



The Mystery of the Sunken Catnip

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

Detective: _____ Date: _____

The Grand Pearl Keeper of Meow-lantis woke up to find the sacred Golden Catnip Kelp gone! A mysterious rogue mer-cat was spotted fleeing the scene. We need you to decode the evidence, trace the culprit, and save the ocean ecosystem.

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 mer-cat is _____

Possible suspects

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

NAME	PRIMARY MAGIC	SECONDARY GEAR	SWIM STYLE	TAIL FIN COLOR	VULNERABILITY
Oliver	Jellyfish shock	Kelp lasso	Left-finned stroke	Abyssal blue	High pitches
Milo	Coral craft	Pearl wand	Right-finned stroke	Abyssal blue	High pitches
Toby	Coral craft	Shell flute	Right-finned stroke	Coral pink	Tickly seaweed
Ziggy	Coral craft	Shell flute	Left-finned stroke	Seafoam green	High pitches
Ariel	Jellyfish shock	Pearl wand	Right-finned stroke	Seafoam green	Bright spotlights
Jasper	Bubble shield	Kelp lasso	Right-finned stroke	Seafoam green	High pitches
Bubbles	Whirlwind claw	Crab shield	Right-finned stroke	Coral pink	Tickly seaweed
Marina	Coral craft	Crab shield	Right-finned stroke	Coral pink	High pitches
Selena	Whirlwind claw	Shell flute	Right-finned stroke	Coral pink	High pitches
Felix	Whirlwind claw	Pearl wand	Right-finned stroke	Coral pink	Tickly seaweed
Coralia	Echo purr	Crab shield	Right-finned stroke	Coral pink	Tickly seaweed
Luna	Whirlwind claw	Kelp lasso	Left-finned stroke	Abyssal blue	Bright spotlights
Simba	Bubble shield	Pearl wand	Right-finned stroke	Abyssal blue	Tickly seaweed
Whisker	Echo purr	Crab shield	Right-finned stroke	Seafoam green	High pitches
Pearl	Echo purr	Crab shield	Right-finned stroke	Seafoam green	Tickly seaweed
Barnaby	Jellyfish shock	Starfish crown	Left-finned stroke	Coral pink	Tickly seaweed
Clawdia	Bubble shield	Crab shield	Left-finned stroke	Coral pink	Bright spotlights
Poseidon	Echo purr	Starfish crown	Right-finned stroke	Abyssal blue	Bright spotlights
Salty	Coral craft	Pearl wand	Right-finned stroke	Abyssal blue	Tickly seaweed
Muriel	Bubble shield	Kelp lasso	Right-finned stroke	Coral pink	Tickly seaweed
Cleo	Whirlwind claw	Crab shield	Left-finned stroke	Coral pink	Bright spotlights

CLUE 1 Integers

To trace the suspect's escape route, we must analyze the depth logs. A patrol submersible registered rapid changes in altitude, diving below sea level and rising near thermal vents. Help us calculate the final integer depth value to unlock the first evidence locker.

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

A 2x10 grid of boxes. The top row contains the following sequence: an orange box with 'T', three empty boxes, and then a sequence of 17 empty boxes. The bottom row contains the following sequence: three empty boxes, one empty box, and then a sequence of 16 empty boxes, with the 10th box from the start of the bottom row being orange and containing 'T'.

T																			T
30	3	21	13	14	6	6	18	14	16	28	29	21	4	16	29	30			
15	4	21	18	4	3	21	6	6	9	6	15	T	30	21					

$$(-15) + 45 = \boxed{} \rightarrow \boxed{\text{T}}$$

$$21 - (-8) = \boxed{} \rightarrow \boxed{0}$$

$$4 - (-14) = \boxed{} \rightarrow \boxed{\mathbf{A}}$$

$$2 - (-14) = \boxed{} \rightarrow \boxed{\text{N}}$$

$$(-5) + 33 = \boxed{} \rightarrow \boxed{\mathbf{D}}$$

$$(-15) + 30 = \boxed{} \rightarrow \boxed{\text{U}}$$

$$(-14) + 27 = \boxed{} \rightarrow \boxed{\mathbf{V}}$$

$$(-14) + 23 = \boxed{} \rightarrow \boxed{\mathbf{F}}$$

$$13 - (-8) = \boxed{} \rightarrow \boxed{\text{E}}$$

$(-3) + 6 = \square \rightarrow \boxed{\text{H}}$

$$(-12) + 18 = \boxed{} \rightarrow \boxed{\text{L}}$$

$$2 - (-2) = \boxed{} \rightarrow \boxed{\text{S}}$$

$$(-10) + 24 = \boxed{} \rightarrow \boxed{\text{I}}$$

Scratch space:

CLUE 2 Percentages

The palace vault doors are locked with a hydro-pressure seal that requires calculating the exact percentage of water flow diversion. Solve the percentage puzzle to open the secondary files.

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

T									T									T	
20	10	45	27	17	27	58	45	26	20	27	12	29	42	27	12	29	20	10	
					T								T						
18	46	29	13	10	20	33	29	57	57	45	11	27	20	46	16	23	45		

25% of 80 = → T	10% of 260 = → C	10% of 570 = → N
50% of 26 = → G	10% of 180 = → A	5% of 200 = → H
25% of 44 = → D	60% of 75 = → E	5% of 320 = → O
60% of 45 = → S	10% of 290 = → I	50% of 24 = → W
50% of 66 = → F	10% of 460 = → R	50% of 84 = → M
5% of 460 = → K	50% of 34 = → U	25% of 232 = → P

Scratch space:

CLUE 3

Order of operations

Our ancient hydro-puzzles require solving multi-step equations using the correct sequence of operations. Solve this sequence to activate the deep-sea sonar system and pin down the suspect's movement.

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

T										T					
42	33	102	96	28	96	86	102	49	42	72	102	43	97	96	

T												
42	44	49	35	76	29	96	102	43	54	102	102	84

$7 \times 10 - 28 = \square \rightarrow \boxed{\text{T}}$

$24 + 2 \times 2 = \square \rightarrow \boxed{\text{U}}$

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

$3 \times 12 - 1 = \square \rightarrow \boxed{\text{K}}$

$42 + 2 \times 6 = \square \rightarrow \boxed{\text{W}}$

$10 \times 12 - 18 = \square \rightarrow \boxed{\text{E}}$

$68 + 4 \times 7 = \square \rightarrow \boxed{\text{S}}$

$40 + 2 \times 2 = \square \rightarrow \boxed{\text{I}}$

$12 \times 10 - 23 = \square \rightarrow \boxed{\text{R}}$

$8 \times 10 - 8 = \square \rightarrow \boxed{\text{F}}$

$9 \times 8 - 23 = \square \rightarrow \boxed{\text{C}}$

$39 + 9 \times 5 = \square \rightarrow \boxed{\text{D}}$

$11 \times 4 - 15 = \square \rightarrow \boxed{\text{Y}}$

$7 \times 11 - 1 = \square \rightarrow \boxed{\text{L}}$

$6 \times 12 - 29 = \square \rightarrow \boxed{\text{A}}$

$8 \times 11 - 2 = \square \rightarrow \boxed{\text{P}}$

Scratch space:

CLUE 4 Exponents

The stolen catnip kelp contains spores that multiply exponentially when exposed to deep-sea light. To prevent a massive ecological overgrowth, we must calculate the exponent value of the spreading spores.

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

W																		
100	196	121	32	9	216	8	361	32	343	125	25	36	256	216	128	121	256	216
64	361	125	25	196	49	343	125	361	196	64								

$10^2 = \square \rightarrow \text{W}$	$7^2 = \square \rightarrow \text{T}$	$16^2 = \square \rightarrow \text{I}$	$2^5 = \square \rightarrow \text{O}$
$2^3 = \square \rightarrow \text{D}$	$11^2 = \square \rightarrow \text{F}$	$19^2 = \square \rightarrow \text{C}$	$8^2 = \square \rightarrow \text{S}$
$14^2 = \square \rightarrow \text{E}$	$6^3 = \square \rightarrow \text{N}$	$2^7 = \square \rightarrow \text{K}$	$7^3 = \square \rightarrow \text{R}$
$5^3 = \square \rightarrow \text{A}$	$3^2 = \square \rightarrow \text{U}$	$6^2 = \square \rightarrow \text{P}$	$5^2 = \square \rightarrow \text{L}$

Scratch space:

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

We found a set of balance scales used by the suspect to weigh stolen pearls. By setting up a two-step equation representing the weights of the shells and the pearls, we can balance the scales and reveal the final clue.

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:

$3x + 5 = 8, x = \boxed{}$

$4x + 9 = 49, x = \boxed{}$

$5x + 9 = 19, x = \boxed{}$

$6x + 12 = 84, x = \boxed{}$

$6x + 2 = 50, x = \boxed{}$

$3x + 4 = 16, x = \boxed{}$

$3x + 4 = 22, x = \boxed{}$

$5x + 7 = 62, x = \boxed{}$

$3x + 5 = 14, x = \boxed{}$

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

$6x + 3 = 45, x = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain plundered the pearl vault, then vanished into the deep trench.
2. The villain swiped the royal catnip, then escaped in a bubble ship.
3. The villain pilfered the golden clam, then hid inside the dark shipwreck.
4. The villain snatched the glowing coral, then escaped in a bubble ship.
5. The villain pilfered the golden clam, then vanished into the deep trench.
6. The villain pinched the sacred seaweed, then vanished into the deep trench.
7. The villain swiped the royal catnip, then hid inside the dark shipwreck.
8. The villain snatched the glowing coral, then vanished into the deep trench.
9. The villain snatched the glowing coral, then swam through the kelp forest.
10. The villain swiped the royal catnip, then vanished into the deep trench.
11. The villain plundered the pearl vault, then escaped in a bubble ship.
12. The villain pilfered the golden clam, then swam through the kelp forest.

Answer Key

The Mystery of the Sunken Catnip

Culprit: Muriel

Bubble shield · Kelp lasso · Right-finned stroke · Coral pink · Tickly seaweed

Trail: Start 21 → Clue 1 18 → Clue 2 13 → Clue 3 7 → Clue 4 4 → Clue 5 1

Clue 1 (Integers): "THE VILLAIN DOES NOT USE A SHELL FLUTE"

$(-15) + 45 = 30$ (T) · $21 - (-8) = 29$ (O) · $4 - (-14) = 18$ (A) · $2 - (-14) = 16$ (N) · $(-5) + 33 = 28$ (D) · $(-15) + 30 = 15$ (U) · $(-14) + 27 = 13$ (V) · $(-14) + 23 = 9$ (F) · $13 - (-8) = 21$ (E) · $(-3) + 6 = 3$ (H) · $(-12) + 18 = 6$ (L) · $2 - (-2) = 4$ (S) · $(-10) + 24 = 14$ (I)

Clue 2 (Percentages): "THE SUSPECT SWIMS WITH A RIGHT FINNED STROKE"

25% of 80 = 20 (T) · 10% of 260 = 26 (C) · 10% of 570 = 57 (N) · 50% of 26 = 13 (G) · 10% of 180 = 18 (A) · 5% of 200 = 10 (H) · 25% of 44 = 11 (D) · 60% of 75 = 45 (E) · 5% of 320 = 16 (O) · 60% of 45 = 27 (S) · 10% of 290 = 29 (I) · 50% of 24 = 12 (W) · 50% of 66 = 33 (F) · 10% of 460 = 46 (R) · 50% of 84 = 42 (M) · 5% of 460 = 23 (K) · 50% of 34 = 17 (U) · 25% of 232 = 58 (P)

Clue 3 (Order of operations): "THE SUSPECT FEARS TICKLY SEAWEED"

$7 \times 10 - 28 = 42$ (T) · $24 + 2 \times 2 = 28$ (U) · $11 \times 5 - 22 = 33$ (H) · $3 \times 12 - 1 = 35$ (K) · $42 + 2 \times 6 = 54$ (W) · $10 \times 12 - 18 = 102$ (E) · $68 + 4 \times 7 = 96$ (S) · $40 + 2 \times 2 = 44$ (I) · $12 \times 10 - 23 = 97$ (R) · $8 \times 10 - 8 = 72$ (F) · $9 \times 8 - 23 = 49$ (C) · $39 + 9 \times 5 = 84$ (D) · $11 \times 4 - 15 = 29$ (Y) · $7 \times 11 - 1 = 76$ (L) · $6 \times 12 - 29 = 43$ (A) · $8 \times 11 - 2 = 86$ (P)

Clue 4 (Exponents): "WE FOUND CORAL PINK FIN SCALE TRACES"

$10^2 = 100$ (W) · $7^2 = 49$ (T) · $16^2 = 256$ (I) · $2^5 = 32$ (O) · $2^3 = 8$ (D) · $11^2 = 121$ (F) · $19^2 = 361$ (C) · $8^2 = 64$ (S) · $14^2 = 196$ (E) · $6^3 = 216$ (N) · $2^7 = 128$ (K) · $7^3 = 343$ (R) · $5^3 = 125$ (A) · $3^2 = 9$ (U) · $6^2 = 36$ (P) · $5^2 = 25$ (L)

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

$3x + 5 = 8, x = 1$ · $4x + 9 = 49, x = 10$ · $5x + 9 = 19, x = 2$ · $6x + 12 = 84, x = 12$ · $6x + 2 = 50, x = 8$ · $3x + 4 = 16, x = 4$ · $3x + 4 = 22, x = 6$ · $5x + 7 = 62, x = 11$ · $3x + 5 = 14, x = 3$ · $4x + 12 = 32, x = 5$ · $6x + 3 = 45, x = 7$