# The Sanctuary Seagrass Mystery

Grade 7 math · Integers, Percentages, Order of operations, Exponents, Two-step equations · Reading level grades 7-9

**Detective:** _____ **Date:** _____

Someone tampered with the hydrophones and stole the fresh seagrass supplies meant for rescued manatees. Detective, examine the clues and track down the suspect.

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 sanctuary saboteur is** _____

## Possible suspects

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

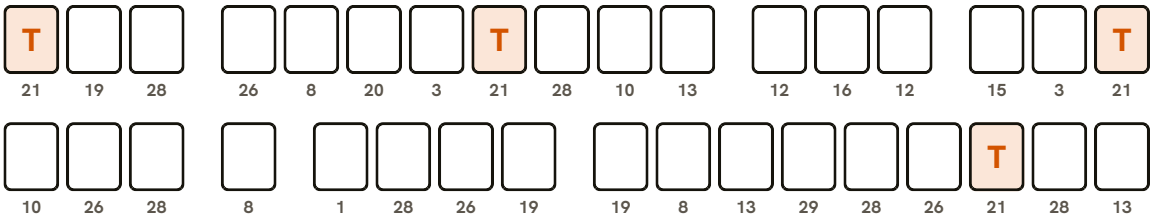
| NAME | PRIMARY GADGET | MARINE GEAR | DOMINANT HAND | HEADGEAR TRAIL | DETERRENT |
|---|---|---|---|---|---|
| **Marina Vega** | Water Jet Pack | Neoprene Suit | Left Handed | Silver Hair Clip | Seagrass Snack |
| **Victor Cruz** | Sonar Tracker | Kevlar Fins | Left Handed | Silver Hair Clip | Acoustic Whistle |
| **Grace Hopper** | Sonar Tracker | Kevlar Fins | Left Handed | Silver Hair Clip | Seagrass Snack |
| **Captain Jonah Reed** | Submersible Drone | Turbo Scooter | Left Handed | Braided Paracord | Warm Water Spray |
| **Felix Dupont** | Thermal Scanner | Kevlar Fins | Left Handed | Silver Hair Clip | Warm Water Spray |
| **Derek Brooks** | Thermal Scanner | Turbo Scooter | Left Handed | Silver Hair Clip | Warm Water Spray |
| **Kai Tani** | Thermal Scanner | Turbo Scooter | Left Handed | Silver Hair Clip | Seagrass Snack |
| **Hugo Morales** | Thermal Scanner | Mesh Harvester | Right Handed | Braided Paracord | Warm Water Spray |
| **Elena Rostova** | Water Jet Pack | Mesh Harvester | Left Handed | Neon Snorkel Strap | Acoustic Whistle |
| **Tessa Wright** | Hydrophone Array | Mesh Harvester | Left Handed | Silver Hair Clip | Warm Water Spray |
| **Marcus Vance** | Thermal Scanner | Dive Beacon | Left Handed | Braided Paracord | Seagrass Snack |
| **Olivia Chen** | Water Jet Pack | Kevlar Fins | Left Handed | Silver Hair Clip | Warm Water Spray |
| **Leo Sterling** | Submersible Drone | Kevlar Fins | Right Handed | Neon Snorkel Strap | Acoustic Whistle |
| **Hannah Abbott** | Submersible Drone | Mesh Harvester | Left Handed | Silver Hair Clip | Warm Water Spray |
| **Samira Khan** | Thermal Scanner | Mesh Harvester | Left Handed | Neon Snorkel Strap | Seagrass Snack |
| **Aisha Patel** | Sonar Tracker | Turbo Scooter | Right Handed | Silver Hair Clip | Warm Water Spray |
| **Sarah Jenkins** | Hydrophone Array | Neoprene Suit | Right Handed | Silver Hair Clip | Acoustic Whistle |
| **Dylan Mercer** | Thermal Scanner | Neoprene Suit | Left Handed | Silver Hair Clip | Warm Water Spray |
| **Naomi Nagata** | Sonar Tracker | Dive Beacon | Left Handed | Braided Paracord | Warm Water Spray |
| **Dr Maya Lin** | Thermal Scanner | Mesh Harvester | Left Handed | Silver Hair Clip | Seagrass Snack |
| **Julian Ross** | Water Jet Pack | Neoprene Suit | Left Handed | Neon Snorkel Strap | Warm Water Spray |

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## CLUE 1 Integers

> The temperature logs in the manatee rehabilitation pool registered sudden positive and negative shifts during the breach.

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




8 - (-13) = ☐ → T

(-13) + 16 = ☐ → O

8 - (-8) = ☐ → I

(-5) + 20 = ☐ → N

(-10) + 39 = ☐ → V

(-15) + 16 = ☐ → M

(-15) + 28 = ☐ → R

(-2) + 22 = ☐ → B

(-4) + 14 = ☐ → U

(-11) + 19 = ☐ → A

11 - (-15) = ☐ → S

(-14) + 26 = ☐ → D

(-11) + 39 = ☐ → E

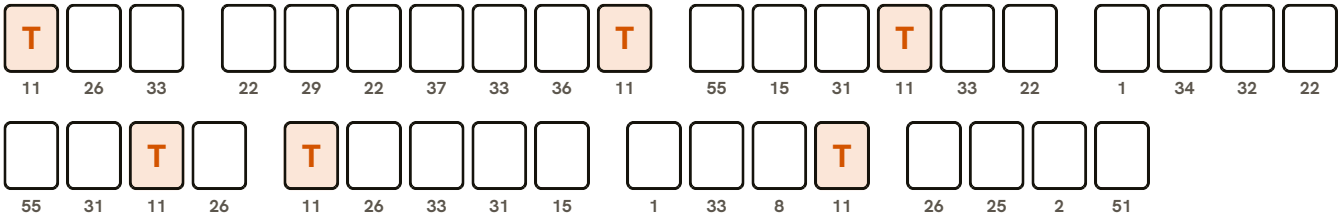
5 - (-14) = ☐ → H

Scratch space:

## CLUE 2 Percentages

A digital tally of the missing seagrass bundles showed precise percentage drop-offs across three storage bays.

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




50% of 22 = ☐ → T

25% of 100 = ☐ → A

40% of 80 = ☐ → G

50% of 52 = ☐ → H

20% of 170 = ☐ → O

10% of 220 = ☐ → S

10% of 310 = ☐ → I

5% of 160 = ☐ → F

10% of 150 = ☐ → R

10% of 510 = ☐ → D

25% of 148 = ☐ → P

20% of 275 = ☐ → W

75% of 48 = ☐ → C

5% of 580 = ☐ → U

25% of 4 = ☐ → L

5% of 40 = ☐ → N

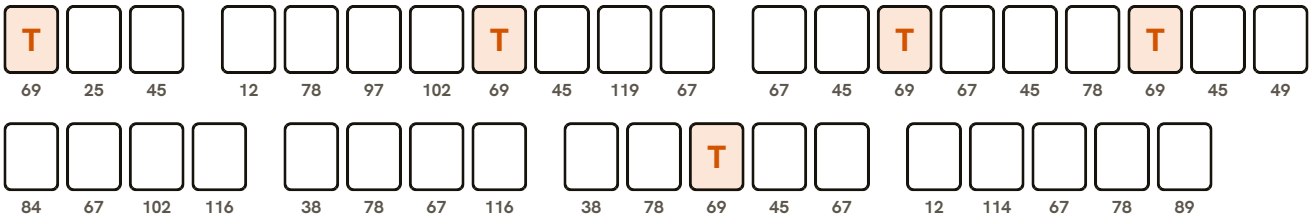
60% of 55 = ☐ → E

Scratch space:

## CLUE 3 Order of operations

> The automated hydrophone diagnostic grid processed sensor equations using strict mathematical priority to pinpoint signals.

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




53 + 8 × 2 = ☐ → T

10 × 11 - 21 = ☐ → Y

37 + 6 × 2 = ☐ → D

12 × 9 - 11 = ☐ → B

3 × 6 - 6 = ☐ → S

11 × 9 - 15 = ☐ → F

8 × 6 - 10 = ☐ → W

12 × 6 - 5 = ☐ → R

10 + 7 × 5 = ☐ → E

75 + 3 × 9 = ☐ → O

7 + 9 × 2 = ☐ → H

12 × 10 - 4 = ☐ → M

12 × 10 - 1 = ☐ → U

12 × 12 - 30 = ☐ → P

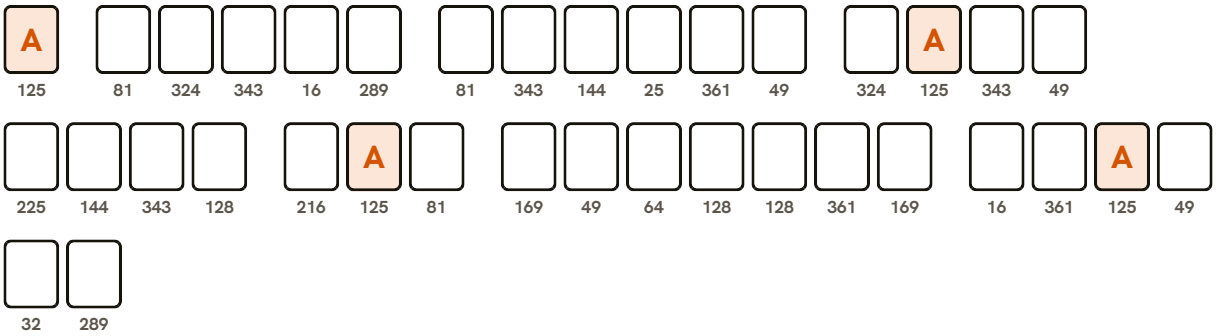
68 + 2 × 5 = ☐ → A

Scratch space:

## CLUE 4 Exponents

> Data rates from the underwater tracking beacons multiplied exponentially as the intruder fled through the canal.

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




5^3 = ☐ → A

12^2 = ☐ → L

15^2 = ☐ → C

7^3 = ☐ → I

2^7 = ☐ → P

13^2 = ☐ → D

7^2 = ☐ → R

5^2 = ☐ → V

4^2 = ☐ → N

2^5 = ☐ → B

3^4 = ☐ → S

6^3 = ☐ → W

17^2 = ☐ → Y

18^2 = ☐ → H

19^2 = ☐ → E

2^6 = ☐ → O

Scratch space:

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

> Analyzing the pressure readings in the main water valve required solving a two-step formula to uncover hidden location coordinates.

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:**

| | | | |
|---|---|---|---|
| 6x + 12 = 54, x = ☐ | 6x + 1 = 55, x = ☐ | 4x + 6 = 54, x = ☐ | 5x + 5 = 55, x = ☐ |
| 3x + 2 = 26, x = ☐ | 5x + 1 = 16, x = ☐ | 3x + 3 = 15, x = ☐ | 2x + 1 = 11, x = ☐ |
| 4x + 2 = 46, x = ☐ | 6x + 10 = 46, x = ☐ | 2x + 8 = 12, x = ☐ | |

**Step 2 - cross out the sentence with each answer:**

1. The villain scanned with the thermal scanner, then zipped up the neoprene suit.
2. The villain deployed the submersible drone, then loaded the mesh harvester.
3. The villain activated the sonar tracker, then strapped on the kevlar fins.
4. The villain fired up the water jet pack, then switched on the dive beacon.
5. The villain fired up the water jet pack, then loaded the mesh harvester.
6. The villain deployed the submersible drone, then switched on the dive beacon.
7. The villain scanned with the thermal scanner, then strapped on the kevlar fins.
8. The villain activated the sonar tracker, then revved the turbo scooter.
9. The villain fired up the water jet pack, then strapped on the kevlar fins.
10. The villain rigged the hydrophone array, then revved the turbo scooter.
11. The villain activated the sonar tracker, then zipped up the neoprene suit.
12. The villain scanned with the thermal scanner, then revved the turbo scooter.

TEACHER / PARENT

# Answer Key

The Sanctuary Seagrass Mystery

## Culprit: Dylan Mercer

Thermal Scanner · Neoprene Suit · Left Handed · Silver Hair Clip · Warm Water Spray

Trail: Start 21 → Clue 1 15 → Clue 2 12 → Clue 3 7 → Clue 4 4 → Clue 5 1

### Clue 1 (Integers): "THE SABOTEUR DID NOT USE A MESH HARVESTER"

8 - (-13) = 21 (T) · (-13) + 16 = 3 (O) · 8 - (-8) = 16 (I) · (-5) + 20 = 15 (N) · (-10) + 39 = 29 (V) · (-15) + 16 = 1 (M) · (-15) + 28 = 13 (R) · (-2) + 22 = 20 (B) · (-4) + 14 = 10 (U) · (-11) + 19 = 8 (A) · 11 - (-15) = 26 (S) · (-14) + 26 = 12 (D) · (-11) + 39 = 28 (E) · 5 - (-14) = 19 (H)

### Clue 2 (Percentages): "THE SUSPECT WRITES LOGS WITH THEIR LEFT HAND"

50% of 22 = 11 (T) · 25% of 100 = 25 (A) · 40% of 80 = 32 (G) · 50% of 52 = 26 (H) · 20% of 170 = 34 (O) · 10% of 220 = 22 (S) · 10% of 310 = 31 (I) · 5% of 160 = 8 (F) · 10% of 150 = 15 (R) · 10% of 510 = 51 (D) · 25% of 148 = 37 (P) · 20% of 275 = 55 (W) · 75% of 48 = 36 (C) · 5% of 580 = 29 (U) · 25% of 4 = 1 (L) · 5% of 40 = 2 (N) · 60% of 55 = 33 (E)

### Clue 3 (Order of operations): "THE SABOTEUR RETREATED FROM WARM WATER SPRAY"

53 + 8 × 2 = 69 (T) · 10 × 11 - 21 = 89 (Y) · 37 + 6 × 2 = 49 (D) · 12 × 9 - 11 = 97 (B) · 3 × 6 - 6 = 12 (S) · 11 × 9 - 15 = 84 (F) · 8 × 6 - 10 = 38 (W) · 12 × 6 - 5 = 67 (R) · 10 + 7 × 5 = 45 (E) · 75 + 3 × 9 = 102 (O) · 7 + 9 × 2 = 25 (H) · 12 × 10 - 4 = 116 (M) · 12 × 10 - 1 = 119 (U) · 12 × 12 - 30 = 114 (P) · 68 + 2 × 5 = 78 (A)

### Clue 4 (Exponents): "A SHINY SILVER HAIR CLIP WAS DROPPED NEAR BY"

5^3 = 125 (A) · 12^2 = 144 (L) · 15^2 = 225 (C) · 7^3 = 343 (I) · 2^7 = 128 (P) · 13^2 = 169 (D) · 7^2 = 49 (R) · 5^2 = 25 (V) · 4^2 = 16 (N) · 2^5 = 32 (B) · 3^4 = 81 (S) · 6^3 = 216 (W) · 17^2 = 289 (Y) · 18^2 = 324 (H) · 19^2 = 361 (E) · 2^6 = 64 (O)

### Clue 5 (Two-step equations): surviving statement is box 1 → Dylan Mercer

6x + 12 = 54, x = 7 · 6x + 1 = 55, x = 9 · 4x + 6 = 54, x = 12 · 5x + 5 = 55, x = 10 · 3x + 2 = 26, x = 8 · 5x + 1 = 16, x = 3 · 3x + 3 = 15, x = 4 · 2x + 1 = 11, x = 5 · 4x + 2 = 46, x = 11 · 6x + 10 = 46, x = 6 · 2x + 8 = 12, x = 2