
13	25	M	(1538) Christopher Clausius
	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 RM170 (1873) Tullio Levi-Civita RM098 (1896) Wilhelm Ackermann
	30	S	(1892) Stefan Banach RM134 (1921) Alfréd Rényi
	31	S	(1596) René Descartes RM218

Rudi Mathematici

March

Putnam 2004, A3
Define a sequence $\{u_n\}_{n=0}^{\infty}$ by $u_0 = u_1 = u_2 = 1$, and thereafter by the condition that

$$det\begin{pmatrix} u_n & u_{n+1} \\ u_{n+2} & u_{n+3} \end{pmatrix} = n!$$

for all $n \geq 0$. Show that u_n is an integer for all n. (By convention, 0! = 1.)

Vintage computer definitions
Alpha Test Version: Too buggy to be released to the paying public.
Beta Test Version: Still too buggy to be released.
Release Version: Alternative pronunciation of "Beta Test Version".

Mathematical Jokes
It was mentioned on CNN that the new prime number discovered recently is four times bigger than the previous record.

The mathematician Andre Weil apparently compared finding the right definitions in algebraic number theory – which was like carving adamantine rock – to making definitions in the theory of uniform spaces (which he founded), which was like sculpting with snow.
Samson Abramsky

If we possessed a thorough knowledge of all the parts of the seed of any animal (e.g. man), we could from that alone, be reasons entirely mathematical and certain, deduce the whole conformation and figure of each of its members, and, conversely if we knew several peculiarities of this conformation, we would from those deduce the nature of its seed.
René Descartes

Everything should be made as simple as possible, but not simpler.
Albert Einstein

The heart of mathematics is its problems.
Paul Richard Halmos

I was just going to say, when I was interrupted, that one of the many ways of classifying minds is under the heads of arithmetical and algebraical intellects. All economical and practical wisdom is an extension or variation of the following arithmetical formula: 2+2=4. *Every philosophical proposition has the more general character of the expression a+b=c. We are mere operatives, empirics, and egotists, until we learn to think in letters instead of figures.*
Oliver Wendell Holmes

He uses statistics as a drunken man uses lamp posts – for support rather than illumination.
Andrew Lang

[said about Napier's logarithms:] ...by shortening the labours doubled the life of the astronomer.
Pierre-Simon De Laplace

Truth . . . and if mine eyes Can bear its blaze, and trace its symmetries, Measure its distance, and its advent wait, I am no prophet – I but calculate.
Charles Mackay

14	1	M	(1640) Georg Mohr (1776) Marie-Sophie Germain (1895) Alexander Craig Aitken	RM219
	2	T	(1878) Edward Kasner (1934) Paul Joseph Cohen	
	3	W	(1835) John Howard Van Amringe (1892) Hans Rademacher (1900) Albert Edward Ingham (1909) Stanislaw Marcin Ulam (1971) Alice Riddle	RM171
	4	T	(1809) Benjamin Peirce (1842) François Édouard Anatole Lucas (1949) Shing-Tung Yau	RM123
	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 (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 (1903) Jan Tinbergen	
	13	S	(1728) Paolo Frisi (1813) Duncan Farquharson Gregory (1869) Ada Isabel Maddison (1879) Francesco Severi	
	14	S	(1629) Christiaan Huygens	RM135
16	15	M	(1452) Leonardo da Vinci (1548) Pietro Antonio Cataldi (1707) Leonhard Euler (1809) Herman Gunther Grassmann	RM051
	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 (1907) Lars Valerian Ahlfors (1918) Hsien Chung Wang (1949) Charles Louis Fefferman	RM150
	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 (1935) Bhama Srinivasan (1939) Sir Michael Francis Atiyah	RM063
	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 (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 (1916) Claude Elwood Shannon	RM147 RM111

April

Putnam 2004, A4
Show that for any positive integer n, there is an integer N such that the product $x_1x_2\ldots x_n$ can be expressed identically in the form:

$$x_1 x_2 \ldots x_n = \sum_{i=1}^{N} c_i \left(a_{i1} x_1 + a_{i2} x_2 + \ldots + a_{in} x_n \right)^n$$

where the c_i are rational numbers and each a_{ij} is one of the numbers −1, 0, 1.

Vintage computer definitions
Consultant: A former sales associate who has mastered at least one tenth of the dBase III Plus Manual.

Mathematical Jokes
The Romans didn't find algebra very challenging, because X was always 10.

There are problems to whose solution I would attach an infinitely greater importance than to those of mathematics, for example touching ethics, or our relation to God, or concerning our destiny and our future; but their solution lies wholly beyond us and completely outside the province of science.
Johann Carl Friedrich Gauss

One of the big misapprehensions about mathematics that we perpetrate in our classrooms is that the teacher always seems to know the answer to any problem that is discussed. This gives students the idea that there is a book somewhere with all the right answers to all of the interesting questions, and that teachers know those answers. And if one could get hold of the book, one would have everything settled. That's so unlike the true nature of mathematics.
Leon Henkin

10th August 1851: On Tuesday evening at Museum, at a ball in the gardens. The night was chill, I dropped too suddenly from Differential Calculus into ladies' society, and could not give myself freely to the change. After an hour's attempt so to do, I returned, cursing the mode of life I was pursuing; next morning I had already shaken hands, however, with Diff. Calculus, and forgot the ladies...
Thomas Archer Hirst

Logic is neither a science nor an art, but a dodge.
Benjamin Jowett

In one word he told me the secret of success in mathematics: plagiarize; only be sure always to call it… research.
Thomas Andrew Lehrer

Today, it is not only that our kings do not know mathematics, but our philosophers do not know mathematics and – to go a step further – our mathematicians do not know mathematics.
Julius Robert Oppenheimer

Mathematics is the art of giving the same name to different things. [As opposed to the quotation: Poetry is the art of giving different names to the same thing].
Jules Henri Poincarè

	1	W	(1825) Johann Jacob Balmer	RM122
			(1908) Morris Kline	
			(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	
			(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	
	26	S	(1667) Abraham de Moivre	
			(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	(1926) John Kemeny	

May

Putnam 2004, A5
An $m \times n$ checkerboard is colored randomly: each square is independently assigned red or black with probability ½. We say that two squares, p and q, are in the same connected monochromatic component if there is a sequence of squares, all of the same color, starting at p and ending at q, in which successive squares in the sequence share a common side. Show that the expected number of connected monochromatic regions is greater than $mn/8$.

Vintage computer definitions
Systems Integrator: A former consultant who understands the term AUTOEXEC.BAT.

Mathematical Jokes
The primary purpose of the DATA statement is to give names to constants; instead of referring to π as 3.141592653589793 at every appearance, the variable PI can be given that value with a DATA statement and used instead of the longer form of the constant. This also simplifies modifying the program, should the value of π change. [FORTRAN manual for Xerox Computers].

I listened to a conversation between two girls, and one was explaining that if you want to make a straight line, you see, you go over a certain number to the right for each row you go up – that is, if you go over each time the same amount when you go up a row, you make a straight line – a deep principle of analytic geometry! It went on. I was rather amazed. I didn't realize the female mind was capable of understanding analytic geometry. She went on and said, "Suppose you have another line coming in from the other side, and you want to figure out where they are going to intersect. Suppose on one line you go over two to the right for every one you go up, and the other line goes over three to the right for every one that it goes up, and they start twenty steps apart," etc. – I was flabbergasted. She figured out where the intersection was. It turned out that one girl was explaining to the other how to knit argyle socks.

Richard Phillips Feynman

Geometry enlightens the intellect and sets one's mind right. All its proofs are very clear and orderly. It is hardly possible for errors to enter into geometrical reasoning, because it is well arranged and orderly. Thus, the mind that constantly applies itself to geometry is not likely to fall into error. In this convenient way, the person who knows geometry acquires intelligence.

Ibn Khaldun

Mathematics is more than a method or an art, is a body of knowledge with content that can be used by physicists, social scientists, philosophers, logicians and artists. Mathematics is a body of knowledge, but contains no truth.

Morris Kline

Aristotle maintained that women have fewer teeth than men; although he was twice married, it never occurred to him to verify this statement by examining his wives' mouths.

Bertrand Arthur William Russell

	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 (1819) John Couch Adams (1883) John Maynard Keynes	RM065
	6	T	(1436) Johann Müller Regiomontanus (1857) Aleksandr Michailovitch Lyapunov (1906) Max August Zorn	RM185 RM077
	7	F	(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	RM209
	9	S	(1885) John Edensor Littlewood	RM049
24	10	M	(940) Mohammad Abu'L Wafa Al-Buzjani (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 (1872) Jessie Chrystal Macmillan (1876) William Sealey Gosset (Student) (1928) John Forbes Nash	RM113 RM149
	14	F	(1736) Charles Augustin de Coulomb (1856) Andrei Andreyevich Markov (1903) Alonzo Church	RM125 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 (1915) Alice Turner Schafer	RM148
	19	W	(1623) Blaise Pascal (1902) Wallace John Eckert	RM053
	20	T	(1873) Alfred Loewy (1917) Helena Rasiowa	
	21	F	(1781) Simeon Denis Poisson (1828) Giuseppe Bruno (1870) Maria Skłodowska Curie	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 (1918) Yudell Leo Luke	RM161
	27	T	(1806) Augustus de Morgan	
	28	F	(1875) Henri Léon Lebesgue	RM173
	29	S	(1888) Aleksandr Aleksandrovich Friedmann (1979) Artur Avila Cordeiro de Melo	RM101 RM189
	30	S	(1791) Felix Savart (1958) Abigail Thompson	

June

Putnam 2004, A6
Suppose that $f(x, y)$ is a continuous real-valued function on the unit square $0 \le x \le 1$, $0 \le y \le 1$. Show that

$$\int_0^1 \left(\int_0^1 f(x,y)dx \right)^2 dy + \int_0^1 \left(\int_0^1 f(x,y)dy \right)^2 dx \le \left(\int_0^1 \int_0^1 f(x,y)dxdy \right)^2 + \int_0^1 \int_0^1 [f(x,y)]^2 dxdy.$$

Vintage computer definitions
Backup: The duplicate copy of crucial data that no one bothered to make; used only in the abstract.

Mathematical Jokes
Did quantum mechanics exist before it was observed?

In my experience most mathematicians are intellectually lazy and especially dislike reading experimental papers. He (René Thom) seemed to have very strong biological intuitions but unfortunately of negative sign.
Francis Harry Compton Crick

Mathematics began to seem too much like puzzle solving. Physics is puzzle solving, too, but of puzzles created by nature, not by the mind of man.
Maria Goeppert-Mayer

Probability is a mere euphemism for ignorance.
E. Kasner, J.R. Newman

I constantly meet people who are doubtful, generally without due reason, about their potential capacity [as mathematicians]. The first test is whether you got anything out of geometry. To have disliked or failed to get on with other [mathematical] subjects need mean nothing; much drill and drudgery is unavoidable before they can get started, and bad teaching can make them unintelligible even to a born mathematician.
John Edensor Littlewood

Contradiction is not a sign of falsity, nor the lack of contradiction a sign of truth.
Blaise Pascal

She doesn't understand the concept of Roman numerals. She thought we just fought in world war eleven.
Joan Rivers

Perhaps the most surprising thing about mathematics is that it is so surprising. The rules which we make up at the beginning seem ordinary and inevitable, but it is impossible to foresee their consequences. These have only been found out by long study, extending over many centuries. Much of our knowledge is due to a comparatively few great mathematicians such as Newton, Euler, Gauss, or Riemann; few careers can have been more satisfying than theirs. They have contributed something to human thought even more lasting than great literature, since it is independent of language.
Edward Charles Titchmarsh

27	**1**	**M**	(1643) Gottfried Wilhelm von Leibniz	RM054
			(1788) Jean-Victor Poncelet	
			(1906) Jean Alexandre Eugène Dieudonné	
	2	**T**	(1820) William John Racquorn Rankine	
			(1852) William Burnside	
			(1925) Olga Arsen'evna Oleinik	
	3	**W**	(1807) Ernest Jean Philippe Fauque de Jonquiere	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	
			(1635) Robert Hooke	RM114
			(1853) Hendrik Antoon Lorentz	RM161
	19	**F**	(1768) Francois Joseph Servois	
	20	**S**	(1876) Otto Blumenthal	
			(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	
	30	**T**	(1889) Vladimir Kosma Zworkyn	
	31	**W**	(1704) Gabriel Cramer	RM186
			(1712) Johann Samuel Koenig	
			(1926) Hilary Putnam	

July

Putnam 2004, B1

Let $P(x) = c_n x^n + c_{n-1} x^{n-1} + \ldots + c_0$ be a polynomial with integer coefficients. Suppose that r is a rational number such that $P(r)=0$. Show that the n numbers: $c_n r$, $c_n r^2 + c_{n-1}$, $c_n r^3 + c_{n-1} r^2 + c_{n-2} r$, ..., $c_n r^n + c_{n-1} r^{n-1} + \cdots + c_1 r$ are integers.

Vintage computer definitions

Convertible: Transformable from a second-rate computer to a first-rate doorstop or paperweight. (Replaces the term "junior".)

Mathematical Jokes

Our World: MARKET SHARE FOR ELECTRIC CARS TRIPLES!!!! Mathematically Literate World: Market Share for Electric Cars Rises to 0.4%.

Even literature and mathematics are nothing but mirrors in each of which the truth - or, to use a less demanding expression, the variety of the universe - is only partially reflected.

Claudio Bartocci

One of the most difficult concepts to communicate to students who are faced with higher mathematics is the concept of demonstration. And not by chance: the concept is esoteric.

Errett Bishop

Logic, like whiskey, loses its beneficial effects when taken in too high quantities.

Lord Dunsany

If we were to evolve a race of Isaac Newton, this would not be progress. Because the price that Newton had to pay to be a supreme intellect was the inability of friendship, love, fatherhood, and many other desirable things. As a man he was a failure; as a monster he was superb.

Aldous Huxley

I am so in favor of the present infinite that instead of affirming that Nature abhors it, as it is usually said, I argue that Nature often uses it everywhere, to show more effectively the perfections of its Author.

Gottfried Wilhelm von Leibniz

I have often noticed that when people come to understand a mathematical proposition in some other way than that of the ordinary demonstration, they promptly say, "Oh, I see. That's how it must be." This is a sign that they explain it to themselves from within their own system.

Georg Christoph Lichtenberg

The mathematician is fascinated by the marvelous beauty of the forms he constructs, and in their beauty finds an everlasting truth.

George Bernard Shaw

I had the impression we were following a predetermined script, but this did not eliminate the enchantment derived from talking about math with a naked woman.

Jorge Volpi

	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 (1838) John Venn	RM079
32	5	M	(1802) Niels Henrik Abel (1941) Alexander Keewatin Dewdney	RM055
	6	T	(1638) Nicolas Malebranche (1741) John Wilson	
	7	W	(1868) Ladislaus Josephowitsch Bortkiewitz	
	8	T	(1902) Paul Adrien Maurice Dirac (1931) Sir Roger Penrose (1974) Manjul Bhargava	RM103 RM189
	9	F	(1537) Francesco Barozzi (Franciscus Barocius) (1940) Linda Goldway Keen	RM223
	10	S	(1602) Gilles Personne de Roberval (1901) Franco Dino Rasetti (1926) Carol Ruth Karp	 RM235
	11	S	(1730) Charles Bossut (1842) Enrico D'Ovidio	
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 (1892) Louis Pierre Victor Duc de Broglie (1901) Piotr Sergeevich Novikov	 RM175
	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 (1863) Corrado Segre (1882) Wacław Sierpiński	
	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 (1856) Carle David Tolmé Runge (1906) Olga Taussky-Todd	RM186 RM139
	31	S	(1821) Hermann Ludwig Ferdinand von Helmholtz (1885) Herbert Westren Turnbull	RM211

August

Putnam 2004, B2
Let m and n positive integers. Show that

$$\frac{(m+n)!}{(m+n)^{m+n}} < \frac{m!}{m^m}\frac{n!}{n^n}$$

Vintage computer definitions
Copy Protection: A clever method of preventing incompetent pirates from stealing software and legitimate customers from using it.

Mathematical Jokes
Three logicians walk into a bar. The Bartender asks: "Beer for everyone?" The first logician says: "I don't know". The second logician says: "I don't know". The third logician says: "Yes!".

Mathematicians are like Frenchmen: whatever you say to them they translate into their own language and forthwith it is something entirely different.

Wolfgang Goethe

Grasping a mathematical demonstration or a wit provokes similar experiences. They are perhaps the same thing.

Furio Honsell

[On the Gaussian curve, remarked to Poincaré:] Experimentalists think that it is a mathematical theorem while the mathematicians believe it to be an experimental fact.

Gabriel Lippman

Mathematical proofs, like diamonds, are hard and clear, and will be touched with nothing but strict reasoning.

John Locke

A mathematician of the first rank, Laplace quickly revealed himself as only a mediocre administrator; from his first work we saw that we had been deceived. Laplace saw no question from its true point of view; he sought subtleties everywhere; had only doubtful ideas, and finally carried the spirit of the infinitely small into administration.

Napoleon

The most painful thing about mathematics is how far away you are from being able to use it after you have learned it.

James R. Newman

Often, when doing mathematics, we strive to find algorithms, but this effort itself does not seem to be an algorithmic process.

Sir Roger Penrose

The story was told that the young Dirichlet had as a constant companion all his travels, like a devout man with his prayer book, an old, worn copy of the Disquisitiones Arithmeticae of Gauss.

Heinrich Tietze

	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	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	
	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	

September

Putnam 2004, B3

Determine all real numbers $a > 0$ for which there exists a nonnegative continuous function $f(x)$ defined on $[0, a]$ with the property that the region

$$R = \{(x, y): 0 \le x \le a,\ 0 \le y \le f(x)\}$$

has perimeter k units and area k square units for some real number k.

Vintage computer definitions

Encryption: A powerful algorithmic encoding technique employed in the creation of computer manuals.

Mathematical Jokes

A Roman walks into a bar and asks for a Martinus. "You mean a Martini?" The bartender asks. The Roman replies: "If I wanted a double, I would have asked for it!"

In the index to the six hundred odd pages of Arnold Toynbee's A Study of History, abridged version, the names of Copernicus, Galileo, Descartes and Newton do not occur yet their cosmic quest destroyed the medieval vision of an immutable social order in a walled-in universe and transformed the European landscape, society, culture, habits and general outlook, as thoroughly as if a new species had arisen on this planet.

Arthur Koestler

Facts are stubborn things, but statistics are more pliable.

Laurence J. Peter

[on graph theory...] The theory of ramification is one of pure colligation, for it takes no account of magnitude or position; geometrical lines are used, but these have no more real bearing on the matter than those employed in genealogical tables have in explaining the laws of procreation.

James Joseph Sylvester

A modern branch of mathematics, having achieved the art of dealing with the infinitely small, can now yield solutions in other more complex problems of motion, which used to appear insoluble. This modern branch of mathematics, unknown to the ancients, when dealing with problems of motion, admits the conception of the infinitely small, and so conforms to the chief condition of motion (absolute continuity) and thereby corrects the inevitable error which the human mind cannot avoid when dealing with separate elements of motion instead of examining continuous motion. In seeking the laws of historical movement just the same thing happens. The movement of humanity, arising as it does from innumerable human wills, is continuous. To understand the laws of this continuous movement is the aim of history . Only by taking an infinitesimally small unit for observation (the differential of history, that is, the individual tendencies of man) and attaining to the art of integrating them (that is, finding the sum of these infinitesimals) can we hope to arrive at the laws of history.

Lev Nikolgevich Tolstoj

	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	
			(1873) Karl Schwarzschild	RM153
			(1949) Fan Rong K Chung Graham	RM110
	10	T	(1861) Heinrich Friedrich Karl Ludwig Burkhardt	
	11	F	(1675) Samuel Clarke	
			(1777) Barnabè Brisson	
			(1881) Lewis Fry Richardson	
			(1885) Alfred Haar	
			(1910) Cahit Arf	
	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	(1741) John Wilson	
			(1945) Margaret Dusa Waddington Mcduff	
	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	
			(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

October

Putnam 2004, B4
Let n be a positive integer, $n \geq 2$, and put $\theta = 2\pi/n$. Define points $Pk = (k, 0)$ in the xy-plane, for $k = 1, 2, ..., n$. Let R_k be the map that rotates the plane counterclockwise by the angle θ about the point P_k. Let R denote the map obtained by applying, in order, R_1, then R_2, ..., then R_n. For an arbitrary point (x, y), find, and then simplify, the coordinates of $R(x, y)$.

Vintage computer definitions
FCC-Certified: Guaranteed not to interfere with radio or television reception until you add the cable that is required to make it work.

Mathematical Jokes
Entropy isn't what it used to be.

If you ask mathematicians what they do, you always get the same answer. They think. They think about difficult and unusual problems. They do not think about ordinary problems: they just write down the answers.

M. Egrafov

1, 2, 3, 4, 5.
6; 7; 8; 9; 10.
12?
11!

François Le Lionnais

All great theorems were discovered after midnight.

Adrian Mathesis

Mathematics is like draughts [checkers] in being suitable for the young, not too difficult, amusing, and without peril to the state.

Plato

It was by just such a hazard, as if a man should let fall a handful of sand upon a table and the particles of it should be so ranged that we could read distinctly on it a whole page of Virgil's Aenead.

Jacques Rohault

"My family is full of scientists," adds Randy. "Mathematicians. The less intelligent of us become engineers, which is more or less what I am."

Neal Stephenson

In the physical world, one cannot increase the size or quantity of a thing without changing its quality. Similar figures exist only in pure geometry.

Paul Valéry

Prayers for the condemned man will be offered on an adding machine. Numbers constitute the only universal language.

Nathanael West

	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	(1567) Clara Immerwahr	RM182
			(1660) Thomas Fantet de Lagny	
			(1799) Karl Heinrich Graffe	
			(1878) Lise Meitner	RM238
			(1898) Raphael Salem	
	8	F	(1656) Edmond Halley	RM190
			(1781) Giovanni Antonio Amedeo Plana	RM154
			(1846) Eugenio Bertini	
			(1848) Fredrich Ludwig Gottlob Frege	
			(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	RM150
	17	S	(1597) Henry Gellibrand	
			(1717) Jean-Baptiste Le Rond D'Alembert	RM166
			(1790) August Ferdinand Möbius	RM118
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	
			(1849) Sir Horace Lamb	
			(1879) Nikolay Mitrofanovich Krylov	
	30	S	(1549) Sir Henry Savile	
			(1969) Matilde Marcolli	RM142

Rudi Mathematici

November

Putnam 2004, B5
Evaluate:

$$\lim_{x\to 1^-}\prod\left(\frac{1+x^{n+1}}{1+x^n}\right)^{x^n}$$

Vintage computer definitions
Hard Disk: A device that allows users to delete vast quantities of data with simple mnemonic commands.

Mathematical Jokes
Werner Heisenberg, Kurt Gödel and Noam Chomsky walk into a bar. Heisenberg says "Clearly this is a joke, but how can we figure out if it's funny or not?" Gödel replies: "We can't know that because we're inside the joke". Chomsky says: "Of course it's funny. You're just telling it wrong".

The good Christian should beware of mathematicians, and all those who make empty prophecies. The danger already exists that the mathematicians have made a covenant with the devil to darken the spirit and to confine man in the bonds of Hell.

Augustine of Hippo

The mathematician requires tact and good taste at every step of his work, and he has to learn to trust to his own instinct to distinguish between what is really worthy of his efforts and what is not.

James Whitbread Lee Glaisher

A time will however come (as I believe) when physiology will invade and destroy mathematical physics, as the latter has destroyed geometry.

John Burdon Sanderson Haldane

Kepler's principal goal was to explain the relationship between the existence of five planets (and their motions) and the five regular solids. It is customary to sneer at Kepler for this. It is instructive to compare this with the current attempts to "explain" the zoology of elementary particles in terms of irreducible representations of Lie groups.

Shlomo Sternberg

What vexes me most is, that my female friends, who could bear me very well a dozen years ago, have now forsaken me, although I am not so old in proportion to them as I formerly was: which I can prove by arithmetic, for then I was double their age, which now I am not.

Jonathan Swift

Whatever a man prays for, he prays for a miracle. Every prayer reduces itself to this: 'Great God, grant that twice two be not four'.

Ivan Sergeievich Turgenev

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

Rudi Mathematici

December

Putnam 2004, B6

Let A be a non-empty set of positive integers, and let $N(x)$ denote the number of elements of A not exceeding x. Let B denote the set of positive integers b that can be written in the form $b = a-a'$ with $a \in A$ and $a' \in A$. Let $b_1 < b_2 < \ldots$ be the members of B, listed in increasing order. Show that if the sequence $b_{i+1}-b_i$ is unbounded, then

$$\lim_{x\to\infty} N(x)/x = 0.$$

Vintage computer definitions

Integrated Software: A single product that deftly performs hundreds of functions that the user never needs and awkwardly performs the half-dozen he uses constantly.

Mathematical Jokes

Schrödinger's cat walks into a bar. And doesn't.

Throughout the 1960s and 1970s devoted Beckett readers greeted each successively shorter volume from the master with a mixture of awe and apprehensiveness; it was like watching a great mathematician wielding an infinitesimal calculus, his equations approaching nearer and still nearer to the null point.

John Banville

Human life is proverbially uncertain; few things are more certain than the solvency of a life-insurance company.

Arthur Stanley Eddington

A mind is accustomed to mathematical deduction, when confronted with the faulty foundations of astrology, resists a long, long time, like an obstinate mule, until compelled by beating and curses to put its foot into that dirty puddle.

Johannes Kepler

...from the same principles, I now demonstrate the frame of the System of the World.

Isaac Newton

Even fairly good students, when they have obtained the solution of the problem and written down neatly the argument, shut their books and look for something else. Doing so, they miss an important and instructive phase of the work. ... A good teacher should understand and impress on his students the view that no problem whatever is completely exhausted. One of the first and foremost duties of the teacher is not to give his students the impression that mathematical problems have little connection with each other, and no connection at all with anything else. We have a natural opportunity to investigate the connections of a problem when looking back at its solution.

George Polya

An equation means nothing to me unless it expresses a thought of God.

Srinivasa Aiyangar Ramanujan