



Mystery of the Lost Sun Disk

Grade 8 math · Exponents, Square roots, Pythagorean theorem, Order of operations, Two-step equations · Reading level grades 5-6

Detective: _____ Date: _____

Someone broke into the camp supply tent and swiped the ancient Golden Sun Disk. Gather evidence around the dig site to uncover 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 The Masked Bandit is _____

Possible suspects

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

NAME	EXPLORER TOOL	SURVIVAL GEAR	HANDEDNESS	HAT FEATHER	PHOBIA
Mila Mud	Grappling Hook	Parachute	Right Handed	Blue Feather	Afraid of Snakes
Lucas Lake	Machete	Map Scroll	Left Handed	Blue Feather	Afraid of Bats
Elena Explorer	Machete	Canteen	Right Handed	Blue Feather	Afraid of Bats
Iris River	Machete	Map Scroll	Left Handed	Red Feather	Afraid of Spiders
Sienna Stone	Grappling Hook	Canteen	Left Handed	Red Feather	Afraid of Snakes
Toby Trek	Machete	Map Scroll	Left Handed	Blue Feather	Afraid of Spiders
Clara Canyon	Compass Badge	Map Scroll	Left Handed	Gold Feather	Afraid of Spiders
Jasper Jade	Grappling Hook	Parachute	Right Handed	Blue Feather	Afraid of Spiders
Rory Ridge	Binoculars	Map Scroll	Right Handed	Red Feather	Afraid of Bats
Professor Leo	Compass Badge	Signal Flare	Right Handed	Blue Feather	Afraid of Bats
Marcus Moss	Lantern Torch	Rope Ladder	Right Handed	Blue Feather	Afraid of Bats
Nora Nav	Compass Badge	Canteen	Right Handed	Blue Feather	Afraid of Bats
Nico Peak	Grappling Hook	Rope Ladder	Right Handed	Blue Feather	Afraid of Spiders
Bruno Boulder	Machete	Parachute	Right Handed	Gold Feather	Afraid of Snakes
Sammy Swift	Compass Badge	Map Scroll	Left Handed	Red Feather	Afraid of Snakes
Dr Maya	Binoculars	Canteen	Left Handed	Blue Feather	Afraid of Snakes
Kira Karst	Grappling Hook	Rope Ladder	Right Handed	Gold Feather	Afraid of Snakes
Daisy Diggs	Lantern Torch	Map Scroll	Left Handed	Gold Feather	Afraid of Spiders
Hugo Hill	Binoculars	Canteen	Right Handed	Blue Feather	Afraid of Bats
Felix Fern	Machete	Canteen	Right Handed	Gold Feather	Afraid of Bats
Victor Vine	Compass Badge	Signal Flare	Left Handed	Blue Feather	Afraid of Spiders

CLUE 1

To calculate how the jungle radio signal amplified across base stations evaluate the power levels

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

144 216 121 100 729 100 196 121 512 144 27 8 121 100 256 8 144

512 225 4 4 81 225 100 441 125 256 225 625 243 625 225 4 121

$12^2 = \square \rightarrow \boxed{\text{T}}$

$10^2 = \square \rightarrow \boxed{\text{S}}$

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

$$2^3 = \boxed{} \rightarrow \boxed{0}$$

$$21^2 = \boxed{} \rightarrow \boxed{I}$$

$3^5 = \square \rightarrow \boxed{\text{F}}$

$8^3 = \boxed{} \rightarrow \boxed{\text{C}}$

$3^3 = \square \rightarrow \boxed{\text{D}}$

$$2^2 = \boxed{} \rightarrow \boxed{\mathbf{R}}$$

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

$$2^8 = \boxed{} \rightarrow \boxed{\text{N}}$$

$$6^3 = \boxed{} \rightarrow \boxed{\text{H}}$$

$15^2 =$ $\rightarrow$ **A**

$14^2 = \boxed{} \rightarrow \boxed{\text{P}}$

$$5^4 = \boxed{} \rightarrow \boxed{\text{L}}$$

$$3^6 = \boxed{} \rightarrow \boxed{\text{U}}$$

$$5^3 = \boxed{} \rightarrow \boxed{\mathbf{G}}$$

Scratch space:

CLUE 2 Square roots

The floor tiles of the ancient temple form a square grid so solve for the side length

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

T			T															
17	6	14	17	2	11	3	25	4	10	14	2	14	23	11	16	14	8	19
					T													
11	2	20	22	6	17	6	11	18	16	14	16	4	18	14	11	25		

$$\sqrt{289} = \square \rightarrow \boxed{\text{T}}$$

$$\sqrt{100} = \square \rightarrow \boxed{\text{W}}$$

$$\sqrt{324} = \square \rightarrow \boxed{\text{N}}$$

$$\sqrt{121} = \square \rightarrow \boxed{\text{A}}$$

$$\sqrt{64} = \square \rightarrow \boxed{\text{B}}$$

$$\sqrt{36} = \square \rightarrow \boxed{\text{H}}$$

$$\sqrt{529} = \square \rightarrow \boxed{\text{M}}$$

$$\sqrt{361} = \square \rightarrow \boxed{\text{Y}}$$

$$\sqrt{16} = \square \rightarrow \boxed{\text{S}}$$

$$\sqrt{256} = \square \rightarrow \boxed{\text{D}}$$

$$\sqrt{196} = \square \rightarrow \boxed{\text{E}}$$

$$\sqrt{484} = \square \rightarrow \boxed{\text{G}}$$

$$\sqrt{625} = \square \rightarrow \boxed{\text{K}}$$

$$\sqrt{9} = \square \rightarrow \boxed{\text{C}}$$

$$\sqrt{4} = \square \rightarrow \boxed{\text{R}}$$

$$\sqrt{400} = \square \rightarrow \boxed{\text{I}}$$

Scratch space:

CLUE 3
Pythagorean theorem

To find the direct distance across the canyon from camp to the ruins measure the right triangle sides

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

T									T							
5	50	13	10	20	68	52	17	87	5	17	40	41	40	58	40	51
														T		
15	17	29	26	40	82	58	40	17	26	29	15	25	40	5	82	

legs 3 and 4, hypotenuse = → **T**

legs 32 and 60, hypotenuse = → **L**

legs 20 and 21, hypotenuse = → **O**

legs 18 and 80, hypotenuse = → **S**

legs 20 and 48, hypotenuse = → **P**

legs 8 and 15, hypotenuse = → **R**

legs 40 and 42, hypotenuse = → **W**

legs 24 and 45, hypotenuse = → **Y**

legs 24 and 32, hypotenuse = → **A**

legs 6 and 8, hypotenuse = → **C**

legs 14 and 48, hypotenuse = → **H**

legs 9 and 12, hypotenuse = → **F**

legs 12 and 16, hypotenuse = → **U**

legs 60 and 63, hypotenuse = → **I**

legs 10 and 24, hypotenuse = → **M**

legs 7 and 24, hypotenuse = → **B**

legs 9 and 40, hypotenuse = → **N**

legs 5 and 12, hypotenuse = → **E**

Scratch space:

CLUE 4
Order of operations

The ancient lock code requires following the strict order of mathematical steps to turn the gears

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

T					T			T											
77	79	88	42	88	77	88	64	77	68	75	88	94	105	27	77	77	88	42	6

							T				
57	11	31	88	120	88	6	77	79	88	97	

$59 + 9 \times 2 = \square \rightarrow \boxed{\text{T}}$

$12 \times 9 - 20 = \square \rightarrow \boxed{\text{E}}$

$8 \times 8 - 7 = \square \rightarrow \boxed{\text{B}}$

$65 + 2 \times 5 = \square \rightarrow \boxed{\text{V}}$

$77 + 4 \times 5 = \square \rightarrow \boxed{\text{R}}$

$10 \times 12 - 15 = \square \rightarrow \boxed{\text{P}}$

$9 \times 9 - 17 = \square \rightarrow \boxed{\text{C}}$

$9 \times 2 - 12 = \square \rightarrow \boxed{\text{A}}$

$5 \times 12 - 29 = \square \rightarrow \boxed{\text{U}}$

$9 \times 8 - 4 = \square \rightarrow \boxed{\text{I}}$

$8 \times 5 - 13 = \square \rightarrow \boxed{\text{O}}$

$11 \times 12 - 12 = \square \rightarrow \boxed{\text{F}}$

$5 + 2 \times 3 = \square \rightarrow \boxed{\text{L}}$

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

$67 + 4 \times 3 = \square \rightarrow \boxed{\text{H}}$

$11 \times 11 - 27 = \square \rightarrow \boxed{\text{S}}$

Scratch space:

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

The expedition log tracks remaining trail supplies using an algebraic formula

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:

$2x + 10 = 20, x = \boxed{}$

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

$5x + 9 = 59, x = \boxed{}$

$4x + 6 = 50, x = \boxed{}$

$4x + 7 = 11, x = \boxed{}$

$2x + 7 = 31, x = \boxed{}$

$3x + 5 = 26, x = \boxed{}$

$2x + 10 = 22, x = \boxed{}$

$4x + 5 = 41, x = \boxed{}$

$3x + 12 = 24, x = \boxed{}$

$3x + 10 = 19, x = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain swung across the ravine with a grappling hook, then drank water from a canteen.
2. The villain spotted the temple with binoculars, then drank water from a canteen.
3. The villain cleared vines with a machete, then launched a bright signal flare.
4. The villain spotted the temple with binoculars, then climbed down a rope ladder.
5. The villain cleared vines with a machete, then drank water from a canteen.
6. The villain lit the hidden tunnel with a lantern torch, then drank water from a canteen.
7. The villain lit the hidden tunnel with a lantern torch, then unfolded an ancient map scroll.
8. The villain lit the hidden tunnel with a lantern torch, then climbed down a rope ladder.
9. The villain checked direction with a compass badge, then climbed down a rope ladder.
10. The villain checked direction with a compass badge, then drank water from a canteen.
11. The villain spotted the temple with binoculars, then floated down safely with a parachute.
12. The villain spotted the temple with binoculars, then launched a bright signal flare.

Answer Key

Mystery of the Lost Sun Disk

Culprit: Marcus Moss

Lantern Torch · Rope Ladder · Right Handed · Blue Feather · Afraid of Bats

Trail: Start 21 → Clue 1 19 → Clue 2 11 → Clue 3 6 → Clue 4 4 → Clue 5 1

Clue 1 (Exponents): "THE SUSPECT DOES NOT CARRY A SIGNAL FLARE"

$12^2 = 144$ (T) · $10^2 = 100$ (S) · $11^2 = 121$ (E) · $2^3 = 8$ (O) · $21^2 = 441$ (I) · $3^5 = 243$ (F) · $8^3 = 512$ (C) · $3^3 = 27$ (D) · $2^2 = 4$ (R) · $3^4 = 81$ (Y) · $2^8 = 256$ (N) · $6^3 = 216$ (H) · $15^2 = 225$ (A) · $14^2 = 196$ (P) · $5^4 = 625$ (L) · $3^6 = 729$ (U) · $5^3 = 125$ (G)

Clue 2 (Square roots): "THE TRACKS WERE MADE BY A RIGHT HANDED SNEAK"

$\sqrt{289} = 17$ (T) · $\sqrt{100} = 10$ (W) · $\sqrt{324} = 18$ (N) · $\sqrt{121} = 11$ (A) · $\sqrt{64} = 8$ (B) · $\sqrt{36} = 6$ (H) · $\sqrt{529} = 23$ (M) · $\sqrt{361} = 19$ (Y) · $\sqrt{16} = 4$ (S) · $\sqrt{256} = 16$ (D) · $\sqrt{196} = 14$ (E) · $\sqrt{484} = 22$ (G) · $\sqrt{625} = 25$ (K) · $\sqrt{9} = 3$ (C) · $\sqrt{4} = 2$ (R) · $\sqrt{400} = 20$ (I)

Clue 3 (Pythagorean theorem): "THE CULPRIT RAN AWAY FROM A SWARM OF BATS"

legs 3 and 4, hypotenuse = 5 (T) · legs 32 and 60, hypotenuse = 68 (L) · legs 20 and 21, hypotenuse = 29 (O) · legs 18 and 80, hypotenuse = 82 (S) · legs 20 and 48, hypotenuse = 52 (P) · legs 8 and 15, hypotenuse = 17 (R) · legs 40 and 42, hypotenuse = 58 (W) · legs 24 and 45, hypotenuse = 51 (Y) · legs 24 and 32, hypotenuse = 40 (A) · legs 6 and 8, hypotenuse = 10 (C) · legs 14 and 48, hypotenuse = 50 (H) · legs 9 and 12, hypotenuse = 15 (F) · legs 12 and 16, hypotenuse = 20 (U) · legs 60 and 63, hypotenuse = 87 (I) · legs 10 and 24, hypotenuse = 26 (M) · legs 7 and 24, hypotenuse = 25 (B) · legs 9 and 40, hypotenuse = 41 (N) · legs 5 and 12, hypotenuse = 13 (E)

Clue 4 (Order of operations): "THE DETECTIVE SPOTTED A BLUE FEATHER"

$59 + 9 \times 2 = 77$ (T) · $12 \times 9 - 20 = 88$ (E) · $8 \times 8 - 7 = 57$ (B) · $65 + 2 \times 5 = 75$ (V) · $77 + 4 \times 5 = 97$ (R) · $10 \times 12 - 15 = 105$ (P) · $9 \times 9 - 17 = 64$ (C) · $9 \times 2 - 12 = 6$ (A) · $5 \times 12 - 29 = 31$ (U) · $9 \times 8 - 4 = 68$ (I) · $8 \times 5 - 13 = 27$ (O) · $11 \times 12 - 12 = 120$ (F) · $5 + 2 \times 3 = 11$ (L) · $7 + 5 \times 7 = 42$ (D) · $67 + 4 \times 3 = 79$ (H) · $11 \times 11 - 27 = 94$ (S)

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

$2x + 10 = 20, x = 5$ · $6x + 6 = 18, x = 2$ · $5x + 9 = 59, x = 10$ · $4x + 6 = 50, x = 11$ · $4x + 7 = 11, x = 1$ · $2x + 7 = 31, x = 12$ · $3x + 5 = 26, x = 7$ · $2x + 10 = 22, x = 6$ · $4x + 5 = 41, x = 9$ · $3x + 12 = 24, x = 4$ · $3x + 10 = 19, x = 3$