



The Aura Archipelago Incident

Grade 8 math · Exponents, Square roots, Pythagorean theorem, Order of operations, Two-step equations · Reading level grades 7-9

Detective: _____ Date: _____

The Master Control Core of the Aura Archipelago has been overridden! A Rogue Ranger has locked the sanctuary staff inside the volcanic observatory and is planning to upload a virus to the cyber-wildlife. You have to trace the electronic footprints left across the islands to deduce which ranger committed this cyber-sabotage before the wild drones escape.

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 Rogue Ranger is _____

Possible suspects

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

NAME	SIGNATURE GEAR	TACTICAL TOOL	DEVICE ORIENTATION	HAIR STYLE	DEFENSIVE COUNTER
Ranger Dakota	Drone Swarm	Holo Projector	Right Handed Tech	Spiky Neon Blue	EMP Grenade
Ranger Quinn	Sonic Decoy	Net Launcher	Right Handed Tech	Braid Fire Orange	Water Splashes
Ranger Dallas	Drone Swarm	Glider Wings	Left Handed Tech	Shaved Silver	Magnetic Field
Ranger Skyler	Drone Swarm	Holo Projector	Left Handed Tech	Shaved Silver	EMP Grenade
Ranger Hayden	Camo Cloak	Net Launcher	Left Handed Tech	Shaved Silver	EMP Grenade
Ranger Morgan	Hover Boots	Laser Torch	Left Handed Tech	Spiky Neon Blue	Water Splashes
Ranger Emery	Camo Cloak	Glider Wings	Left Handed Tech	Braid Fire Orange	Magnetic Field
Ranger Rowan	Sonic Decoy	Net Launcher	Right Handed Tech	Shaved Silver	Magnetic Field
Ranger Casey	Camo Cloak	Laser Torch	Left Handed Tech	Shaved Silver	Magnetic Field
Ranger Reagan	Sonic Decoy	Net Launcher	Left Handed Tech	Shaved Silver	Magnetic Field
Ranger Finley	Camo Cloak	Glider Wings	Right Handed Tech	Shaved Silver	Magnetic Field
Ranger Carter	Camo Cloak	Laser Torch	Right Handed Tech	Spiky Neon Blue	Water Splashes
Ranger Harlow	Hover Boots	Holo Projector	Right Handed Tech	Shaved Silver	Magnetic Field
Ranger Sawyer	Pulse Grapple	Glider Wings	Right Handed Tech	Braid Fire Orange	Magnetic Field
Ranger Taylor	Pulse Grapple	Net Launcher	Left Handed Tech	Spiky Neon Blue	Water Splashes
Ranger Hunter	Sonic Decoy	Net Launcher	Left Handed Tech	Shaved Silver	EMP Grenade
Ranger Reese	Camo Cloak	Shock Gloves	Left Handed Tech	Shaved Silver	Magnetic Field
Ranger Bailey	Pulse Grapple	Net Launcher	Left Handed Tech	Braid Fire Orange	EMP Grenade
Ranger Avery	Camo Cloak	Net Launcher	Left Handed Tech	Shaved Silver	Magnetic Field
Ranger Parker	Camo Cloak	Net Launcher	Left Handed Tech	Spiky Neon Blue	Magnetic Field
Ranger Peyton	Pulse Grapple	Glider Wings	Right Handed Tech	Spiky Neon Blue	Magnetic Field

CLUE 1 Exponents

You discover a locked digital safe containing the suspect's original gear list. The security passcode is hidden in an exponent puzzle where the storage capacity doubles at every level. Calculate the final value to crack the safe.

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

T			T					T							T			
729	36	343	729	64	441	81	343	729	289	27	343	361	484	27	729	4	361	343

						T				
64	225	64	361	343	441	729	27	441	32	36

$9^3 = \square \rightarrow \text{T}$	$3^4 = \square \rightarrow \text{G}$	$22^2 = \square \rightarrow \text{N}$	$2^6 = \square \rightarrow \text{A}$
$15^2 = \square \rightarrow \text{L}$	$6^2 = \square \rightarrow \text{H}$	$3^3 = \square \rightarrow \text{O}$	$2^5 = \square \rightarrow \text{C}$
$21^2 = \square \rightarrow \text{R}$	$17^2 = \square \rightarrow \text{D}$	$7^3 = \square \rightarrow \text{E}$	$19^2 = \square \rightarrow \text{S}$
$2^2 = \square \rightarrow \text{U}$			

Scratch space:

CLUE 2
Square roots

To map the area where the suspect was spotted, you must divide the quadrant into a perfect square grid.
Calculate the side length from the total grid area to pinpoint the exact search coordinates.

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

L																			
7	23	9	10	4	15	18	11	23	11	24	18	10	23	6	9	15	8	23	14
13	23	6	23	15	8	10	24	3	15	10	23	11							

$\sqrt{49} = \square \rightarrow \boxed{\text{L}}$

$\sqrt{324} = \square \rightarrow \boxed{\text{N}}$

$\sqrt{16} = \square \rightarrow \boxed{\text{H}}$

$\sqrt{196} = \square \rightarrow \boxed{\text{S}}$

$\sqrt{529} = \square \rightarrow \boxed{\text{E}}$

$\sqrt{64} = \square \rightarrow \boxed{\text{C}}$

$\sqrt{121} = \square \rightarrow \boxed{\text{D}}$

$\sqrt{225} = \square \rightarrow \boxed{\text{A}}$

$\sqrt{169} = \square \rightarrow \boxed{\text{W}}$

$\sqrt{81} = \square \rightarrow \boxed{\text{F}}$

$\sqrt{36} = \square \rightarrow \boxed{\text{R}}$

$\sqrt{100} = \square \rightarrow \boxed{\text{T}}$

$\sqrt{9} = \square \rightarrow \boxed{\text{V}}$

$\sqrt{576} = \square \rightarrow \boxed{\text{I}}$

Scratch space:

CLUE 3

Pythagorean theorem

The suspect fled diagonally across a steep, rocky ravine. You can estimate the length of their escape cable by treating the drop height and horizontal distance as the legs of a right triangle.

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

A		A												
75	58	75	13	52	26	41	40	15	10	40	26	29	17	
		A								A				
41	39	75	37	37	26	17	41	51	26	39	75	52	13	26

legs 21 and 72, hypotenuse = → **A**

legs 6 and 8, hypotenuse = → **F**

legs 10 and 24, hypotenuse = → **E**

legs 9 and 40, hypotenuse = → **T**

legs 8 and 15, hypotenuse = → **D**

legs 5 and 12, hypotenuse = → **G**

legs 20 and 48, hypotenuse = → **N**

legs 40 and 42, hypotenuse = → **M**

legs 24 and 32, hypotenuse = → **I**

legs 24 and 45, hypotenuse = → **H**

legs 9 and 12, hypotenuse = → **C**

legs 12 and 35, hypotenuse = → **P**

legs 20 and 21, hypotenuse = → **L**

legs 15 and 36, hypotenuse = → **R**

Scratch space:

CLUE 4 Order of operations

You recover a damaged encrypted logbook from the forest floor. You must solve the multi-step calculation on the keypad, following the strict hierarchy of operations, to unlock the decrypted text.

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

S						S						S						S
64	43	115	71	102	23	64	81	114	71	102	19	64	51	19	115	13	23	64
50	114	87	100	100	102	23	51	43	102	71	102	13	51					

$58 + 2 \times 3 = \square \rightarrow$ S	$37 + 3 \times 2 = \square \rightarrow$ H	$4 \times 12 - 25 = \square \rightarrow$ D
$9 \times 8 - 21 = \square \rightarrow$ T	$5 + 2 \times 4 = \square \rightarrow$ N	$12 \times 12 - 30 = \square \rightarrow$ L
$12 \times 10 - 18 = \square \rightarrow$ E	$3 \times 12 - 17 = \square \rightarrow$ R	$10 \times 12 - 5 = \square \rightarrow$ A
$29 + 7 \times 3 = \square \rightarrow$ C	$12 \times 9 - 27 = \square \rightarrow$ I	$11 \times 10 - 23 = \square \rightarrow$ O
$88 + 6 \times 2 = \square \rightarrow$ G	$67 + 2 \times 2 = \square \rightarrow$ V	

Scratch space:

CLUE 5**Two-step equations - the last clue**

The suspect's mechanical tracking signal is fading fast. Set up and solve the equation representing their speed and the distance they had already traveled to determine exactly when they will reach the coast.

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:

$4x + 1 = 9, x = \boxed{}$

$5x + 4 = 54, x = \boxed{}$

$6x + 4 = 52, x = \boxed{}$

$5x + 4 = 64, x = \boxed{}$

$5x + 5 = 10, x = \boxed{}$

$3x + 9 = 42, x = \boxed{}$

$5x + 6 = 26, x = \boxed{}$

$4x + 12 = 32, x = \boxed{}$

$5x + 10 = 45, x = \boxed{}$

$4x + 8 = 32, x = \boxed{}$

$2x + 2 = 8, x = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain breaches the volcanic database, then vanishes into the dense jungle foliage.
2. The villain locks down the research compound, then slips through the drainage canal.
3. The villain disables the main power grid, then flees across the lava bridge.
4. The villain disables the main power grid, then vanishes into the dense jungle foliage.
5. The villain scrambles the animal tracking system, then flees across the lava bridge.
6. The villain locks down the research compound, then flees across the lava bridge.
7. The villain locks down the research compound, then escapes on a high-speed hoverbike.
8. The villain overrides the security gates, then zips away using a line launcher.
9. The villain overrides the security gates, then slips through the drainage canal.
10. The villain breaches the volcanic database, then flees across the lava bridge.
11. The villain scrambles the animal tracking system, then zips away using a line launcher.
12. The villain overrides the security gates, then flees across the lava bridge.

Answer Key

The Aura Archipelago Incident

Culprit: Ranger Avery

Camo Cloak · Net Launcher · Left Handed Tech · Shaved Silver · Magnetic Field

Trail: Start 21 → Clue 1 18 → Clue 2 11 → Clue 3 6 → Clue 4 4 → Clue 5 1

Clue 1 (Exponents): "THE TARGET DOES NOT USE A LASER TORCH"

$9^3 = 729$ (T) · $3^4 = 81$ (G) · $22^2 = 484$ (N) · $2^6 = 64$ (A) · $15^2 = 225$ (L) · $6^2 = 36$ (H) · $3^3 = 27$ (O) · $2^5 = 32$ (C) · $21^2 = 441$ (R) · $17^2 = 289$ (D) · $7^3 = 343$ (E) · $19^2 = 361$ (S) · $2^2 = 4$ (U)

Clue 2 (Square roots): "LEFT HANDED INTERFACES WERE ACTIVATED"

$\sqrt{49} = 7$ (L) · $\sqrt{324} = 18$ (N) · $\sqrt{16} = 4$ (H) · $\sqrt{196} = 14$ (S) · $\sqrt{529} = 23$ (E) · $\sqrt{64} = 8$ (C) · $\sqrt{121} = 11$ (D) · $\sqrt{225} = 15$ (A) · $\sqrt{169} = 13$ (W) · $\sqrt{81} = 9$ (F) · $\sqrt{36} = 6$ (R) · $\sqrt{100} = 10$ (T) · $\sqrt{9} = 3$ (V) · $\sqrt{576} = 24$ (I)

Clue 3 (Pythagorean theorem): "A MAGNETIC FIELD TRAPPED THE RANGER"

legs 21 and 72, hypotenuse = 75 (A) · legs 6 and 8, hypotenuse = 10 (F) · legs 10 and 24, hypotenuse = 26 (E) · legs 9 and 40, hypotenuse = 41 (T) · legs 8 and 15, hypotenuse = 17 (D) · legs 5 and 12, hypotenuse = 13 (G) · legs 20 and 48, hypotenuse = 52 (N) · legs 40 and 42, hypotenuse = 58 (M) · legs 24 and 32, hypotenuse = 40 (I) · legs 24 and 45, hypotenuse = 51 (H) · legs 9 and 12, hypotenuse = 15 (C) · legs 12 and 35, hypotenuse = 37 (P) · legs 20 and 21, hypotenuse = 29 (L) · legs 15 and 36, hypotenuse = 39 (R)

Clue 4 (Order of operations): "SHAVED SILVER STRANDS CLOGGED THE VENT"

$58 + 2 \times 3 = 64$ (S) · $37 + 3 \times 2 = 43$ (H) · $4 \times 12 - 25 = 23$ (D) · $9 \times 8 - 21 = 51$ (T) · $5 + 2 \times 4 = 13$ (N) · $12 \times 12 - 30 = 114$ (L) · $12 \times 10 - 18 = 102$ (E) · $3 \times 12 - 17 = 19$ (R) · $10 \times 12 - 5 = 115$ (A) · $29 + 7 \times 3 = 50$ (C) · $12 \times 9 - 27 = 81$ (I) · $11 \times 10 - 23 = 87$ (O) · $88 + 6 \times 2 = 100$ (G) · $67 + 2 \times 2 = 71$ (V)

Clue 5 (Two-step equations): surviving statement is box 9 → Ranger Avery

$4x + 1 = 9, x = 2$ · $5x + 4 = 54, x = 10$ · $6x + 4 = 52, x = 8$ · $5x + 4 = 64, x = 12$ · $5x + 5 = 10, x = 1$ · $3x + 9 = 42, x = 11$ · $5x + 6 = 26, x = 4$ · $4x + 12 = 32, x = 5$ · $5x + 10 = 45, x = 7$ · $4x + 8 = 32, x = 6$ · $2x + 2 = 8, x = 3$