



The Lost Emerald of Mount Canopy

Grade 8 math · Exponents, Word problems, Square roots, Pythagorean theorem, Two-step equations · Reading level grades 3-4

Detective: _____ Date: _____

The ancient Golden Compass has been taken from the Chief Mapmaker's treehouse! Only the craftiest rogue explorer in the Adventure Club could have pulled off this daring heist. Work through the clues to find the culprit before they find the lost temple!

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	MAIN TOOL	SPECIAL GEAR	WRIST ACCESSORY	HAIR COLOR	SECRET FEAR
Toby	laser flashlight	decoding ring	wears a stopwatch	bright orange hair	allergic to pollen
Cole	robo boots	decoding ring	wears a stopwatch	dusty brown hair	scared of spiders
Finn	grappling hook	sonar goggles	wears a stopwatch	bright orange hair	allergic to pollen
Rex	laser flashlight	decoding ring	wears a compass watch	pitch black hair	scared of spiders
Alex	grappling hook	bubble shield	wears a stopwatch	pitch black hair	hates loud noises
Zoe	pocket glider	bubble shield	wears a stopwatch	bright orange hair	allergic to pollen
Jack	climbing claws	decoding ring	wears a stopwatch	pitch black hair	allergic to pollen
Indy	laser flashlight	sonar goggles	wears a stopwatch	bright orange hair	scared of spiders
Sam	grappling hook	sticky gloves	wears a stopwatch	bright orange hair	scared of spiders
Ruby	climbing claws	sticky gloves	wears a stopwatch	pitch black hair	scared of spiders
Kira	grappling hook	smoke pellets	wears a stopwatch	bright orange hair	scared of spiders
Mia	robo boots	decoding ring	wears a stopwatch	bright orange hair	scared of spiders
Jake	pocket glider	sonar goggles	wears a compass watch	dusty brown hair	scared of spiders
Noah	grappling hook	sticky gloves	wears a compass watch	pitch black hair	hates loud noises
Ella	climbing claws	decoding ring	wears a stopwatch	bright orange hair	scared of spiders
Luke	laser flashlight	sonar goggles	wears a stopwatch	pitch black hair	scared of spiders
Ben	pocket glider	sonar goggles	wears a stopwatch	dusty brown hair	scared of spiders
Max	robo boots	bubble shield	wears a stopwatch	bright orange hair	hates loud noises
Maya	climbing claws	decoding ring	wears a compass watch	bright orange hair	scared of spiders
Gail	climbing claws	sonar goggles	wears a compass watch	bright orange hair	scared of spiders
Leo	robo boots	sonar goggles	wears a compass watch	dusty brown hair	scared of spiders

CLUE 1 Exponents

To start the search, we must count the gear left behind. Solve these word problems to find the exact number of lost supplies.

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

T																	
9	441	27	512	169	27	289	169	27	121	16	169	9	441	256	196	27	

	T											
121	9	343	243	216	484	324	125	169	196	27	121	

$3^2 = \square \rightarrow$ T	$21^2 = \square \rightarrow$ H	$2^4 = \square \rightarrow$ N	$6^3 = \square \rightarrow$ K
$4^4 = \square \rightarrow$ A	$8^3 = \square \rightarrow$ F	$18^2 = \square \rightarrow$ G	$17^2 = \square \rightarrow$ D
$3^3 = \square \rightarrow$ E	$22^2 = \square \rightarrow$ Y	$7^3 = \square \rightarrow$ I	$5^3 = \square \rightarrow$ L
$13^2 = \square \rightarrow$ O	$11^2 = \square \rightarrow$ S	$14^2 = \square \rightarrow$ V	$3^5 = \square \rightarrow$ C

Scratch space:

CLUE 2

Word problems

The team finds a strange radio signal that multiplies rapidly. Solve this exponent puzzle to decode the signal's true strength.

Solve each problem, then write its letter in the boxes to fill in the missing word.

A witness saw the villain was

W									P	W			C	H	.
95	53	42	109	16	42	16	37	86		95	42	37			

The Expedition Leader found 59 safari hats yesterday and 36 more today. How many safari hats in all?

Answer: → **W**

There were 98 climbing ropes. 12 were used up. How many climbing ropes are left?

Answer: → **O**

The Expedition Leader found 4 canteen bottles yesterday and 33 more today. How many canteen bottles in all?

Answer: → **T**

The Expedition Leader found 37 vines yesterday and 72 more today. How many vines in all?

Answer: → **R**

The Expedition Leader lined up 6 rows of 7 canteen bottles. How many canteen bottles in all?

Answer: → **A**

There were 93 vines. 40 were used up. How many vines are left?

Answer: → **E**

The Expedition Leader lined up 8 rows of 2 vines. How many vines in all?

Answer: → **S**

Scratch space:

CLUE 3 Square roots

A locked stone door blocks the path! The puzzle lock asks for the square root of the giant numbers carved on the wall.

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

T										T									
9	16	7	4	11	4	21	7	13	9	19	15	14	15	12	15	6			
						T													
23	19	3	17	15	9	22	14	6	4	21	22	2	7	19					

$\sqrt{81} = \square \rightarrow$ T	$\sqrt{484} = \square \rightarrow$ I	$\sqrt{361} = \square \rightarrow$ R
$\sqrt{144} = \square \rightarrow$ W	$\sqrt{121} = \square \rightarrow$ U	$\sqrt{289} = \square \rightarrow$ M
$\sqrt{225} = \square \rightarrow$ A	$\sqrt{169} = \square \rightarrow$ C	$\sqrt{16} = \square \rightarrow$ S
$\sqrt{441} = \square \rightarrow$ P	$\sqrt{4} = \square \rightarrow$ D	$\sqrt{256} = \square \rightarrow$ H
$\sqrt{529} = \square \rightarrow$ F	$\sqrt{196} = \square \rightarrow$ N	$\sqrt{49} = \square \rightarrow$ E
$\sqrt{36} = \square \rightarrow$ Y	$\sqrt{9} = \square \rightarrow$ O	

Scratch space:

CLUE 4

Pythagorean theorem

We need to zip-line across a canyon to follow the trail. Use the Pythagorean formula to calculate the exact length of the rope.

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

W																		
74	29	75	87	15	85	58	87	68	40	85	25	29	52	40	30	68	87	85
20	52	29	20	68	29	29	65	68	40	85	50	52						

legs 24 and 70, hypotenuse = → **W**

legs 18 and 24, hypotenuse = → **I**

legs 40 and 42, hypotenuse = → **D**

legs 60 and 63, hypotenuse = → **O**

legs 25 and 60, hypotenuse = → **B**

legs 21 and 72, hypotenuse = → **F**

legs 14 and 48, hypotenuse = → **C**

legs 40 and 75, hypotenuse = → **N**

legs 12 and 16, hypotenuse = → **T**

legs 9 and 12, hypotenuse = → **U**

legs 20 and 21, hypotenuse = → **E**

legs 32 and 60, hypotenuse = → **R**

legs 24 and 32, hypotenuse = → **A**

legs 15 and 20, hypotenuse = → **G**

legs 20 and 48, hypotenuse = → **H**

Scratch space:

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

The ancient scales of balance must be set just right. Solve this two-step equation to open the hidden escape hatch.

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:

$4x + 3 = 27, x = \boxed{}$

$6x + 6 = 18, x = \boxed{}$

$6x + 5 = 77, x = \boxed{}$

$2x + 4 = 20, x = \boxed{}$

$3x + 9 = 18, x = \boxed{}$

$5x + 8 = 13, x = \boxed{}$

$6x + 2 = 62, x = \boxed{}$

$4x + 5 = 33, x = \boxed{}$

$4x + 3 = 19, x = \boxed{}$

$4x + 9 = 29, x = \boxed{}$

$2x + 1 = 23, x = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain swung past the temple gates, then unlocked the ancient puzzle box.
2. The villain scaled the steep stone wall, then unlocked the ancient puzzle box.
3. The villain soared over the canopy, then spotted the secret passage.
4. The villain soared over the canopy, then unlocked the ancient puzzle box.
5. The villain swung past the temple gates, then grabbed the gold statue.
6. The villain jumped high over the mud pits, then unlocked the ancient puzzle box.
7. The villain jumped high over the mud pits, then spotted the secret passage.
8. The villain jumped high over the mud pits, then left a cloud of blue fog.
9. The villain beamed a path through the dark, then spotted the secret passage.
10. The villain swung past the temple gates, then escaped the giant rolling boulder.
11. The villain jumped high over the mud pits, then escaped the giant rolling boulder.
12. The villain swung past the temple gates, then left a cloud of blue fog.

Answer Key

The Lost Emerald of Mount Canopy

Culprit: Indy

laser flashlight · sonar goggles · wears a stopwatch · bright orange hair · scared of spiders

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

Clue 1 (Exponents): "THE FOE DOES NOT HAVE STICKY GLOVES"

$3^2 = 9$ (T) · $21^2 = 441$ (H) · $2^4 = 16$ (N) · $6^3 = 216$ (K) · $4^4 = 256$ (A) · $8^3 = 512$ (F) · $18^2 = 324$ (G) · $17^2 = 289$ (D) · $3^3 = 27$ (E) · $22^2 = 484$ (Y) · $7^3 = 343$ (I) · $5^3 = 125$ (L) · $13^2 = 169$ (O) · $11^2 = 121$ (S) · $14^2 = 196$ (V) · $3^5 = 243$ (C)

Clue 2 (Word problems): "WEARS A STOPWATCH"

The Expedition Leader found 59 safari hats yesterday and 36 more today. How many safari hats in all? = 95 (W) · There were 98 climbing ropes. 12 were used up. How many climbing ropes are left? = 86 (O) · The Expedition Leader found 4 canteen bottles yesterday and 33 more today. How many canteen bottles in all? = 37 (T) · The Expedition Leader found 37 vines yesterday and 72 more today. How many vines in all? = 109 (R) · The Expedition Leader lined up 6 rows of 7 canteen bottles. How many canteen bottles in all? = 42 (A) · There were 93 vines. 40 were used up. How many vines are left? = 53 (E) · The Expedition Leader lined up 8 rows of 2 vines. How many vines in all? = 16 (S)

Clue 3 (Square roots): "THE SUSPECT RAN AWAY FROM A TINY SPIDER"

$\sqrt{81} = 9$ (T) · $\sqrt{484} = 22$ (I) · $\sqrt{361} = 19$ (R) · $\sqrt{144} = 12$ (W) · $\sqrt{121} = 11$ (U) · $\sqrt{289} = 17$ (M) · $\sqrt{225} = 15$ (A) · $\sqrt{169} = 13$ (C) · $\sqrt{16} = 4$ (S) · $\sqrt{441} = 21$ (P) · $\sqrt{4} = 2$ (D) · $\sqrt{256} = 16$ (H) · $\sqrt{529} = 23$ (F) · $\sqrt{196} = 14$ (N) · $\sqrt{49} = 7$ (E) · $\sqrt{36} = 6$ (Y) · $\sqrt{9} = 3$ (O)

Clue 4 (Pythagorean theorem): "WE FOUND ORANGE HAIR ON THE TREE BRANCH"

legs 24 and 70, hypotenuse = 74 (W) · legs 18 and 24, hypotenuse = 30 (I) · legs 40 and 42, hypotenuse = 58 (D) · legs 60 and 63, hypotenuse = 87 (O) · legs 25 and 60, hypotenuse = 65 (B) · legs 21 and 72, hypotenuse = 75 (F) · legs 14 and 48, hypotenuse = 50 (C) · legs 40 and 75, hypotenuse = 85 (N) · legs 12 and 16, hypotenuse = 20 (T) · legs 9 and 12, hypotenuse = 15 (U) · legs 20 and 21, hypotenuse = 29 (E) · legs 32 and 60, hypotenuse = 68 (R) · legs 24 and 32, hypotenuse = 40 (A) · legs 15 and 20, hypotenuse = 25 (G) · legs 20 and 48, hypotenuse = 52 (H)

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

$4x + 3 = 27, x = 6$ · $6x + 6 = 18, x = 2$ · $6x + 5 = 77, x = 12$ · $2x + 4 = 20, x = 8$ · $3x + 9 = 18, x = 3$ · $5x + 8 = 13, x = 1$ · $6x + 2 = 62, x = 10$ · $4x + 5 = 33, x = 7$ · $4x + 3 = 19, x = 4$ · $4x + 9 = 29, x = 5$ · $2x + 1 = 23, x = 11$