



The Sub-Oceanic Heist

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

Detective: _____ Date: _____

An alarm echoes through the metallic halls of Outpost Lambda. Someone has breached the deep-sea vault and stolen the Poseidon Core! As the leading marine detective, you must analyze the sonar logs and gear signatures before the thief escapes into the black abyss.

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 Abyssal Rogue is _____

Possible suspects

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

NAME	PRIMARY GEAR	AUXILIARY TOOL	DIVE WATCH WRIST	WETSUIT HOOD	SIREN SONG FREQ
Jeanne Baret	Heavy Harpoon	Flashlight	Left Wrist Watch	Kelp Green	Low Hum
Matthew Maury	Seismic Probe	Flashlight	Right Wrist Watch	Sandy Blonde	Deep Bass
Edward Forbes	Hydro-Thruster	Coral Hook	Left Wrist Watch	Kelp Green	Deep Bass
Mary Anning	Plasma Cutter	Scanner	Left Wrist Watch	Kelp Green	High Pitch
Marie Tharp	Heavy Harpoon	Flashlight	Right Wrist Watch	Kelp Green	High Pitch
Alistair Hardy	Plasma Cutter	Laser Pointer	Left Wrist Watch	Kelp Green	High Pitch
Henry Bryant	Plasma Cutter	Coral Hook	Right Wrist Watch	Deep Navy	Deep Bass
Charles Darwin	Triton Net	Coral Hook	Left Wrist Watch	Sandy Blonde	Deep Bass
Jacques Cousteau	Plasma Cutter	Laser Pointer	Left Wrist Watch	Kelp Green	Deep Bass
David Attenborough	Hydro-Thruster	Laser Pointer	Right Wrist Watch	Kelp Green	Deep Bass
Vagn Ekman	Plasma Cutter	Scanner	Left Wrist Watch	Deep Navy	Low Hum
Hans Hass	Heavy Harpoon	Sonar Flare	Left Wrist Watch	Kelp Green	Deep Bass
Eugenie Clark	Plasma Cutter	Coral Hook	Right Wrist Watch	Deep Navy	High Pitch
Walter Munk	Plasma Cutter	Flashlight	Left Wrist Watch	Kelp Green	Deep Bass
Sylvia Earle	Heavy Harpoon	Sonar Flare	Left Wrist Watch	Sandy Blonde	High Pitch
Nancy Foster	Heavy Harpoon	Flashlight	Left Wrist Watch	Kelp Green	Deep Bass
Cindy Lee Van	Seismic Probe	Scanner	Left Wrist Watch	Sandy Blonde	Deep Bass
Ernest Shackleton	Seismic Probe	Scanner	Right Wrist Watch	Deep Navy	High Pitch
Robert Ballard	Triton Net	Sonar Flare	Right Wrist Watch	Deep Navy	Low Hum
James Cameron	Hydro-Thruster	Scanner	Left Wrist Watch	Deep Navy	High Pitch
Rachel Carson	Hydro-Thruster	Sonar Flare	Left Wrist Watch	Kelp Green	Low Hum

CLUE 1

The deep-sea pressure sensors recorded an exponential energy spike in the water. By calculating the power of the base reading, we can determine the first clue.

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

[illegible]

$$21^2 = \boxed{} \rightarrow \boxed{\text{T}}$$

$$2^6 = \boxed{} \rightarrow \boxed{\text{D}}$$

$$3^3 = \boxed{} \rightarrow \boxed{\text{R}}$$

$$16^2 = \boxed{} \rightarrow \boxed{\mathbf{S}}$$

$$20^2 = \boxed{} \rightarrow \boxed{\text{C}}$$

$2^9 = \boxed{} \rightarrow \boxed{\mathbf{F}}$

$$3^4 = \boxed{} \rightarrow \boxed{\text{P}}$$

$$5^3 = \boxed{} \rightarrow \boxed{\text{U}}$$

$$15^2 = \boxed{} \rightarrow \boxed{\text{L}}$$

$$7^3 = \boxed{} \rightarrow \boxed{0}$$

$$22^2 = \boxed{} \rightarrow \boxed{\text{H}}$$

$$2^7 = \boxed{} \rightarrow \mathbf{A}$$

$$11^2 = \boxed{} \rightarrow \boxed{\text{N}}$$

$$6^2 = \boxed{} \rightarrow \boxed{\text{E}}$$

Scratch space:

CLUE 2 Square roots

We mapped the square grid of the flooded ruins where the thief escaped. Solving for the square root of the total area will reveal the suspect's watch preference.

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

T																	
24	2	18	17	5	23	17	18	16	5	12	12	18	4	23	20	18	7
		T						T						T			
21	11	24	2	18	13	18	8	24	16	20	6	12	24				

$$\sqrt{576} = \boxed{} \rightarrow \boxed{\text{T}}$$

$$\sqrt{36} = \boxed{} \rightarrow \boxed{\text{I}}$$

$$\sqrt{529} = \boxed{} \rightarrow \boxed{\text{U}}$$

$$\sqrt{49} = \boxed{} \rightarrow \boxed{\text{D}}$$

$$\sqrt{25} = \boxed{} \rightarrow \boxed{\text{A}}$$

$$\sqrt{400} = \boxed{} \rightarrow \boxed{\text{R}}$$

$$\sqrt{324} = \boxed{} \rightarrow \boxed{\text{E}}$$

$$\sqrt{64} = \boxed{} \rightarrow \boxed{\text{F}}$$

$$\sqrt{256} = \boxed{} \rightarrow \boxed{\text{W}}$$

$$\sqrt{289} = \boxed{} \rightarrow \boxed{\text{G}}$$

$$\sqrt{441} = \boxed{} \rightarrow \boxed{\text{O}}$$

$$\sqrt{169} = \boxed{} \rightarrow \boxed{\text{L}}$$

$$\sqrt{144} = \boxed{} \rightarrow \boxed{\text{S}}$$

$$\sqrt{121} = \boxed{} \rightarrow \boxed{\text{N}}$$

$$\sqrt{4} = \boxed{} \rightarrow \boxed{\text{H}}$$

$$\sqrt{16} = \boxed{} \rightarrow \boxed{\text{C}}$$

Scratch space:

CLUE 3

Pythagorean theorem

Our submarine chased the thief along a diagonal path across the trench. Finding the hypotenuse of our dive path gives us the exact frequency needed to stop them.

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

T																			
37	5	13	40	10	58	58	26	10	34	51	5	30	26	34	39	82	30	87	17
26	15	13	13	52	29	26	51	51											

legs 12 and 35, hypotenuse = → **T**

legs 15 and 36, hypotenuse = → **K**

legs 18 and 24, hypotenuse = → **R**

legs 40 and 42, hypotenuse = → **L**

legs 20 and 21, hypotenuse = → **B**

legs 24 and 32, hypotenuse = → **V**

legs 8 and 15, hypotenuse = → **M**

legs 5 and 12, hypotenuse = → **E**

legs 16 and 30, hypotenuse = → **N**

legs 3 and 4, hypotenuse = → **H**

legs 60 and 63, hypotenuse = → **O**

legs 10 and 24, hypotenuse = → **A**

legs 24 and 45, hypotenuse = → **S**

legs 20 and 48, hypotenuse = → **P**

legs 6 and 8, hypotenuse = → **I**

legs 18 and 80, hypotenuse = → **F**

legs 9 and 12, hypotenuse = → **D**

Scratch space:

CLUE 4

Order of operations

A damaged underwater tablet contains encrypted gear logs. By following the correct order of operations, we can decode the wetsuit hood color left behind.

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

A																			
27	62	94	48	55	89	26	94	94	9	33	38	26	27	9	88	80	27	33	
						A													
85	9	38	77	94	41	27	48	41	94										

$9 \times 5 - 18 = \square \rightarrow \boxed{\text{A}}$

$11 \times 10 - 22 = \square \rightarrow \boxed{\text{D}}$

$6 \times 9 - 16 = \square \rightarrow \boxed{\text{T}}$

$12 \times 10 - 26 = \square \rightarrow \boxed{\text{E}}$

$26 + 9 \times 4 = \square \rightarrow \boxed{\text{K}}$

$9 \times 8 - 24 = \square \rightarrow \boxed{\text{L}}$

$10 \times 11 - 21 = \square \rightarrow \boxed{\text{G}}$

$9 \times 3 - 18 = \square \rightarrow \boxed{\text{N}}$

$5 + 7 \times 3 = \square \rightarrow \boxed{\text{R}}$

$38 + 6 \times 7 = \square \rightarrow \boxed{\text{W}}$

$11 \times 6 - 25 = \square \rightarrow \boxed{\text{V}}$

$11 \times 5 - 22 = \square \rightarrow \boxed{\text{S}}$

$10 \times 10 - 15 = \square \rightarrow \boxed{\text{I}}$

$11 \times 8 - 11 = \square \rightarrow \boxed{\text{H}}$

$40 + 3 \times 5 = \square \rightarrow \boxed{\text{P}}$

Scratch space:

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

We need to calculate how fast the thief's mini-sub is draining its battery over time. Solving this two-step equation isolates the thief's identity.

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:

$4x + 6 = 30, x = \boxed{}$

$3x + 9 = 30, x = \boxed{}$

$6x + 4 = 10, x = \boxed{}$

$3x + 6 = 33, x = \boxed{}$

$5x + 3 = 58, x = \boxed{}$

$4x + 12 = 20, x = \boxed{}$

$4x + 12 = 52, x = \boxed{}$

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

$4x + 11 = 23, x = \boxed{}$

$6x + 3 = 33, x = \boxed{}$

$4x + 12 = 44, x = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain ignited a plasma cutter to slice the hatch, then blinded the security cameras with a flashlight.
2. The villain fired a heavy harpoon to crack the vault, then detonated a sonar flare to scramble the radar.
3. The villain fired a heavy harpoon to crack the vault, then snagged the ancient pearl using a coral hook.
4. The villain planted a seismic probe near the foundation, then snagged the ancient pearl using a coral hook.
5. The villain ignited a plasma cutter to slice the hatch, then hacked the ocean lab console with a scanner.
6. The villain ignited a plasma cutter to slice the hatch, then swept the dark waters with a laser pointer.
7. The villain fired a heavy harpoon to crack the vault, then blinded the security cameras with a flashlight.
8. The villain cast a triton net to trap the reef guardian, then swept the dark waters with a laser pointer.
9. The villain cast a triton net to trap the reef guardian, then blinded the security cameras with a flashlight.
10. The villain planted a seismic probe near the foundation, then detonated a sonar flare to scramble the radar.
11. The villain revved a hydro-thruster to blast the gate, then swept the dark waters with a laser pointer.
12. The villain revved a hydro-thruster to blast the gate, then snagged the ancient pearl using a coral hook.

Answer Key

The Sub-Oceanic Heist

Culprit: Edward Forbes

Hydro-Thruster · Coral Hook · Left Wrist Watch · Kelp Green · Deep Bass

Trail: Start 21 → Clue 1 17 → Clue 2 11 → Clue 3 6 → Clue 4 4 → Clue 5 1

Clue 1 (Exponents): "THE SUSPECT DOES NOT USE A SONAR FLARE"

$21^2 = 441$ (T) · $2^6 = 64$ (D) · $3^3 = 27$ (R) · $16^2 = 256$ (S) · $20^2 = 400$ (C) · $2^9 = 512$ (F) · $3^4 = 81$ (P) · $5^3 = 125$ (U) · $15^2 = 225$ (L) · $7^3 = 343$ (O) · $22^2 = 484$ (H) · $2^7 = 128$ (A) · $11^2 = 121$ (N) · $6^2 = 36$ (E)

Clue 2 (Square roots): "THE GAUGE WAS SECURED ON THE LEFT WRIST"

$\sqrt{576} = 24$ (T) · $\sqrt{36} = 6$ (I) · $\sqrt{529} = 23$ (U) · $\sqrt{49} = 7$ (D) · $\sqrt{25} = 5$ (A) · $\sqrt{400} = 20$ (R) · $\sqrt{324} = 18$ (E) · $\sqrt{64} = 8$ (F) · $\sqrt{256} = 16$ (W) · $\sqrt{289} = 17$ (G) · $\sqrt{441} = 21$ (O) · $\sqrt{169} = 13$ (L) · $\sqrt{144} = 12$ (S) · $\sqrt{121} = 11$ (N) · $\sqrt{4} = 2$ (H) · $\sqrt{16} = 4$ (C)

Clue 3 (Pythagorean theorem): "THE VILLAIN SHRANK FROM A DEEP BASS"

legs 12 and 35, hypotenuse = 37 (T) · legs 15 and 36, hypotenuse = 39 (K) · legs 18 and 24, hypotenuse = 30 (R) · legs 40 and 42, hypotenuse = 58 (L) · legs 20 and 21, hypotenuse = 29 (B) · legs 24 and 32, hypotenuse = 40 (V) · legs 8 and 15, hypotenuse = 17 (M) · legs 5 and 12, hypotenuse = 13 (E) · legs 16 and 30, hypotenuse = 34 (N) · legs 3 and 4, hypotenuse = 5 (H) · legs 60 and 63, hypotenuse = 87 (O) · legs 10 and 24, hypotenuse = 26 (A) · legs 24 and 45, hypotenuse = 51 (S) · legs 20 and 48, hypotenuse = 52 (P) · legs 6 and 8, hypotenuse = 10 (I) · legs 18 and 80, hypotenuse = 82 (F) · legs 9 and 12, hypotenuse = 15 (D)

Clue 4 (Order of operations): "A KELP GREEN STRAND WAS IN THE VALVE"

$9 \times 5 - 18 = 27$ (A) · $11 \times 10 - 22 = 88$ (D) · $6 \times 9 - 16 = 38$ (T) · $12 \times 10 - 26 = 94$ (E) · $26 + 9 \times 4 = 62$ (K) · $9 \times 8 - 24 = 48$ (L) · $10 \times 11 - 21 = 89$ (G) · $9 \times 3 - 18 = 9$ (N) · $5 + 7 \times 3 = 26$ (R) · $38 + 6 \times 7 = 80$ (W) · $11 \times 6 - 25 = 41$ (V) · $11 \times 5 - 22 = 33$ (S) · $10 \times 10 - 15 = 85$ (I) · $11 \times 8 - 11 = 77$ (H) · $40 + 3 \times 5 = 55$ (P)

Clue 5 (Two-step equations): surviving statement is box 12 → Edward Forbes

$4x + 6 = 30, x = 6$ · $3x + 9 = 30, x = 7$ · $6x + 4 = 10, x = 1$ · $3x + 6 = 33, x = 9$ · $5x + 3 = 58, x = 11$ · $4x + 12 = 20, x = 2$ · $4x + 12 = 52, x = 10$ · $5x + 6 = 26, x = 4$ · $4x + 11 = 23, x = 3$ · $6x + 3 = 33, x = 5$ · $4x + 12 = 44, x = 8$