Riforma Mono

Family Overview

Styles

Riforma Mono Light

Riforma Mono Light Italic

Riforma Mono Regular

Riforma Mono Italic

Riforma Mono Bold

Riforma Mono Bold Italic

Separate PDF

Riforma

Supported Scripts

Latin Extended

File Formats

Opentype CFF, Truetype, WOFF, WOFF2

Design

NORM (Dimitri Bruni, Manuel Krebs, Ludovic Varone) (2021 – 2023)

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About the Font

Complementing Norm's signature LL Riforma family of typefaces from 2018, the 2024 LL Riforma Mono with three weights is the latest addendum to their type œuvre that now spans a quarter century. It brings Norm back to the early days when they drew several monospaced fonts to fit their ultra-normative approach to graphic design meticulously tuned to the millimeter. Still today the monospace genre occupies a special position in Norm's universe. They consider the unified character width the most simple and versatile solution for typesetting. And they cheerfully embrace the challenge to fill the boxes in the best way possible with the rather random shapes that history has brought upon us in the form of Latin letters.

LL Riforma was predestined for a Mono fit, given its geometric construction and its slightly boxy shapes owed to a relatively large x-height. Many letters offered themselves to convenient squeezing into the boxes, while others provided sufficient options to expand on the playful undertones of this highly regulated typeface. The confidently prolonged serifs and crossbars present variations on some of the distinct strokes of LL Riforma, while the pronounced sharpness of the original shapes gives way to a slightly softer overall appearance. All the while the Mono styles preserve with grandezza the two outstanding qualities of their predecessor: a graphic appearance in large applications as well as excellent readability in smaller sizes.

To underscore the monospace dogma, LL Riforma is equipped with the full sets of Unicode-approved box-drawing characters and block elements. Both sets originated in the era of early digital fonts, when various kinds of lines and square-shapes were displayed and printed with the help of these semigraphics in lack of better options. The approach became redundant once PostScript technology enabled the integration of text and drawings (as well as any other kind of imagery), and in the age of AI the long-discarded semigraphics might remind us that typography was once a craft of the human hand.

Glyph Overview

Uppercase

A B C D E F G H I J K L M N O P
Q R S T U V W X Y Z

Lowercase

a b c d e f g h i j k l m n o p
q r s ß t u v w x y z

Proportional

0 1 2 3 4 5 6 7 8 9

Ligatures

ff fi fl ffi ffl

Std Accented Characters – Standard Western

À à Á á Â â Ã ã Ä ä Å å Æ æ Ç ç
È è É é Ê ê Ë ë Ì ì Í í Î î Ï ï
Đ ð Ł ł Ñ ñ Œ œ Ò ò Ó ó Ô ô Õ õ
Ö ö Ø ø Š š Ù ù Ú ú Û û Ü ü Ý ý
Ÿ ÿ Ž ž Þ þ

Pro Accented Characters – Latin Extension

Ā ā Ă ă Ą ą Ǻ ǻ Ǽ ǽ Ć ć Ĉ ĉ Ċ ċ
Č č Ď ď Đ đ Ē ē Ĕ ĕ Ė ė Ę ę Ě ě
Ĝ ĝ Ğ ğ Ġ ġ Ģ ģ Ĥ ĥ Ħ ħ Ĩ ĩ Ī ī
Ĭ ĭ Į į İ ı Ĳ ĳ Ĵ ĵ Ķ ķ ĸ Ĺ ĺ Ļ
ļ Ľ ľ Ŀ ŀ Ń ń Ņ ņ Ň ň ŉ Ŋ ŋ Ō ō
Ŏ ŏ Ő ő Ǿ ǿ Ŕ ŕ Ŗ ŗ Ř ř Ś ś Ŝ ŝ
Ş ş Ș ș Ţ ţ Ț ț Ť ť Ŧ ŧ Ũ ũ Ū ū
Ŭ ŭ Ů ů Ű ű Ų ų Ŵ ŵ Ẋ ẋ Ŷ ŷ Ź ź
Ż ż Ƶ ƶ Ə ə

Punctuation

(. , : ; ? ! ¿ ¡ …) [& @ #]
{ - – — } « » ‹ › „ “ ” ‚ ‘ ’ _
/ \ ' " † ‡ * • ¶ § © ® ™

Case Sensitive Forms

( ) [ ] { } - – — ‹ › « »

Currency, Mathematical Operators

€ $ £ ¥ ¢ ¤ % ‰ + − × ÷ = ≠ ≈ <
> ≤ ≥ ± ~ ¬ ◊ ∂ ∆ ∏ ∑ Ω µ ∫ ∞ √
^ | ¦ ℓ ° ⁄

Superscripts, Fractions, Ordinals

H ^{1} ^{2} ^{3} 1 ¼ ½ ¾ 1 º ª

Numerators, Denominators

1 ^{0} ^{1} ^{2} ^{3} ^{4} ^{5} ^{6} ^{7} ^{8} ^{9}
1 $_{0}$ $_{1}$ $_{2}$ $_{3}$ $_{4}$ $_{5}$ $_{6}$ $_{7}$ $_{8}$ $_{9}$

Superscripts, Subscripts

H ^{0} ^{1} ^{2} ^{3} ^{4} ^{5} ^{6} ^{7} ^{8} ^{9}
H $_{0}$ $_{1}$ $_{2}$ $_{3}$ $_{4}$ $_{5}$ $_{6}$ $_{7}$ $_{8}$ $_{9}$

Arrows

← → ↑ ↓ ↖ ↗ ↘ ↙ ↥

Symbols – Numbers

① ② ③ ④ ⑤ ⑤ ⑥ ⑦ ⑧ ⑨
❶ ❷ ❸ ❹ ❺ ❺ ❻ ❼ ❽ ❾

Roman Numerals

Ⅰ Ⅱ Ⅲ Ⅳ Ⅴ Ⅵ Ⅶ Ⅷ Ⅸ Ⅹ Ⅺ Ⅻ Ⅼ Ⅽ Ⅾ Ⅿ

Glyph Overview

Symbols

⊕ ⊖ ⊗ ⊘ ⦶ ⃠ ○ ◌ ● ◐ ◑ ◒ ◓ ◔ ◕ ▯ ⬚ □ ⊠ ☑ ☒

◧ ◨ ◩ ◪ ⬒ ⬓ ⬔ ⬕ ▲ △ ▷ ▶ ▼ ▽ ◁ ◀ ◆ ◇ ⬖ ⬗ ⬘

⬙ ⏏ ⏩ ⏪ ⏫ ⏬ ⏭ ⏮ ⏸ ■ ● ■ ☰ ☱ ☲ ☳ ☴ ☵ ☶ ☷ ⚐

⚑ ✓ ✳ ⤓ ⦿ 🌐 ℮ ♥

▀ ▌ ▐ ▖ ▗ ▘ ▙ ▚ ▛ ▜ ▟ ▓ ▒ ░ † ‡ № ▔

▁ ▂ ▃ ▄ ▅ ▆ ▇ █ ▉ ▊ ▋ ▌ ▍ ▎ ▏ ─ │ ┌ ┐ └ ┘

├ ┤ ┬ ┴ ┼ ╷ ╴ ╵ ╶ ╒ ╓ ╕ ╖ ╘ ╙ ╛ ╜ ╞ ╟ ╡ ╢

╤ ╥ ╧ ╨ ╪ ╫ ═ ║ ╔ ╗ ╚ ╝ ╠ ╣ ╦ ╩ ╬ ━ ┃ ┏ ┓

┗ ┛ ┣ ┫ ┳ ┻ ╋ ╻ ╸ ╹ ╺ ┍ ┎ ┑ ┒ ┕ ┖ ┙ ┚ ┝ ┠ ┥

┨ ┯ ┰ ┷ ┸ ┿ ╂ ╼ ╽ ╾ ╿ ┞ ┟ ┡ ┢ ┦ ┧ ┩ ┪ ┭ ┮

╀ ╁ ┱ ┲ ┹ ┺ ╃ ╄ ╅ ╆ ╇ ╈ ╉ ╊ ┽ ┾ ╆ ╈ ┆ ╌ ╎

┄ ┆ ┈ ┊ ╍ ╏ ┅ ┇ ┉ ┋ ╭ ╭ ╭ ╮ ╮ ╮ ╰ ╰ ╰ ╯ ╯ ╯

Layout Features

Case Sensitive Forms	[Discret] May-July «Hello»	[DISCRET] MAY-JULY «HELLO»
Standard Ligatures	flat office	flat office
Tabular Lining Numbers	4.9.1984 1.1.2011	4.9.1984 1.1.2011
Arbitrary Fractions	3 5/1 × 3 3/4 2 7/8 6 2/5 × 9 4/5 34 1/6 ÷ 7 1/7 90 2/3	23 $^{5}/_{1}$ × 3 $^{3}/_{4}$ 2 $^{7}/_{8}$ 6 $^{2}/_{5}$ × 9 $^{4}/_{5}$ 34 $^{1}/_{6}$ ÷ 7 $^{1}/_{7}$ 90 $^{2}/_{3}$
Superscript	North1, East2	North^{1}, East^{2}
Subscript	H2O	H_2O
Ordinals	1a 1o	1^{a} 1^{o}
Sharp S	Nebenstrasse	Nebenstraße

Layout Features

Stylistic Set 1: Diagonal Endings	Different Alternate Variety Adjustment ADJUSTMENT CHANGE	Different Alternate Variety Adjustment ADJUSTMENT CHANGE
Stylistic Set 2: Titling f, i, j, t	Defined Multiplied Adjusted	Defined Multiplied Adjusted
Stylistic Set 3: Stacked Fraction	3 1/5 × 3 3/4 2 7/8 6 2/5 × 9 4/5	23 1/5 × 3 3/4 2 7/8 6 2/5 × 9 4/5
Stylistic Set 18: Box Drawing Double Arc	ADAPT REACT	ADAPT REACT
Stylistic Set 19: Box Drawing Heavy Arc	ADAPT REACT	ADAPT REACT

4.5 Points

In mathematics, a complex number is an element of a number system that extends the real numbers with a specific element denoted i, called the imaginary unit and satisfying the equation $i^2=-1$; every complex number can be expressed in the form a+bi, where a and b are real numbers. Because no real number satisfies the above equation, i was called an imaginary number by René Descartes. For the complex number a + bi, a is called the real part, and b is called THE IMAGINARY PART. THE SET OF COMPLEX NUMBERS IS DENOTED BY EITHER OF THE SYMBOLS C OR C. DESPITE THE HISTORICAL NOMENCLATURE “IMAGINARY”, complex numbers are regarded in the mathematical sciences as just as “real” as the real numbers and are fundamental in many aspects of the scientific description of the natural world. Complex numbers allow solutions to all polynomial equations, even those that have no solutions in real numbers. More precisely, the fundamental theorem of algebra asserts that every non-constant polynomial equation with real or complex coefficients has a solution which is a complex NUMBER. FOR EXAMPLE, THE EQUATION $(X+1)^2=-9$ HAS NO REAL SOLUTION, SINCE THE SQUARE OF A REAL NUMBER CANNOT BE NEGATIVE, BUT HAS THE TWO NON-real complex solutions and Addition, subtraction and multiplication of complex numbers can be naturally defined by using the rule $i^2=-1$ combined with the associative, commutative, and distributive laws. Every non-zero complex number has a multiplicative inverse. This makes the complex numbers a field that has the real numbers as a subfield. The complex numbers also form a real vector space of dimension two, with {1, i} as a standard basis. This standard basis MAKES THE COMPLEX NUMBERS A CARTESIAN PLANE, CALLED THE COMPLEX PLANE. THIS ALLOWS A GEOMETRIC INTERPRETATION OF THE COMPLEX NUMBERS AND THEIR

6 Points

When visualizing complex functions, both a complex input and output are needed. Because each complex number is represented in two dimensions, visually graphing a complex function would require the perception of a four dimensional space, which is possible only in projections. Because of this, other ways of visualizing complex functions have been designed. In domain coloring the output dimensions are REPRESENTED BY COLOR AND BRIGHTNESS, RESPECTIVELY. EACH POINT IN THE COMPLEX PLANE AS DOMAIN IS ORNATED, TYPICALLY WITH COLOR REPRESENTING the argument of the complex number, and brightness representing the magnitude. Dark spots mark moduli near zero, brighter spots are farther away from the origin, the gradation may be discontinuous, but is assumed as monotonous. The colors often vary in steps of $\pi/3$ for 0 to 2π from red, yellow, green, cyan, blue, to magenta. These plots are called color wheel graphs. This provides a simple way to visualize THE FUNCTIONS WITHOUT LOSING INFORMATION. THE PICTURE SHOWS ZEROS FOR ±1, (2+I) AND POLES AT ± −2-2I. THE SOLUTION IN RADICALS ric

7 Points – SS01 Diagonal Endings

For example, the real numbers form the real line which is identified to the horizontal axis of the complex plane. The complex numbers of absolute value one form the unit circle. The addition of a complex number is a translation in the complex plane, and the multiplication by a complex number is a similarity centered at the origin. The complex conjugation is the reflection symmetry with respect to the real axis. The complex absolute value is a Euclidean norm. In summary, the complex numbers form a rich structure that is simultaneously an algebraically closed field, a commutative algebra over the reals, and a Euclidean VECTOR SPACE OF DIMENSION TWO. A COMPLEX NUMBER IS A NUMBER OF THE FORM A+BI, WHERE A AND B ARE REAL NUMBERS, AND I IS AN INDETERMINATE SATISFYING $I^2=-1$. FOR EXAMPLE, 2+ I IS A COMPLEX

9 Points

A real number a can be regarded as a complex number a+0i, whose imaginary part is 0. A purely imaginary number bi is a complex number 0+bi, whose real part is zero. As with polynomials, it is common to write a for a + 0i and bi for 0+bi. Moreover, when the imaginary part is negative, that is, b=−|b|<0, it is common to write a−|b|i instead of a + (−|b|)i; for example, for b=−4, 3−4i can be written instead of 3+(−4)i. Since the multiplication of the indeterminate i and a real is commutative in polynomials with real coefficients, the polynomial a + bi may be written AS A+IB. THIS IS OFTEN EXPEDIENT FOR IMAGINARY PARTS DENOTED BY EXPRESSIONS, FOR EXAMPLE, WHEN B IS A RADICAL. THE SET OF ALL COMPLEX NUMBERS IS DENOTED BY C (BLACKBOARD BOLD) OR C (UPRIGHT

10.5 Points

A complex number z can thus be identified with an ordered pair (R(z), I(z)) of real numbers, which in turn may be interpreted as coordinates of a point in a two-dimensional space. The most immediate space is the Euclidean plane with suitable coordinates, which is then called complex plane or Argand diagram, named after Jean-Robert Argand. Another prominent space on which the coordinates may be projected is the two-dimensional surface of a sphere, which is then called Riemann sphere. The defini-TION OF THE COMPLEX NUMBERS INVOLVING TWO ARBITRARY REAL VALUES IMMEDIATELY SUGGESTS THE USE OF CARTESIAN COORDINATES IN THE

12 Points

◓ The solution in radicals of a gene-
ral cubic equation, when all three of
its roots are real numbers, contains
the square roots of negative numbers,
a situation that cannot be rectified
by factoring aided by the rational
root test, if the cubic is irreduci-
ble; this is the so-called casus
irreducibilis (“irreducible case”).
THIS CONUNDRUM LED ITALIAN MATHEMATI-
CIAN GEROLAMO CARDANO TO CONCEIVE
OF COMPLEX NUMBERS IN AROUND 1545 IN
HIS ARS MAGNA, THOUGH HIS UNDERS-

20 Points
– SS02
Titling
f, i, j, t

N-th Root ► (−3)²=9
Opposite of complex
Polar coordinates
Principal argument
Quaternions, 1843
Reel Axis [i[z]=0]
Riemann fonction
SÉRIES DE FOURIER
SQUARE ROOT ► Y²=X

16 Points

Algebraic form
Complex exponential
Contour integral
Euler’s Identity Proof
Exponential
Fractal geometry
Holomorphic
Imaginary axis
LAPLACE TRANSFORM
LOGARITHM
MEROMORPHIC FUNCTION

32 Points

Tangent n+½
Unit Lenght
Vertical Axis
Wiener-Khinchin
x=0 √1+x
ZETA FUNCTION

LL Riforma Mono Light

11,808 Points

COMPLEX | A

1+2i	-3-4i	5+6i	-7-8i	9+10i	-11-12i	13+14i	-15-16i
17+18i	-19-20i	21+22i	-23-24i	25+26i	-27-28i	29+30i	-31-32i
33+34i	-35-36i	37+38i	-39-40i	41+42i	-43-44i	45+46i	-47-48i
49+50i	-51-52i	53+54i	-55-56i	57+58i	-59-60i	61+62i	-63-64i
65+66i	-67-68i	69+70i	-71-72i	73+74i	-75-76i	77+78i	-79-80i
81+82i	-83-84i	85+86i	-87-88i	89+90i	-91-92i	93+94i	-95-96i
97+98	-99-100i	101+102i	-103-104i	105+106i	-107-108i	109+110i	-111-112i
113+114i	-115-116i	117+118i	-119-120i	121+122i	-123-124i	125+126i	-127-128i
129+130i	-131-132i	133+134i	-135-136i	137+138i	-139-140i	141+142i	-143-144i
145+146i	-147-148i	149+150i	-151-152i	153+154i	-155-156i	157+158i	-159-160i
161+162i	-163-164i	165+166i	-167-168i	169+170i	-171-172i	173+174i	-175-176i
177+178i	-179-180i	181+182i	-183-184i	185+186i	-187-188i	189+190i	-191-192i
193+194i	-195-196i	197+198i	-199-200i	201+202i	-203-204i	205+206i	-207-208i
209+210i	-211-212i	213+214i	-215-216i	217+218i	-219-220i	221+222i	-223-224i
225+226i	-227-228i	229+230i	-231-232i	233+234i	-235-236i	237+238i	-239-240i
241+242i	-243-244i	245+246i	-247-248i	249+250i	-251-252i	253+254i	-255-256i
257+258i	-259-260i	261+262i	-263-264i	265+266i	-267-268i	269+270i	-271-272i
273+274i	-275-276i	277+278i	-279-280i	281+282i	-283-284i	285+286i	-287-288i
289+290i	-291-292i	293+294i	-295-296i	297+298i	-299-300i	301+302i	-303-304i
305+306i	-307-308i	309+310i	-311-312i	313+314i	-315-316i	317+318i	-319-320i
321+322i	-323-324i	325+326i	-327-328i	329+330i	-331-332i	333+334i	-335-336i
337+338i	-339-340i	341+342i	-343-344i	345+346i	-347-348i	349+350i	-351-352i
353+354i	-355-356i	357+358i	-359-360i	361+362i	-363-364i	365+366i	-367-368i
369+370i	-371-372i	373+374i	-375-376i	377+378i	-379-380i	381+382i	-383-384i
385+386i	-387-388i	389+390i	-391-392i	393+394i	-395-396i	397+398i	-399-400i
401+402i	-403-404i	405+406i	-407-408i	409+410i	-411-412i	413+414i	-415-416i
417+418i	-419-420i	421+422i	-423-424i	425+426i	-427-428i	429+430i	-431-432i
433+434i	-435-436i	437+438i	-439-440i	441+442i	-443-444i	445+446i	...

LL Riforma Mono Light Italic

4.5 Points – SS03 Stacked Fractions

The symbol for the real numbers is R. They include all the measuring numbers. Every real number corresponds to a point on the number line. The following paragraph will focus primarily on positive real numbers. The treatment of negative real numbers is according to the general rules of arithmetic and their denotation is simply prefixing the corresponding positive numeral by a minus sign, −123.456. Most real numbers can only be approximated BY DECIMAL NUMERALS, IN WHICH A DECIMAL POINT IS PLACED TO THE RIGHT OF THE DIGIT WITH PLACE VALUE 1. EACH DIGIT TO THE RIGHT OF THE DECIMAL POINT has a place value one-tenth of the place value of the digit to its left. For example, 123.456 represents $\frac{123456}{1000}$, or, in words, one hundred, two tens, three ones, four tenths, five hundredths, and six thousandths. A real number can be expressed by a finite number of decimal digits only if it is rational and its fractional part has a denominator whose prime factors are 2 or 5 or both, because these are the prime factors of 10, the base of the decimal system. THUS, FOR EXAMPLE, ONE HALF IS 0.5, ONE FIFTH IS 0.2, ONE-TENTH IS 0.1, AND ONE FIFTIETH IS 0.02. REPRESENTING OTHER REAL NUMBERS AS DECIMALS would require an infinite sequence of digits to the right of the decimal point. If this infinite sequence of digits follows a pattern, it can be written with an ellipsis or another notation that indicates the repea-ting pattern. Such a decimal is called a repeating decimal. Thus ⅓ can be written as 0.333…, with an ellipsis to indicate that the pattern continues. Forever repeating 3s are also written as 0.3. It turns out that these repea-TING DECIMALS DENOTE EXACTLY THE RATIONAL NUMBERS, ALL RATIONAL NUMBERS ARE ALSO REAL NUMBERS, BUT IT IS NOT THE CASE THAT EVERY REAL NUMBER IS

6 Points

The most familiar numbers are the natural numbers (sometimes called whole numbers or counting numbers): 1, 2, 3, and so on. Traditionally, the sequence of natural numbers started with 1 (0 was not even considered a number for the Ancient Greeks.) However, in the 19th century, set theorists and other mathematicians started including 0 (cardinality of the empty set, 0 elements, where 0 is thus THE SMALLEST CARDINAL NUMBER) IN THE SET OF NATURAL NUMBERS. TODAY, DIFFERENT MATHEMATICIANS USE THE TERM TO DESCRIBE BOTH SETS, INCLUDING 0 or not. The mathematical symbol for the set of all natural numbers is N, also written N and sometimes N_0 or N_1 when it is necessary to indicate whether the set should start with 0 or 1, respectively. In the base 10 numeral system, in almost universal use today for mathematical operations, the symbols for natural numbers are written using ten digits: 0, 1, 2, 3, 4, 5, 6, 7, 8, AND 9. THE RADIX OR BASE IS THE NUMBER OF UNIQUE NUMERICAL DIGITS, INCLUDING ZERO, THAT A NUMERAL SYSTEM USES TO REPRESENT NUMBERS

7 Points

The negative of a positive integer is defined as a number that produces 0 when it is added to the corresponding positive integer. Negative numbers are usually written with a negative sign (a minus sign). As an example, the negative of 7 is written −7, and 7+(−7)=0. When the set of negative numbers is combined with the set of natural numbers (including 0), the result is defined as the set of integers, Z also written Z. Here the letter Z comes from German Zahl 'number'. The set of integers forms a ring with the operations addition and multiplication. The natural numbers form a subset of the integers. AS THERE IS NO COMMON STANDARD FOR THE INCLUSION OR NOT OF ZERO IN THE NATURAL NUMBERS, THE NATURAL NUMBERS WITHOUT ZERO ARE COMMONLY REFERRED TO AS POSITIVE INTEGERS, AND THE NATURAL

9 Points

The notions of convergent series and continuous functions in (real) analysis have natural analogs in complex analysis. A sequence of complex numbers is said to converge if and only if its real and imaginary parts do. This is equivalent to the definition of limits, where the absolute value of real numbers is replaced by the one of complex numbers. From a more abstract point of view, C, endowed with the metric $d(z_1,z_2)=|z_1-z_2|$ is a complete metric space, which notably includes the triangle inequality $|z_1+z_2|\leq|z_1|+|z_2|$ for any two complex numbers z_1 and z_2. Like in real analysis, this notion of convergence is used TO CONSTRUCT A NUMBER OF ELEMENTARY FUNCTIONS: THE EXPONENTIAL FUNCTION EXP Z, ALSO WRITTEN EZ, IS DEFINED AS THE INFINITE SERIES. THE SERIES

10.5 Points

The study of functions of a complex variable is known as complex analysis and has enormous practical use in applied mathematics as well as in other branches of mathematics. Often, the most natural proofs for statements in real analysis or even number theory employ techniques from complex analysis (see prime number theorem for an example). Unlike real functions, which are commonly represented as two-dimensional graphs, complex functions have four-dimensional graphs and MAY USEFULLY BE ILLUSTRATED BY COLOR-CODING A THREE-DIMENSIONAL GRAPH TO SUGGEST FOUR DIMENSIONS, OR BY ANIMATING THE

LL Riforma Mono Light Italic

12 Points

● *Moreover he later described complex numbers as “as subtle as they are useless.” Cardano did use imaginary numbers, but described using them as “mental torture.” This was prior to the use of the graphical complex plane. Cardano and other Italian mathematicians, notably Scipione del Ferro, in the 1500s created an algo-RITHM FOR SOLVING CUBIC EQUATIONS WHICH GENERALLY HAD ONE REAL SOLUTION AND TWO SOLUTIONS CONTAINING AN IMA-GINARY NUMBER. SINCE THEY IGNORED THE*

20 Points

Ⅰ Mersenne prime
Ⅱ Non-terminating
Ⅲ Odd number → 543
Ⅳ Pi(π) → 3.14159265…
Ⅴ Pythagorean triple
Ⅵ Quotient Graph
Ⅶ Repeating decimal
Ⅷ SEMIPRIME/BIPRIMES
Ⅸ SQUARE-FREE [S²|R]

16 Points

Arithmetic mean
Binary, Coefficients
Congruence
Diophantine equation
Elliptic curve
Fermat’s Last Theorem
Golden ratio
Greatest common divisor
HARSHAD NUMBER
INTEGER, LUCAS NUMBER
LENGTHS [A] AND [B]

32 Points

Transcendental
Ulam spiral
Unnatural
Wilson prime
Zermelo-
FRAENKEL THEORY

11,808 Points

COMPLEX *A*

IMAGINARY

i	*– 2i*
3i	*– 4i*
5i	*– 6i*
7i	*– 8i*
9i	*–10i*
11i	*–12i*
13i	*–14i*
15i	*–16i*
17i	*–18i*
19i	*–20i*
21i	*–22i*
23i	*–24i*
25i	*–26i*
27i	*–28i*
29i	*–30i*
31i	*–32i*
33i	*–34i*
35i	*–36i*
37i	*–38i*
39i	*–40i*
41i	*–42i*
43i	*...*

B.1

REAL *B.2*

4.5 Points

Joseph Liouville first proved the existence of transcen-dental numbers in 1844,and in 1851 gave the first decimal examples such as the Liouville constant in which the nth digit after the decimal point is 1 if n is equal to k! for some k and 0 otherwise. In other words, the nth digit of this number is 1 only if n is one of the numbers 1!=1, 2!=2, 3!=6, 4!=24, etc. Liouville showed that this number belongs to a class of transcendental numbers that CAN BE MORE CLOSELY APPRO-XIMATED BY RATIONAL NUMBERS THAN CAN ANY IRRATIONAL ALGE-BRAIC NUMBER, AND THIS CLASS OF NUMBERS ARE CALLED LIOU-VILLE NUMBERS, named in his honour. Liouville showed that all Liouville numbers are transcen-dental. The first number to be proven transcen-dental without having been specifically constructed for the purpose of proving tran-scendental numbers' existence was e, by Charles Hermite in 1873. In 1874, Georg Cantor proved that the algebraic numbers are countable and the real numbers are uncountable. He also gave a new method for constructing transcenden-TAL NUMBERS. ALTHOUGH THIS WAS ALREADY IMPLIED BY HIS PROOF OF THE COUNTABILITY OF THE ALGEBRAIC NUMBERS, CANTOR ALSO PUBLISHED A CONSTRUCTION that proves there are as many transcendental numbers as there are real numbers. Can-tor's work established the ubiquity of transcendental numbers. In 1882, Ferdinand von Lindemann published the first complete proof that π is transcendental. He first pro-ved that ea is trans-cendental if a is a non-zero algebraic number. Then, since eiπ=-1 is alge-braic (see Euler's identity), iπ must be transcendental. But since i is algebraic, Π THEREFORE MUST BE TRANSCEN-DENTAL. THIS APPROACH WAS GENERALIZED BY KARL WEIER-STRASS TO WHAT IS NOW KNOWN AS THE LINDEMANN-WEIERSTRASS

6 Points

Moving to a greater level of abs-traction, the real numbers can be extended to the complex numbers. This set of numbers arose histo-rically from trying to find closed formulas for the roots of cubic and quadratic polynomials. This led to expressions involving the square roots of negative numbers, and eventually to the definition of a new number: a square root of −1, denoted by i, a symbol assigned by LEONHARD EULER, AND CALLED THE IMAGINARY UNIT. THE COMPLEX NUMBERS CONSIST OF ALL NUMBERS OF THE FORM A+BI WHERE A AND B ARE REAL numbers. Because of this, complex numbers correspond to points on the complex plane, a vector space of two real dimensions. In the expression a + bi, the real number a is called the real part and b is called the imaginary part. If the real part of a complex num-ber is 0, then the number is called an imaginary number or is referred to as purely imaginary; if the imaginary part is 0, THEN THE NUMBER IS A REAL NUMBER. THUS THE REAL NUMBERS ARE A SUB-SET OF THE COMPLEX NUMBERS. IF THE REAL AND IMAGINARY PARTS OF A COM-

7 Points

A computable number, also known as recursive number, is a real number such that there exists an algorithm which, given a positive number n as input, produces the first n digits of the computable number's decimal representation. Equivalent definitions can be given using μ-recursive functions, Turing machines or calculus. The computable num-bers are stable for all usual arithmetic operations, including the computation of the roots of a polynomial, and thus form a real closed field that contains the real algebraic numbers. The computable numbers may be viewed as THE REAL NUMBERS THAT MAY BE EXACTLY REPRESENTED IN A COMPUTER: A COMPUTABLE NUMBER IS EXACTLY REPRESENTED BY ITS FIRST DIGITS AND A PROGRAM FOR COMPUTING FURTHER DIGITS.

9 Points

However, an algebraic function of several variables may yield an algebraic number when applied to transcendental numbers if these numbers are not algebraically independent. For example, π and (1−π) are both transcenden-tal, but π+(1−π)=1 is obviously not. It is unknown whether e+π, for example, is trans-cendental, though at least one of e+π and eπ must be transcendental. More generally, for any two transcendental numbers a and b, at least one of a+b and ab must be trans-cendental. To see this, consider the polynomial (x−a)(x−b)=x²−(A+B)X+AB. IF (A+B) AND A B WERE BOTH ALGEBRAIC, THEN THIS WOULD BE A POLY-NOMIAL WITH ALGEBRAIC COEFFICIENTS. BECAUSE ALGEBRAIC NUMBERS FORM AN ALGEBRAICALLY CLOSED

10.5 Points

The first number to be proven trans-cendental without having been specifically constructed for the purpose of proving transcendental numbers' existence was e, by Charles Hermite in 1873. In 1874, Georg Cantor proved that the algebraic numbers are countable and the real numbers are uncountable. He also gave a new method for constructing transcendental numbers. Although this was already implied by his proof of the countability of the algebraic numbers, Cantor also published A CONSTRUCTION THAT PROVES THERE ARE AS MANY TRANSCENDENTAL NUMBERS AS THERE ARE REAL NUMBERS. CANTOR'S WORK SET THE

12 Points

◧ Work on the problem of general polynomials ultimately led to the funda-mental theorem of algebra, which shows that with complex numbers, a solution exists to every polynomial equation of degree one or higher. Complex numbers thus form an algebraically closed field, where any polynomial equation HAS A ROOT. MANY MATHEMATICIANS CONTRIBUTED TO THE DEVELOPMENT OF COMPLEX NUMBERS. THE RULES FOR ADDI-TION, SUBTRACTION, MULTIPLICATION,

20 Points

Lateral surface
Matrix disambiguation
Multiplication
Modular Arithmetic
Negative Expo
Orthocenter $h^2=pq$
Prime factor
QUADRATIC EQUATION
QUARTILE (Q1)

16 Points – Slashed zero

A. Absolute value
Amicable numbers
B. Base 02 (Binary)
Base 08 (Octal)
Base 16 (Hexadecimal)
C. Combinatorial
Cycle Lemma
E. Extraction
EUGÈNE CHARLES CATALAN
G. GEOMETRIC PROGRESSION
I. IDENTITY MATRIX

32 Points

Recursively
Defined Object
Sequences
Subtraction
Property
OF EQUALITY

11,808 Points

```
COMPLEX                                    A

  IMAGINARY     REAL                       B.2

                   IRRATIONAL              C.1

                    √2     =  1.41421356237309504880168872420969807856967187537694...
                    e      =  2.71828182845904523536028747135266249775724709369995...

                   RATIONAL                C.2

                    1/2    =  0.5
                   -3/8    =  0.375
                    2/9    = -0.222222...
                    5/6    =  0.833333333333...
                    9/11   = -0.8181818181818181818181...
                    23/17  =  1.35294117647058823529411764705882352 9...
                    1/98   =  0.01020408163265306122448979591836734693877551020408...
                              16326530612244897959183673469387755102040816326530 61...
                              2244897959183673469387755102040816326530

  B.1
```

4.5 Points

*A transcendental number
is a (possibly complex) number
that is not the root of any
integer polynomial. Every real
transcendental number must
also be irrational, since
a rational number is the root
of an integer polynomial of
degree one. The set of tran-
scendental numbers is uncount-
ably infinite. Since the
polynomials with rational
coef-icients are countable,
and since each such polynomial
has a finite number of zeroes,
the algebraic numbers must
ALSO BE COUNTABLE. HOWEVER,
CANTOR'S DIAGONAL ARGUMENT
PROVES THAT THE REAL NUMBERS
(AND THEREFORE ALSO THE COM-
PLEX NUMBERS) ARE UNCOUNTABLE.*

*Since the real numbers are
the union of algebraic
and transcendental numbers,
it is impossible for both
subsets to be countable.
This makes the transcendental
numbers uncountable. A tran-
scendental number is a number
that is not the root of any
integer polynomial. Every real
transcendental number must
also be irrational, since a
rational number is the root of
an integer polynomial of
degree one.The set of tran-
scendental numbers is uncount-
ABLY INFINITE. SINCE THE POLY-
NOMIALS WITH RATIONAL COEFFI-
CIENTS ARE COUNTABLE, AND
SINCE EACH SUCH POLYNOMIAL HAS
A FINITE NUMBER OF ZEROES,*

*the algebraic numbers must
also be countable. However,
Cantor's diagonal argument
proves that the real numbers
(and therefore also the com-
plex numbers) are uncoun-
table. Since the real numbers
are the union of algebraic
and transcendental numbers,
it is impossible for both sub-
sets to be countable. This
makes the transcendental num-
bers uncountable. No ratio-
nal number is transcendental
and all real transcendental
numbers are irrational. The
IRRATIONAL NUMBERS CONTAIN ALL
THE REAL TRANSCENDENTAL NUM-
BERS AND A SUBSET OF THE ALGE-
BRAIC NUMBERS, INCLUDING
THE QUADRATIC IRRATIONALS AND*

6 Points

*A natural number can be used
to express the size of a finite set;
more precisely, a cardinal number
is a measure for the size of a set,
which is even suitable for infi-
nite sets. This concept of "size"
relies on maps between sets, such
that two sets have the same size,
exactly if there exists a bijection
between them. The set of natural
numbers itself, and any bijective
image of it, is said to be count-
ABLY INFINITE AND TO HAVE CARDINAL-
ITY ALEPH-NULL. NATURAL NUMBERS
ARE ALSO USED AS LINGUISTIC ORDINAL
NUMBERS: "FIRST", "SECOND",*

*"third", and so forth. This way
they can be assigned to the elements
of a totally ordered finite set,
and also to the elements of any
well-ordered countably infinite set.
This assignment can be generali-
zed to general well-orderings with
a cardinality beyond countability,
to yield the ordinal numbers.
An ordinal number may also be used
to describe the notion of "size"
for a well-ordered set, in a sense
DIFFERENT FROM CARDINALITY: IF THERE
IS AN ORDER ISOMORPHISM (MORE
THAN A BIJECTION) BETWEEN TWO WELL-
ORDERED SETS, THEY HAVE THE SAME*

7 Points

*There are two standard methods for formally defining natural
numbers. The first one, named for Giuseppe Peano, consists
of an autonomous axiomatic theory called Peano arithmetic,
based on few axioms called Peano axioms. The second definition
is based on set theory. It defines the natural numbers as
specific sets. More precisely, each natural number n is defined
as an explicitly defined set, whose elements allow counting
the elements of other sets, in the sense that the sentence
"a set S has n elements" means that there exists a one to one
correspondence between the two sets n and S. The sets used
TO DEFINE NATURAL NUMBERS SATISFY PEANO AXIOMS. IT FOLLOWS THAT
EVERY THEOREM THAT CAN BE STATED AND PROVED IN PEANO ARITH-
METIC CAN ALSO BE PROVED IN SET THEORY. HOWEVER, THE TWO DEFI-*

9 Points

*Intuitively, the natural number n is the common
property of all sets that have n elements.
So, it seems natural to define n as an equivalence
class under the relation "can be made in one
to one correspondence". Unfortunately, this does
not work in set theory, as such an equivalence
class would not be a set. The standard solution
is to define a particular set with n elements
that will be called the natural number n. The fol-
lowing definition was first published by John
von Neumann,although Levy attributes the idea to
unpublished work of Zermelo in 1916. As this
DEFINITION EXTENDS TO INFINITE SET AS A DEFINI-
TION OF ORDINAL NUMBER, THE SETS CONSIDERED
BELOW ARE SOMETIMES CALLED VON NEUMANN ORDINALS.
THE DEFINITION PROCEEDS AS FOLLOWS: CALL THE*

10.5 Points

*It can be checked that the natural numbers
satisfies the Peano axioms. With this
definition, given a natural number n, the
sentence "a set S has n elements" can
be formally defined as "there exists a
bijection from n to S. This formalizes the
operation of counting the elements of S.
Also, n≤m if and only if n is a subset
of m. In other words, the set inclusion
defines the usual total order on the natu-
ral numbers. This order is a well-order.
It follows from the definition that each
NATURAL NUMBER IS EQUAL TO THE SET OF ALL
NATURAL NUMBERS LESS THAN IT. THIS DEFI-
NITION, CAN BE EXTENDED TO THE VON NEUMANN*

12 Points

◔ *The impetus to study complex numbers as a topic in itself first arose in the 16th century when algebraic solutions for the roots of cubic and quartic polynomials were discovered by Italian mathematicians (Niccolò Fontana Tartaglia and Gerolamo Cardano). It was soon realized (but proved much later)that these formulas, EVEN IF ONE WERE INTERESTED ONLY IN REAL SOLUTIONS, SOMETIMES REQUIRED THE MANIPULATION OF SQUARE ROOTS OF NEGATIVE NUMBERS. IN FACT, IT WAS*

16 Points

1. Additive inverse
2. Asymptotic
3. Calculus
4. Complex, Conjugate
5. De Moivre's theory
6. Fondamental
7. Generated function
8. Geometric Root
9. HOOK-LENGTH
10.IMAGINARY UNIT
11.INEQUALITY

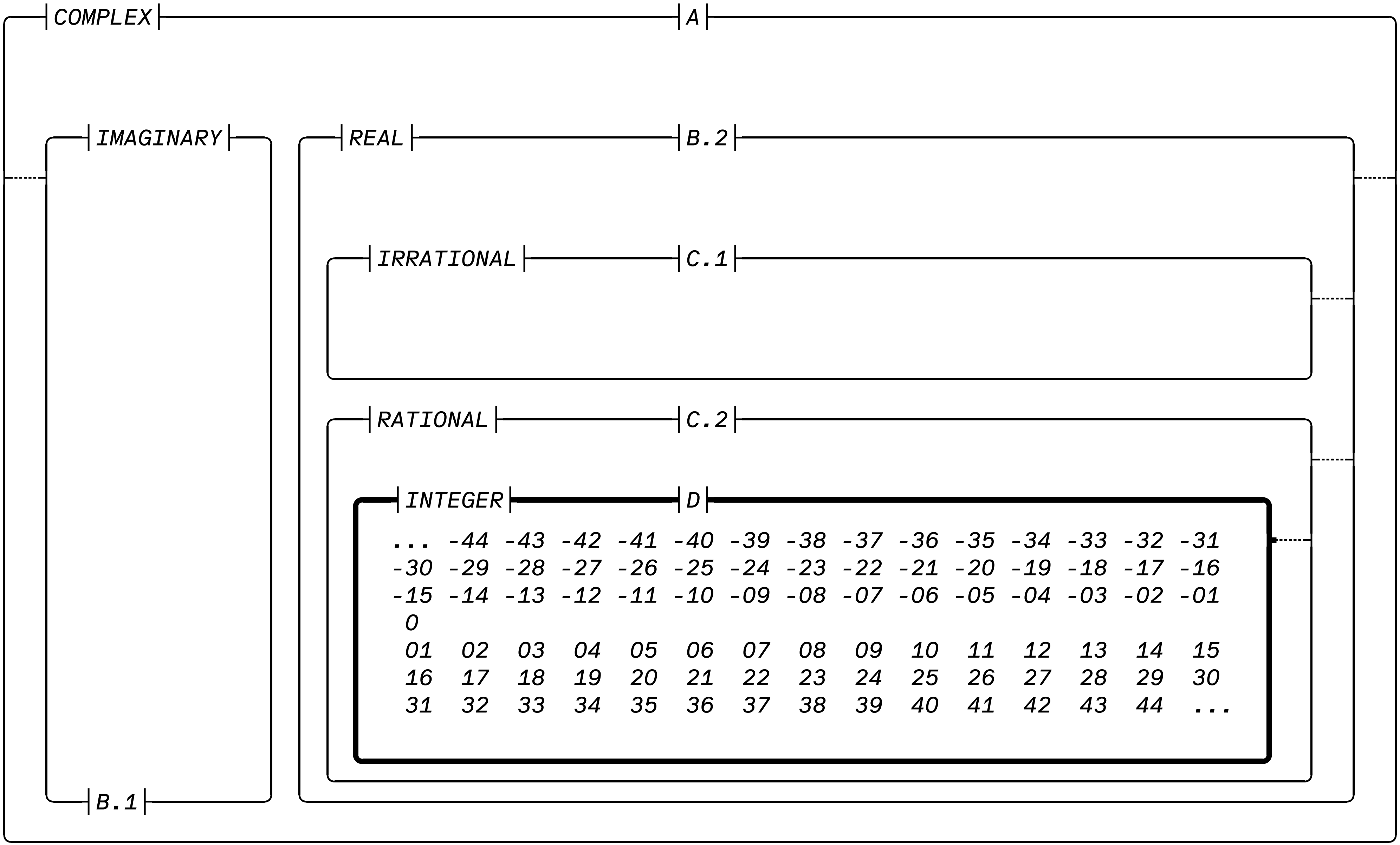
20 Points

Mandelbrot Fractal
Null set (Empty ∅)
Prime Factorization
Theorem Proofing
Power Series $d_0=a_0/b_0$
Quadratic equations
Repeating decimal
RHOMBUS QUADRILATERAL
STATISTICAL MEDIAN

32 Points – SS01 Diagonal Endings

Uncoutable Set
Unique Factor
Factorization
Wilson prime
Whole Unit
ZERO-CROSSING

11,808 Points



LL Riforma Mono Bold

4.5 Points

Simple fractions were used by the Egyptians around 1000 BC; the Vedic "Shulba Sutras" ("The rules of chords") in c. 600 BC include what may be the first "use" of irrational numbers. The concept of irrationality was implicitly accepted by early Indian mathematicians such as Manava (c. 750–690 BC), who was aware that the square roots of certain numbers, such as 2 and 61, could not be exactly determined. Around 500 BC, the Greek mathematicians led by PythaGORAS ALSO REALIZED THAT THE SQUARE ROOT OF 2 IS IRRATIONAL. THE MIDDLE AGES BROUGHT ABOUT THE ACCEPTANCE OF ZERO, NEGATIVE NUMBERS, INTEGERS, AND fractional numbers, first by Indian and Chinese mathematicians, and then by Arabic mathematicians, who were also the first to treat irrational numbers as algebraic objects (the latter being made possible by the development of algebra). Arabic mathematicians merged the concepts of "number" and "magnitude" into a more general idea of real numbers. The Egyptian mathematician Abū Kāmil Shujā ibn Aslam (c. 850–930) was the first to accept irrational numbers as solutions to quadRATIC EQUATIONS, OR AS COEFFICIENTS IN AN EQUATION (OFTEN IN THE FORM OF SQUARE ROOTS, CUBE ROOTS AND FOURTH ROOTS). IN EUROPE, SUCH NUMBERS, not commensurable with the numerical unit, were called irrational or surd ("deaf"). In the 16th century, Simon Stevin created the basis for modern decimal notation, and insisted that there is no difference between rational and irrational numbers in this regard. In the 17th century, Descartes introduced the term "real" to describe roots of a polynomial, distinguishing them from "imaginary" ones. In the 18th and 19th centuries, there was much work on irraTIONAL AND TRANSCENDENTAL NUMBERS. LAMBERT (1761) GAVE A FLAWED PROOF THAT Π CANNOT BE RATIONAL; LEGENDRE (1794) COMPLETED THE PROOFAND SHOWED

6 Points

In mathematics, a real number is a number that can be used to measure a continuous one-dimensional quantity such as a distance, duration or temperature. Here, continuous means that pairs of values can have arbitrarily small differences. Every real number can be almost uniquely represented by an infinite decimal expansion. The real numbers are fundamental in calculus, in particular by their role in the CLASSICAL DEFINITIONS OF LIMITS, CONTINUITY AND DERIVATIVES. THE SET OF REAL NUMBERS IS DENOTED R AND IS SOMETIMES CALLED "THE REALS". The adjective real, used in the 17th century by René Descartes, distinguishes real numbers from imaginary numbers such as the square roots of −1. The real numbers include the rational numbers, such as the integer −5 and the fraction 4/3. The rest of the real numbers are called irrational numbers. Some irrational numbers are the root of a polynomial with integer coefficients, such AS THE SQUARE ROOT √2=1.414…; THESE ARE ALGEBRAIC NUMBERS. THERE ARE ALSO REAL NUMBERS WHICH ARE NOT SUCH AS Π=3.1415…; THESE ARE

7 Points

Conversely, analytic geometry is the association of points on lines (especially axis lines) to real numbers such that geometric displacements are proportional to differences between corresponding numbers. The informal descriptions above of the real numbers are not sufficient for ensuring the correctness of proofs of theorems involving real numbers. The realization that a better definition was needed, and the elaboration of such a definition was a major development of 19th-century mathematics and is the foundation of real analysis, the study of real functions and real-valued sequences. A current axioMATIC DEFINITION IS THAT REAL NUMBERS FORM THE UNIQUE (UP TO AN ISOMORPHISM) DEDEKIND-COMPLETE ORDERED FIELD. OTHER COMMON DEFINITIONS OF REAL NUMBERS INCLUDE EQUIVALENCE CLASSES OF

9 Points

Real numbers are completely characterized by their fundamental properties that can be summarized by saying that they form an ordered field that is Dedekind complete. Here, "completely characterized" means that there is a unique isomorphism between any two Dedekind complete ordered fields, and thus that their elements have exactly the same properties. This implies that one can manipulate real numbers and compute with them, without knowing how they can be defined; this is what mathematicians and physicists did during several centuries before the first formal definiTIONS WERE PROVIDED IN THE SECOND HALF OF THE 19TH CENTURY. SEE CONSTRUCTION OF THE REAL NUMBERS FOR DETAILS ABOUT THESE FORMAL DEFINITIONS AND THE PROOF OF THEIR EQUIVALENCE. THE REAL NUMBERS

10.5 Points – SS02 Titling f, i, j, t

The real numbers form a metric space: the distance between x and y is defined as the absolute value |x−y|. By virtue of being a totally ordered set, they also carry an order topology; the topology arising from the metric and the one arising from the order are identical, but yield different presentations for the topology in the order topology as ordered intervals, in the metric topology as epsilon-balls. The reals form a contractible connected and simply connected), SEPARABLE AND COMPLETE METRIC SPACE OF HAUSDORFF DIMENSION 1. THE REAL NUMBERS ARE LOCALLY COMPACT BUT NOT COMPACT.

12 Points

◈ Wessel's memoir appeared in the Proceedings of the Copenhagen Academy but went largely unnoticed. In 1806 Jean-Robert Argand independently issued a pamphlet on complex numbers and provided a rigorous proof of the fundamental theorem of algebra. Carl Friedrich Gauss had earlier published an essentially topological PROOF OF THE THEOREM IN 1797 BUT EXPRESSED HIS DOUBTS AT THE TIME ABOUT "THE TRUE METAPHYSICS OF THE SQUARE ROOT OF −1". IT WAS NOT UNTIL

16 Points

Argand diagram
Argument
Analytic function
Conjugate pair
Contour integral
Exponential
Essential singularity
Fractal Suite
GAUSSIAN INTEGERS
GEOMETRIC
IMAGINARY UNIT (I)

20 Points

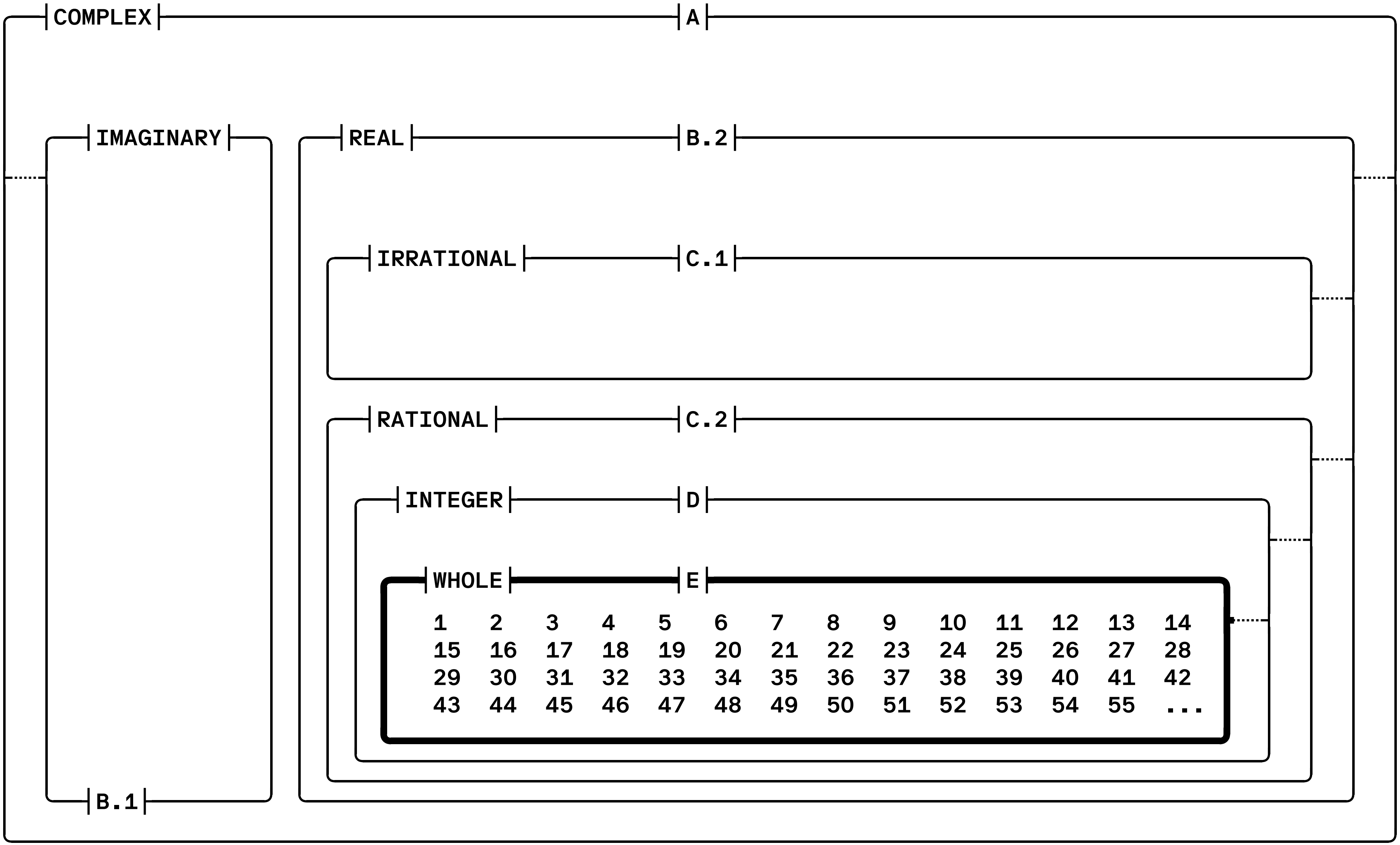
I. Isomorphism
M. Magnitude
Möbius Function
Modulus
N. Normal form
O. Orthogonal
P. Phase angles
PRINCIPAL VALUE
Q. QUATERNON

32 Points – SS03 Stacked Fractions

Quotient
Riemann sphere
Reciprocal
[5=5⁄1]→[1⁄5]
Tangent
WAVE FUNCTION

LL Riforma Mono Bold

11,808 Points



4.5 Points

*Electronic calculators
and computers cannot operate
on arbitrary real numbers,
because finite computers can-
not directly store infini-
tely many digits or other
infinite representations. Nor
do they usually even operate
on arbitrary definable real
numbers, which are inconven-
ient to manipulate. Instead,
computers typically work
with finite-precision approxi-
mations called floating-
point numbers, a representa-
tion similar to scientific
NOTATION. THE ACHIEVABLE
PRECISION IS LIMITED BY THE
DATA STORAGE SPACE ALLO-
CATED FOR EACH NUMBER, WHETHER
AS FIXED-POINT, FLOATING-
point, or arbitrary-precision
numbers, or some other repre-
sentation. Most scientific
computation uses binary float-
ing-point arithmetic, often
a 64-bit representation with
around 16 decimal digits
of precision. Real numbers
satisfy the usual rules of
arithmetic, but floating-point
numbers do not. The field
of numerical analysis studies
the stability and accuracy
of numerical algorithms imple-
mented with approximate ari-
thmetic.Alternately, computer
ALGEBRA SYSTEMS CAN OPERATE
ON IRRATIONAL QUANTITIES EXAC-
TLY BY MANIPULATING SYMBOLIC
FORMULAS FOR THEM RATHER THAN
THEIR RATIONAL OR DECIMAL
approximation. But exact
and symbolic arithmetic also
have limitations: for ins-
tance, they are computation-
ally more expensive; it is
not in general possible to
determine whether two symbolic
expressions are equal (the
constant problem); and arith-
metic operations can cause
exponential explosion in the
size of representation of a
single number (for instance,
squaring a rational number
roughly doubles the number of
digits in its numerator and
DENOMINATOR, AND SQUARING A
POLYNOMIAL ROUGHLY DOUBLES
ITS NUMBER OF TERMS), OVER-
WHELMING FINITE COMPUTER STOR-
AGE. A REAL NUMBER IS CALLED*

6 Points

*Although the Greek mathematician
and engineer Heron of Alexandria is
noted as the first to present
a calculation involving the square
root of a negative number, it
was Rafael Bombelli who first set
down the rules for multiplica-
tion of complex numbers in 1572.
The concept had appeared in
print earlier, such as in work by
Gerolamo Cardano. At the time,
imaginary numbers and negative num-
BERS WERE POORLY UNDERSTOOD AND
WERE REGARDED BY SOME AS FICTITIOUS
OR USELESS, MUCH AS ZERO ONCE WAS.
MANY OTHER MATHEMATICIANS WERE
slow to adopt the use of imagi-
nary numbers, including René
Descartes, who wrote about them
in his La Géométrie in which
he coined the term imaginary and
meant it to be derogatory.
The use of imaginary numbers was
not widely accepted until the
work of Leonhard Euler (1707–1783)
and Carl Friedrich Gauss (1777–
1855). The geometric significance
of complex numbers as points
IN A PLANE WAS FIRST DESCRIBED BY
CASPAR WESSEL (1745–1818). IN 1843,
WILLIAM ROWAN HAMILTON EXTENDED
THE IDEA OF AN AXIS OF IMAGINARY*

7 Points

*Geometrically, imaginary numbers are found on the vertical
axis of the complex number plane, which allows them to be pre-
sented perpendicular to the real axis. One way of viewing
imaginary numbers is to consider a standard number line posi-
tively increasing in magnitude to the right and negatively
increasing in magnitude to the left. At 0 on the x-axis, a
y-axis can be drawn with "positive" direction going up; "posi-
tive" imaginary numbers then increase in magnitude upwards,
and "negative" imaginary numbers increase in magnitude down-
WARDS. THIS VERTICAL AXIS IS OFTEN CALLED THE "IMAGINARY
AXIS" AND IS DENOTED IR, I, OR I. IN THIS REPRESENTATION, MUL-
TIPLICATION BY I CORRESPONDS TO A COUNTERCLOCKWISE ROTATION
OF 90 DEGREES ABOUT THE ORIGIN, WHICH IS A QUARTER OF A CIRCLE.*

9 Points

*In mathematics, the irrational numbers
(from in- prefix assimilated to ir- (negative
prefix, privative) + rational) are all
the real numbers that are not rational numbers.
That is, irrational numbers cannot be expre-
ssed as the ratio of two integers. When
the ratio of lengths of two line segments is
an irrational number, the line segments
are also described as being incommensurable,
meaning that they share no "measure" in
common, that is, there is no length ("the mea-
sure"), no matter how short, that could
BE USED TO EXPRESS THE LENGTHS OF BOTH OF THE
TWO GIVEN SEGMENTS AS INTEGER MULTIPLES
OF ITSELF. AMONG IRRATIONAL NUMBERS ARE THE
RATIO Π OF A CIRCLE'S CIRCUMFERENCE TO*

10.5 Points

*The next step was taken by Eudoxus
of Cnidus, who formalized a new theory
of proportion that took into account
commensurable as well as incommensurable
quantities. Central to his idea was
the distinction between magnitude and
number. A magnitude"… was not a number
but stood for entities such as line
segments, angles, areas, volumes, and
time which could vary, as we would say,
continuously. Magnitudes were opposed
to numbers, which jumped from one value
TO ANOTHER, AS FROM 4 TO 5". NUMBERS
ARE COMPOSED OF SOME SMALLEST, INDIVISI-
BLE UNIT, WHEREAS MAGNITUDES ARE INFI-*

12 Points

◉ *Unlike the real numbers, there is no natural ordering of the com-plex numbers. In particular, there is no linear ordering on the com-plex numbers that is compatible with addition and multiplication. Hence, the complex numbers do not have the structure of an ordered field. One explanation for this is THAT EVERY NON-TRIVIAL SUM OF SQUA-RES IN AN ORDERED FIELD IS NONZERO, AND* $I^2+1^2=0$ *IS A NONTRIVIAL SUM OF SQUARES. THUS, COMPLEX NUMBERS*

20 Points

◒ *Inradius ¼a(√(3)-1)*
◓ *Identity element*
● *Logistic growth*
◐ *Multiplicative*
◑ *Nth term, Odd number*
● *Octal Periodic*
◔ *Power of Ten*
◕ *PROPERTY OF ZERO*
● *PYTHAGOREAN*

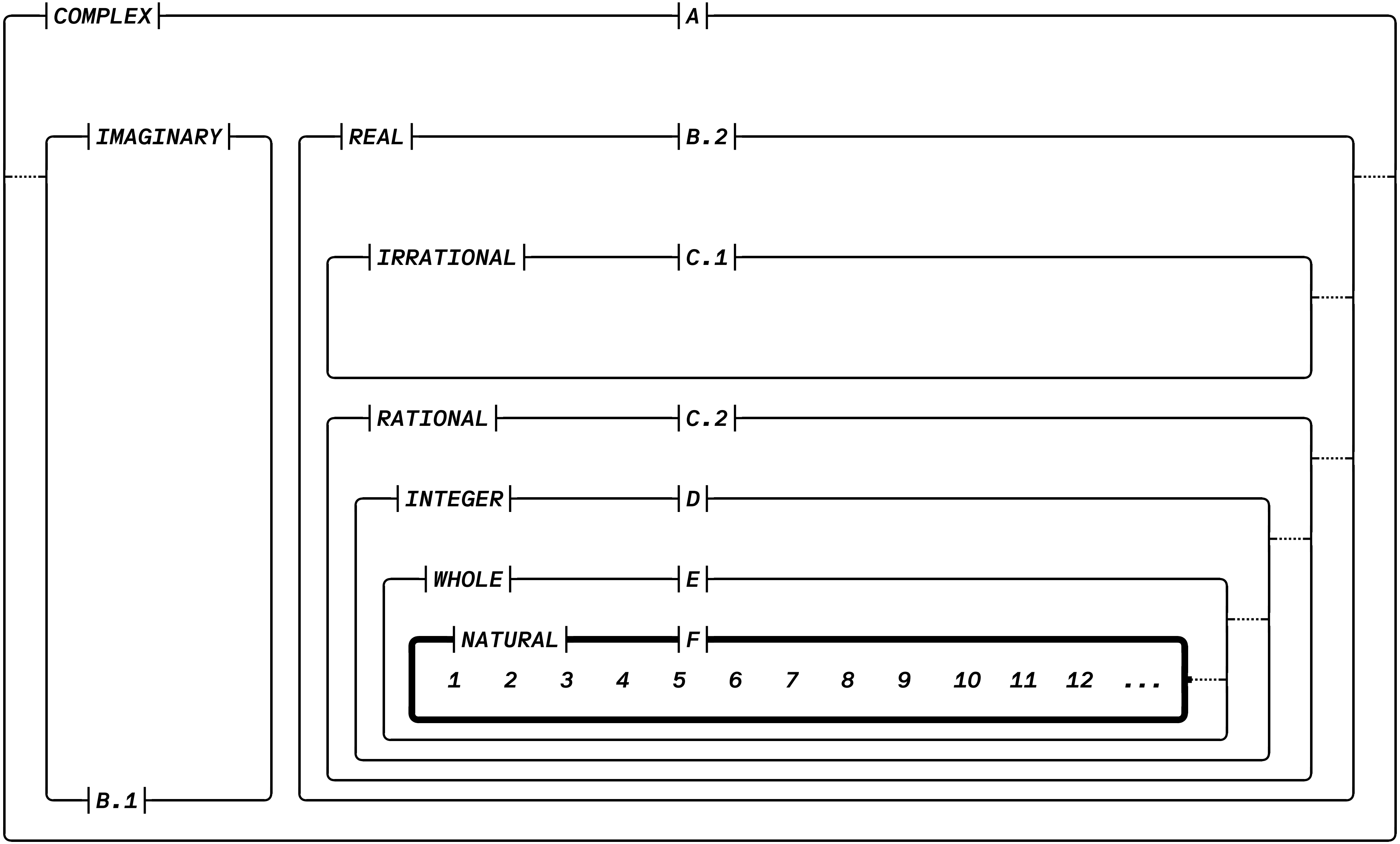
16 Points

Associative property
Average coefficient
(Base 10) X System
Commutative property
±Divisibile
Equal groups, Exponent
Factorization
Fraction $1/(2^2)=¼$
GEOMETRIC MEAN
HINDU-ARABIC SYSTEM
INFINITE INTEGRERS

32 Points

Residue(f,a)
Squaring = x^2
Tetrahedron
Unit Matrice
Venn, Vinculum
$V_1=(\sqrt{8/9},0,-\tfrac{1}{3})$

11,808 Points



11,808 Points

Upright Axis	
300	A New Topology
	A New Topology
	A New Topology
400	A New Topology
	A New Topology
	A New Topology
	A New Topology
	A New Topology
	A New Topology
	A New Topology
	A New Topology
	A New Topology
	A New Topology
700	A New Topology

Italic Axis	
300	*A New Topology*
	A New Topology
	A New Topology
400	*A New Topology*
	A New Topology
	A New Topology
	A New Topology
	A New Topology
	A New Topology
	A New Topology
	A New Topology
	A New Topology
	A New Topology
700	*A New Topology*

108 Points
Bold
Default

Riforma
GJ0£}fjrty

108 Points
Bold
– SS01
Alternate
Set

Riforma
GJ0£}fjrty

80 Points
Light
– Default

A Number

80 Points
Regular
– SS01
Diagonal
Endings

Classification

40 Points
– Default

Cmplx a+ib
Imaginary
Irrational
Rational
Integer(0)
NATURAL

40 Points
– SS03
Titling
f, i, j, t

Cmplx a+ib
Imaginary
Irrational
Rational
Integer(0)
NATURAL

LL Riforma Mono — Default vs. Aternates

10 Points
Light
– Default

There are two standard methods for formally defining natural numbers. The first one, named for Giuseppe Peano, consists of an autonomous axiomatic theory called Peano arithmetic, based on few axioms called Peano axioms. The second definition is based ON SET THEORY. IT DEFINES THE NATURAL NUMBERS AS SPECIFIC SETS. MORE PRECISELY,

10 Points
Light
– SS01
Diagonal
Endings

There are two standard methods for formally defining natural numbers. The first one, named for Giuseppe Peano, consists of an autonomous axiomatic theory called Peano arithmetic, based on few axioms called Peano axioms. The second definition is based ON SET THEORY. IT DEFINES THE NATURAL NUMBERS AS SPECIFIC SETS. MORE PRECISELY,

14 Points
Regular
– Default

The sets used to define natu ral numbers satisfy Peano axioms. It follows that every theorem that can be stated and proved in Peano arithmetic can also be proved in set theory. However, the two defini- tions are not equivalent, as there are theorems that can BE STATED IN TERMS OF PEANO ARITHMETIC AND PROVED IN SET THEORY, WHICH ARE NOT PROVABLE

14 Points
Regular
– SS02
Titling
f, i, j, t

The sets used to define natu ral numbers satisfy Peano axioms. It follows that every theorem that can be stated and proved in Peano arithmetic can also be proved in set theory. However, the two defini- tions are not equivalent, as there are theorems that can BE STATED IN TERMS OF PEANO ARITHMETIC AND PROVED IN SET THEORY, WHICH ARE NOT PROVABLE

18 Points
Bold
– Default

Infinitude of the primes and the diver- gence of the sum of the reciprocals of the PRIMES ½ + ⅓…

18 Points
Bold
– SS03
Stacked
Fractions

Infinitude of the primes and the diver- gence of the sum of the reciprocals of the PRIMES ½ + ⅓…

Technical Information

Latin

Afrikaans
Albanian
Asturian
Asu
Basque
Bemba
Bena
Breton
Catalan
Chiga
Colognian
Cornish
Croatian
Czech
Danish
Dutch
Embu
English
Esperanto
Estonian
Faroese
Filipino
Finnish
French
Friulian
Galician
Ganda
German
Gusii
Hungarian
Icelandic
Igbo
Inari Sami
Indonesian
Irish
Italian
Jola-Fonyi
Kabuverdianu
Kabyle
Kalaallisut
Kalenjin
Kamba
Kikuyu
Kinyarwanda
Koyra Chiini
Koyraboro Senni
Langi
Latvian
Lithuanian
Lower Sorbian
Luo
Luxembourgish
Luyia
Machame
Makhuwa-Meetto
Makonde
Malagasy
Maltese
Manx
Meru
Morisyen
North Ndebele
Northern Sami
Norwegian Bokmål
Norwegian Nynorsk
Nyankole
Oromo
Polish
Portuguese
Prussian
Quechua
Romanian
Romansh
Rombo
Rundi
Rwa
Samburu
Sango
Sangu
Scottish Gaelic
Sena
Serbian
Shambala
Shona
Slovak
Slovenian
Soga
Somali
Spanish
Swahili
Swedish
Swiss German
Tachelhit
Taita
Tasawaq
Teso
Turkish
Upper Sorbian
Uzbek
Volapük
Vunjo
Walser
Welsh
Western Frisian
Yoruba
Zarma
Zulu

Open Type Features

aalt	Access All Alternates
calt	Contextual Alternates
case	Case-Sensitive Forms
ccmp	Glyph Composition / Decomposition
dlig	Discretionary Ligatures
dnom	Denominators
frac	Fractions
liga	Standard Ligatures
locl	Localized Forms
nalt	Alternate Annotation Forms
numr	Numerators
ordn	Ordinals
ornm	Ornaments
salt	Stylistic Alternates
ss01	Stylistic Set 1
ss02	Stylistic Set 2
ss03	Stylistic Set 3
ss17	Stylistic Set 17
ss18	Stylistic Set 18
ss19	Stylistic Set 19
ss20	Stylistic Set 20
subs	Subscript
sups	Superscript
zero	Slashed Zero

Codepage

Please refer to the Technical Document

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