



The Lost Sunstone of Whispering Canyons

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

Detective: _____ Date: _____

The camp is in an uproar! Sometime before dawn, someone breached the high-security research tent and swiped the golden Sunstone-a priceless artifact discovered just yesterday. The lead archaeologist needs your sharp detective skills to analyze the clues left behind, track down the thief among the visiting expedition members, and recover the relic before it leaves the canyon.

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 explorer 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	SECONDARY GEAR	DOMINANT HAND	HAIR COLOR	MAJOR PHOBIA
Alex	climbing axes	ancient map	left handed	blonde hair	afraid of heights
Isabella	grappling hook	walkie talkie	right handed	black hair	afraid of spiders
Jacques	metal detector	decoder ring	left handed	blonde hair	afraid of heights
Percy	laser scanner	decoder ring	left handed	brown hair	afraid of spiders
Marco	grappling hook	smoke bomb	left handed	brown hair	afraid of water
Zelda	laser scanner	compass watch	left handed	black hair	afraid of heights
Amelia	climbing axes	ancient map	left handed	blonde hair	afraid of spiders
Gertrude	drone controller	ancient map	left handed	black hair	afraid of spiders
Arthur	metal detector	walkie talkie	right handed	black hair	afraid of water
Nathan	laser scanner	walkie talkie	left handed	blonde hair	afraid of water
Ernest	climbing axes	ancient map	left handed	black hair	afraid of spiders
Indiana	grappling hook	smoke bomb	right handed	black hair	afraid of spiders
Kingsley	drone controller	ancient map	left handed	brown hair	afraid of water
Charles	grappling hook	smoke bomb	left handed	black hair	afraid of water
Rick	grappling hook	ancient map	left handed	blonde hair	afraid of water
Lara	metal detector	smoke bomb	right handed	blonde hair	afraid of water
Roy	climbing axes	compass watch	left handed	black hair	afraid of spiders
Sacagawea	climbing axes	smoke bomb	left handed	black hair	afraid of spiders
Hiram	climbing axes	decoder ring	left handed	black hair	afraid of heights
Steve	metal detector	decoder ring	left handed	black hair	afraid of spiders
Nellie	drone controller	decoder ring	right handed	brown hair	afraid of heights

CLUE 1 Integers

We found a pressure-sensitive scale near the vault entrance that measures the change in weight. To activate the clue printer, we need to calculate the net change from the archaeological gear loaded and unloaded today.

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

T									T								T
9	29	6	5	4	5	11	6	3	9	27	17	6	5	14	17	9	
														T			
29	7	1	6	7	3	17	19	11	7	5	5	16	7	9	3	29	

$3 - (-6) = \square \rightarrow$ T	$(-11) + 40 = \square \rightarrow$ H	$(-14) + 41 = \square \rightarrow$ D
$4 - (-15) = \square \rightarrow$ M	$2 - (-9) = \square \rightarrow$ P	$(-14) + 18 = \square \rightarrow$ U
$(-7) + 21 = \square \rightarrow$ N	$(-15) + 18 = \square \rightarrow$ C	$(-3) + 8 = \square \rightarrow$ S
$(-9) + 26 = \square \rightarrow$ O	$(-9) + 16 = \square \rightarrow$ A	$(-8) + 14 = \square \rightarrow$ E
$6 - (-10) = \square \rightarrow$ W	$(-15) + 16 = \square \rightarrow$ V	

Scratch space:

CLUE 2 Percentages

The ancient temple door is locked by a solar dial that only opens when we input the exact percentage of sunlight blocked by the canyon walls. Calculate the shaded area percentage to unlock the next file.

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

T					T											T				
30	17	7	42	20	30	1	52	33	7	1	52	24	7	33	30	17	7	42	1	
			T					T												
6	7	9	30	17	40	20	33	30	44	7	24	59	40	5	7					

$60\% \text{ of } 50 = \square \rightarrow \text{ T }$

$5\% \text{ of } 880 = \square \rightarrow \text{ O }$

$60\% \text{ of } 10 = \square \rightarrow \text{ L }$

$10\% \text{ of } 590 = \square \rightarrow \text{ C }$

$10\% \text{ of } 170 = \square \rightarrow \text{ H }$

$20\% \text{ of } 100 = \square \rightarrow \text{ N }$

$10\% \text{ of } 90 = \square \rightarrow \text{ F }$

$5\% \text{ of } 100 = \square \rightarrow \text{ P }$

$25\% \text{ of } 160 = \square \rightarrow \text{ A }$

$5\% \text{ of } 840 = \square \rightarrow \text{ I }$

$60\% \text{ of } 40 = \square \rightarrow \text{ S }$

$50\% \text{ of } 104 = \square \rightarrow \text{ U }$

$5\% \text{ of } 140 = \square \rightarrow \text{ E }$

$25\% \text{ of } 132 = \square \rightarrow \text{ D }$

$25\% \text{ of } 4 = \square \rightarrow \text{ R }$

Scratch space:

CLUE 3 Order of operations

To boot up the camp's main computer, we must solve the system-restore code sequence. Follow the strict order of mathematical operations to bypass the security lock and download the suspect's profile.

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

T			T					T									T		
68	72	26	68	85	83	60	26	68	85	30	10	117	92	26	92	68	72	26	
						T													
110	26	111	63	117	118	68	72	26	92	85	83	7	6	85	30	26			

$8 \times 11 - 20 = \square \rightarrow$ T	$10 \times 9 - 30 = \square \rightarrow$ G	$18 + 5 \times 9 = \square \rightarrow$ S
$12 \times 8 - 13 = \square \rightarrow$ R	$45 + 8 \times 9 = \square \rightarrow$ I	$83 + 7 \times 5 = \square \rightarrow$ N
$5 \times 5 - 19 = \square \rightarrow$ C	$7 \times 8 - 26 = \square \rightarrow$ V	$10 \times 10 - 15 = \square \rightarrow$ A
$10 \times 10 - 28 = \square \rightarrow$ H	$50 + 7 \times 6 = \square \rightarrow$ D	$4 \times 8 - 25 = \square \rightarrow$ K
$57 + 6 \times 9 = \square \rightarrow$ B	$3 \times 5 - 5 = \square \rightarrow$ O	$18 + 4 \times 2 = \square \rightarrow$ E
$11 \times 12 - 22 = \square \rightarrow$ W		

Scratch space:

CLUE 4 Exponents

The rogue explorer left a trail of digital breadcrumbs that double in frequency with every mile they travel. Calculate the exponential growth of the radio pings to pinpoint their campsite on our map.

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

W																	
25	64	128	243	216	4	343	27	169	243	4	289	125	361	49	27	4	343
243	128	121	64	361	225	169	27	196	81	36	27	16	49				

$5^2 = \square \rightarrow \mathbf{W}$	$2^2 = \square \rightarrow \mathbf{N}$	$6^3 = \square \rightarrow \mathbf{U}$	$11^2 = \square \rightarrow \mathbf{J}$
$7^3 = \square \rightarrow \mathbf{D}$	$14^2 = \square \rightarrow \mathbf{C}$	$4^2 = \square \rightarrow \mathbf{I}$	$3^5 = \square \rightarrow \mathbf{O}$
$3^4 = \square \rightarrow \mathbf{K}$	$2^7 = \square \rightarrow \mathbf{F}$	$7^2 = \square \rightarrow \mathbf{R}$	$4^3 = \square \rightarrow \mathbf{E}$
$6^2 = \square \rightarrow \mathbf{H}$	$17^2 = \square \rightarrow \mathbf{G}$	$13^2 = \square \rightarrow \mathbf{L}$	$3^3 = \square \rightarrow \mathbf{A}$
$19^2 = \square \rightarrow \mathbf{T}$	$5^3 = \square \rightarrow \mathbf{S}$	$15^2 = \square \rightarrow \mathbf{B}$	

Scratch space:

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

The local supply outpost charges a flat rental fee for digging gear plus a fixed rate per hour. Solve the two-step equation to figure out exactly how long the suspect rented their equipment.

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:

$5x + 11 = 66, x = \boxed{}$

$2x + 9 = 13, x = \boxed{}$

$3x + 4 = 13, x = \boxed{}$

$6x + 4 = 34, x = \boxed{}$

$3x + 8 = 29, x = \boxed{}$

$6x + 7 = 79, x = \boxed{}$

$4x + 11 = 27, x = \boxed{}$

$5x + 4 = 49, x = \boxed{}$

$6x + 1 = 61, x = \boxed{}$

$5x + 2 = 32, x = \boxed{}$

$4x + 10 = 14, x = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain searched the dusty tomb floor using a metal detector, then called coordinates to an accomplice over a walkie talkie.
2. The villain scouted the narrow canyon using a drone controller, then navigated the secret passages with an ancient map.
3. The villain carved a path up the icy cliff using climbing axes, then escaped into the jungle under the cover of a smoke bomb.
4. The villain carved a path up the icy cliff using climbing axes, then tracked their heading back to camp using a compass watch.
5. The villain scaled the ancient stone ruins using a grappling hook, then tracked their heading back to camp using a compass watch.
6. The villain mapped the hidden temple walls with a laser scanner, then tracked their heading back to camp using a compass watch.
7. The villain carved a path up the icy cliff using climbing axes, then unlocked the stone vault using a decoder ring.
8. The villain searched the dusty tomb floor using a metal detector, then unlocked the stone vault using a decoder ring.
9. The villain mapped the hidden temple walls with a laser scanner, then escaped into the jungle under the cover of a smoke bomb.
10. The villain scouted the narrow canyon using a drone controller, then unlocked the stone vault using a decoder ring.
11. The villain carved a path up the icy cliff using climbing axes, then navigated the secret passages with an ancient map.
12. The villain searched the dusty tomb floor using a metal detector, then navigated the secret passages with an ancient map.

Answer Key

The Lost Sunstone of Whispering Canyons

Culprit: Steve

metal detector · decoder ring · left handed · black hair · afraid of spiders

Trail: Start 21 → Clue 1 19 → Clue 2 14 → Clue 3 6 → Clue 4 4 → Clue 5 1

Clue 1 (Integers): "THE SUSPECT DOES NOT HAVE A COMPASS WATCH"

$3 - (-6) = 9$ (T) · $(-11) + 40 = 29$ (H) · $(-14) + 41 = 27$ (D) · $4 - (-15) = 19$ (M) · $2 - (-9) = 11$ (P) · $(-14) + 18 = 4$ (U) · $(-7) + 21 = 14$ (N) · $(-15) + 18 = 3$ (C) · $(-3) + 8 = 5$ (S) · $(-9) + 26 = 17$ (O) · $(-9) + 16 = 7$ (A) · $(-8) + 14 = 6$ (E) · $6 - (-10) = 16$ (W) · $(-15) + 16 = 1$ (V)

Clue 2 (Percentages): "THE INTRUDER USED THEIR LEFT HAND TO ESCAPE"

60% of 50 = 30 (T) · 5% of 880 = 44 (O) · 60% of 10 = 6 (L) · 10% of 590 = 59 (C) · 10% of 170 = 17 (H) · 20% of 100 = 20 (N) · 10% of 90 = 9 (F) · 5% of 100 = 5 (P) · 25% of 160 = 40 (A) · 5% of 840 = 42 (I) · 60% of 40 = 24 (S) · 50% of 104 = 52 (U) · 5% of 140 = 7 (E) · 25% of 132 = 33 (D) · 25% of 4 = 1 (R)

Clue 3 (Order of operations): "THE TARGET AVOIDED THE WEBS IN THE DARK CAVE"

$8 \times 11 - 20 = 68$ (T) · $10 \times 9 - 30 = 60$ (G) · $18 + 5 \times 9 = 63$ (S) · $12 \times 8 - 13 = 83$ (R) · $45 + 8 \times 9 = 117$ (I) · $83 + 7 \times 5 = 118$ (N) · $5 \times 5 - 19 = 6$ (C) · $7 \times 8 - 26 = 30$ (V) · $10 \times 10 - 15 = 85$ (A) · $10 \times 10 - 28 = 72$ (H) · $50 + 7 \times 6 = 92$ (D) · $4 \times 8 - 25 = 7$ (K) · $57 + 6 \times 9 = 111$ (B) · $3 \times 5 - 5 = 10$ (O) · $18 + 4 \times 2 = 26$ (E) · $11 \times 12 - 22 = 110$ (W)

Clue 4 (Exponents): "WE FOUND A LONG STRAND OF JET BLACK HAIR"

$5^2 = 25$ (W) · $2^2 = 4$ (N) · $6^3 = 216$ (U) · $11^2 = 121$ (J) · $7^3 = 343$ (D) · $14^2 = 196$ (C) · $4^2 = 16$ (I) · $3^5 = 243$ (O) · $3^4 = 81$ (K) · $2^7 = 128$ (F) · $7^2 = 49$ (R) · $4^3 = 64$ (E) · $6^2 = 36$ (H) · $17^2 = 289$ (G) · $13^2 = 169$ (L) · $3^3 = 27$ (A) · $19^2 = 361$ (T) · $5^3 = 125$ (S) · $15^2 = 225$ (B)

Clue 5 (Two-step equations): surviving statement is box 8 → Steve

$5x + 11 = 66$, $x = 11$ · $2x + 9 = 13$, $x = 2$ · $3x + 4 = 13$, $x = 3$ · $6x + 4 = 34$, $x = 5$ · $3x + 8 = 29$, $x = 7$ · $6x + 7 = 79$, $x = 12$ · $4x + 11 = 27$, $x = 4$ · $5x + 4 = 49$, $x = 9$ · $6x + 1 = 61$, $x = 10$ · $5x + 2 = 32$, $x = 6$ · $4x + 10 = 14$, $x = 1$