



The Riemann Hypothesis Heist

Grade 10 math · Fractions of a number, Multiplication, Rounding, Pythagorean theorem · Reading level grades 7-9

Detective: _____ **Date:** _____

The legendary Archimedes Medal has vanished from the university vault just hours before the global mathematics symposium. A shadowy culprit bypassed the complex laser grid and left behind a series of high-level formulas. Detective, we must use our analytical skills to deduce which brilliant but misguided mathematician stole the prize.

1. Solve each math problem. The answer is a number, and the letter beside it is what that number stands for.
2. In the clue boxes, write that letter in every box showing the same number, then read the secret clue.
3. Use each clue to cross suspects off the list. The one suspect left at the end is the culprit!

My answer: the Saboteur is _____

Possible suspects

Cross off a row as each clue rules it out. The one left at the end is the culprit.

NAME	MATHEMATICAL SPECIALTY	SIGNATURE TOOL	CHALKBOARD PREFERENCE	HAIR STYLE	CONCENTRATION BREAKER
Grigori Perelman	topology puzzles	golden slide rule	left-handed chalk work	neon hair dye	loud music
Henri Poincare	topology puzzles	fractal compass	left-handed chalk work	silver ponytail	spilled coffee
Maryam Mirzakhani	number theory	chalk holster	right-handed chalk work	neon hair dye	spilled coffee
Euclid	game theory	fractal compass	right-handed chalk work	ink-stained hair	loud music
Ada Lovelace	topology puzzles	graphing calculator	left-handed chalk work	ink-stained hair	spilled coffee
Bernhard Riemann	number theory	abacus ring	left-handed chalk work	neon hair dye	spilled coffee
Claude Shannon	number theory	golden slide rule	left-handed chalk work	neon hair dye	spilled coffee
Gottfried Leibniz	game theory	chalk holster	left-handed chalk work	ink-stained hair	spilled coffee
Pierre de Fermat	number theory	golden slide rule	left-handed chalk work	neon hair dye	broken pencils
Grace Hopper	number theory	graphing calculator	right-handed chalk work	ink-stained hair	broken pencils
Joseph Fourier	combinatorics	abacus ring	left-handed chalk work	ink-stained hair	loud music
Srinivasa Ramanujan	number theory	graphing calculator	left-handed chalk work	neon hair dye	spilled coffee
Emmy Noether	number theory	graphing calculator	left-handed chalk work	silver ponytail	spilled coffee
Leonhard Euler	calculus equations	fractal compass	right-handed chalk work	silver ponytail	loud music
John von Neumann	topology puzzles	fractal compass	right-handed chalk work	ink-stained hair	loud music
Sofia Kovalevskaya	number theory	chalk holster	left-handed chalk work	ink-stained hair	broken pencils
Terence Tao	game theory	golden slide rule	left-handed chalk work	neon hair dye	spilled coffee
Blaise Pascal	game theory	abacus ring	left-handed chalk work	neon hair dye	broken pencils
Rene Descartes	calculus equations	chalk holster	left-handed chalk work	ink-stained hair	broken pencils
Augustin Cauchy	number theory	fractal compass	left-handed chalk work	neon hair dye	spilled coffee
Carl Gauss	game theory	graphing calculator	left-handed chalk work	neon hair dye	loud music

CLUE 1
Fractions of a number

To find the suspect's lab locker number, we must calculate the exact fractional volume of water missing from the cooling tank.

Solve each problem, then write its letter in every clue box that shows the same number.

T																	T
34	16	47	20	54	7	7	2	54	37	52	49	47	8	37	49	34	
				T													
59	47	2	51	34	16	47	2	31	2	26	39	8	51	54	37	42	

$4/8 \text{ of } 68 = \square \rightarrow \text{T}$

$1/4 \text{ of } 124 = \square \rightarrow \text{B}$

$1/6 \text{ of } 12 = \square \rightarrow \text{A}$

$2/10 \text{ of } 185 = \square \rightarrow \text{N}$

$4/6 \text{ of } 12 = \square \rightarrow \text{S}$

$1/3 \text{ of } 162 = \square \rightarrow \text{I}$

$2/6 \text{ of } 156 = \square \rightarrow \text{D}$

$2/5 \text{ of } 40 = \square \rightarrow \text{H}$

$1/2 \text{ of } 98 = \square \rightarrow \text{O}$

$1/4 \text{ of } 104 = \square \rightarrow \text{C}$

$2/6 \text{ of } 126 = \square \rightarrow \text{G}$

$5/10 \text{ of } 102 = \square \rightarrow \text{R}$

$1/5 \text{ of } 195 = \square \rightarrow \text{U}$

$4/8 \text{ of } 94 = \square \rightarrow \text{E}$

$3/6 \text{ of } 40 = \square \rightarrow \text{V}$

$1/2 \text{ of } 14 = \square \rightarrow \text{L}$

$1/3 \text{ of } 177 = \square \rightarrow \text{W}$

Scratch space:

CLUE 2
Multiplication facts (1-12)

The suspect escaped down a grid of tiled hallways, and multiplying the rows reveals which floor they fled to.

Solve each problem, then write its letter in every clue box that shows the same number.

T															
64	44	100	11	88	7	10	100	27	11	100	60	100	44	63	27
								T					T		
11	44	63	8	50	54	60	64	44	100	8	100	132	64	27	7

$8 \times 8 = \square \rightarrow$ T	$11 \times 8 = \square \rightarrow$ R	$1 \times 11 = \square \rightarrow$ C	
$1 \times 10 = \square \rightarrow$ M	$11 \times 12 = \square \rightarrow$ F	$4 \times 2 = \square \rightarrow$ L	
$11 \times 11 = \square \rightarrow$ D	$9 \times 7 = \square \rightarrow$ A	$10 \times 10 = \square \rightarrow$ E	
$3 \times 9 = \square \rightarrow$ S	$1 \times 7 = \square \rightarrow$ I	$10 \times 5 = \square \rightarrow$ K	$6 \times 9 = \square \rightarrow$ O
$4 \times 11 = \square \rightarrow$ H	$6 \times 10 = \square \rightarrow$ N		

Scratch space:

CLUE 3 Rounding

A security sensor recorded the weight of the suspect's getaway bag, but the damaged screen only shows a rounded value.

Solve each problem, then write its letter in every clue box that shows the same number.

S																		S
900	1700	430	110	110	130	1100	200	370	90	90	130	130	700	500	430	1300	900	
5000	3000	130	430	700	200	370	1300	200	130	1300	5000	700	30	5000	430	370	1300	

Round 942 to the nearest hundred → **S**

Round 106 to the nearest ten → **L**

Round 126 to the nearest ten → **E**

Round 27 to the nearest ten → **A**

Round 2,578 to the nearest thousand → **H**

Round 431 to the nearest ten → **I**

Round 5,220 to the nearest thousand → **T**

Round 93 to the nearest ten → **F**

Round 1,709 to the nearest hundred → **P**

Round 1,068 to the nearest hundred → **D**

Round 693 to the nearest hundred → **R**

Round 466 to the nearest hundred → **U**

Round 373 to the nearest ten → **O**

Round 1,271 to the nearest hundred → **N**

Round 204 to the nearest hundred → **C**

Scratch space:

CLUE 4

Pythagorean theorem

We can trace the suspect's escape path across the quad by finding the hypotenuse of the right triangle they ran across.

Solve each problem, then write its letter in every clue box that shows the same number.

T										T									
125	34	40	52	123	52	65	40	5	125	34	25	52	75	40	68	75			
34	25	74	29	58	13	40													

legs 35 and 120, hypotenuse = → **T**

legs 24 and 32, hypotenuse = → **E**

legs 40 and 42, hypotenuse = → **D**

legs 7 and 24, hypotenuse = → **A**

legs 27 and 120, hypotenuse = → **U**

legs 20 and 21, hypotenuse = → **R**

legs 25 and 60, hypotenuse = → **P**

legs 32 and 60, hypotenuse = → **O**

legs 3 and 4, hypotenuse = → **C**

legs 24 and 70, hypotenuse = → **I**

legs 21 and 72, hypotenuse = → **N**

legs 16 and 30, hypotenuse = → **H**

legs 20 and 48, hypotenuse = → **S**

legs 5 and 12, hypotenuse = → **Y**

Scratch space:

CLUE 5**Fractions of a number - the last clue**

The server room logs were partially deleted, but we can piece together the timeline by solving for the remaining fraction of data.

First solve each problem. Then find each answer in the numbered list below and cross that sentence out. One sentence will be left - that is exactly what the villain did!

Step 1 - solve these:

$4/8 \text{ of } 12 = \boxed{}$

$4/8 \text{ of } 16 = \boxed{}$

$1/5 \text{ of } 20 = \boxed{}$

$1/4 \text{ of } 12 = \boxed{}$

$2/5 \text{ of } 5 = \boxed{}$

$9/10 \text{ of } 10 = \boxed{}$

$7/10 \text{ of } 10 = \boxed{}$

$2/6 \text{ of } 3 = \boxed{}$

$2/4 \text{ of } 20 = \boxed{}$

$3/4 \text{ of } 16 = \boxed{}$

$1/4 \text{ of } 20 = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain runs a combinatorics model, then draws with the fractal compass.
2. The villain cracks a number theory code, then twirls the abacus ring.
3. The villain plots a game theory trap, then programs the graphing calculator.
4. The villain plots a game theory trap, then checks the golden slide rule.
5. The villain plots a game theory trap, then twirls the abacus ring.
6. The villain cracks a number theory code, then checks the golden slide rule.
7. The villain runs a combinatorics model, then programs the graphing calculator.
8. The villain cracks a number theory code, then programs the graphing calculator.
9. The villain plots a game theory trap, then unholsters the chalk.
10. The villain solves a topology riddle, then unholsters the chalk.
11. The villain cracks a number theory code, then draws with the fractal compass.
12. The villain derives a calculus formula, then twirls the abacus ring.

Answer Key

The Riemann Hypothesis Heist

Culprit: Augustin Cauchy

number theory · fractal compass · left-handed chalk work · neon hair dye · spilled coffee

Trail: Start 21 → Clue 1 18 → Clue 2 13 → Clue 3 8 → Clue 4 4 → Clue 5 1

Clue 1 (Fractions of a number): "THE VILLAIN DOES NOT WEAR THE ABACUS RING"

$\frac{4}{8}$ of 68 = 34 (T) · $\frac{1}{4}$ of 124 = 31 (B) · $\frac{1}{6}$ of 12 = 2 (A) · $\frac{2}{10}$ of 185 = 37 (N) · $\frac{4}{6}$ of 12 = 8 (S) · $\frac{1}{3}$ of 162 = 54 (I) · $\frac{2}{6}$ of 156 = 52 (D) · $\frac{2}{5}$ of 40 = 16 (H) · $\frac{1}{2}$ of 98 = 49 (O) · $\frac{1}{4}$ of 104 = 26 (C) · $\frac{2}{6}$ of 126 = 42 (G) · $\frac{5}{10}$ of 102 = 51 (R) · $\frac{1}{5}$ of 195 = 39 (U) · $\frac{4}{8}$ of 94 = 47 (E) · $\frac{3}{6}$ of 40 = 20 (V) · $\frac{1}{2}$ of 14 = 7 (L) · $\frac{1}{3}$ of 177 = 59 (W)

Clue 2 (Multiplication facts (1-12)): "THE CRIME SCENE HAS CHALK ON THE LEFT SIDE"

$8 \times 8 = 64$ (T) · $11 \times 8 = 88$ (R) · $1 \times 11 = 11$ (C) · $1 \times 10 = 10$ (M) · $11 \times 12 = 132$ (F) · $4 \times 2 = 8$ (L) · $11 \times 11 = 121$ (D) · $9 \times 7 = 63$ (A) · $10 \times 10 = 100$ (E) · $3 \times 9 = 27$ (S) · $1 \times 7 = 7$ (I) · $10 \times 5 = 50$ (K) · $6 \times 9 = 54$ (O) · $4 \times 11 = 44$ (H) · $6 \times 10 = 60$ (N)

Clue 3 (Rounding): "SPILLED COFFEE RUINS THEIR CONCENTRATION"

Round 942 to the nearest hundred = 900 (S) · Round 106 to the nearest ten = 110 (L) · Round 126 to the nearest ten = 130 (E) · Round 27 to the nearest ten = 30 (A) · Round 2,578 to the nearest thousand = 3000 (H) · Round 431 to the nearest ten = 430 (I) · Round 5,220 to the nearest thousand = 5000 (T) · Round 93 to the nearest ten = 90 (F) · Round 1,709 to the nearest hundred = 1700 (P) · Round 1,068 to the nearest hundred = 1100 (D) · Round 693 to the nearest hundred = 700 (R) · Round 466 to the nearest hundred = 500 (U) · Round 373 to the nearest ten = 370 (O) · Round 1,271 to the nearest hundred = 1300 (N) · Round 204 to the nearest hundred = 200 (C)

Clue 4 (Pythagorean theorem): "THE SUSPECT HAS NEON HAIR DYE"

legs 35 and 120, hypotenuse = 125 (T) · legs 24 and 32, hypotenuse = 40 (E) · legs 40 and 42, hypotenuse = 58 (D) · legs 7 and 24, hypotenuse = 25 (A) · legs 27 and 120, hypotenuse = 123 (U) · legs 20 and 21, hypotenuse = 29 (R) · legs 25 and 60, hypotenuse = 65 (P) · legs 32 and 60, hypotenuse = 68 (O) · legs 3 and 4, hypotenuse = 5 (C) · legs 24 and 70, hypotenuse = 74 (I) · legs 21 and 72, hypotenuse = 75 (N) · legs 16 and 30, hypotenuse = 34 (H) · legs 20 and 48, hypotenuse = 52 (S) · legs 5 and 12, hypotenuse = 13 (Y)

Clue 5 (Fractions of a number): surviving statement is box 11 → Augustin Cauchy

$\frac{4}{8}$ of 12 = 6 · $\frac{4}{8}$ of 16 = 8 · $\frac{1}{5}$ of 20 = 4 · $\frac{1}{4}$ of 12 = 3 · $\frac{2}{5}$ of 5 = 2 · $\frac{9}{10}$ of 10 = 9 · $\frac{7}{10}$ of 10 = 7 · $\frac{2}{6}$ of 3 = 1 · $\frac{2}{4}$ of 20 = 10 · $\frac{3}{4}$ of 16 = 12 · $\frac{1}{4}$ of 20 = 5