The Case of the Missing Golden Sun Disk

Grade 8 math · Exponents, Square roots, Pythagorean theorem, Order of operations, Two-step equations · Reading level grades 7-9

Detective: _____ **Date:** _____

During a midnight storm at the Crestwood Citadel, an unknown intruder broke into the main vault and vanished with the priceless Golden Sun Disk. Cryptic field logs and equipment clues were left scattered along the escape trail.

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 Shadow Raider is _____

Possible suspects

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

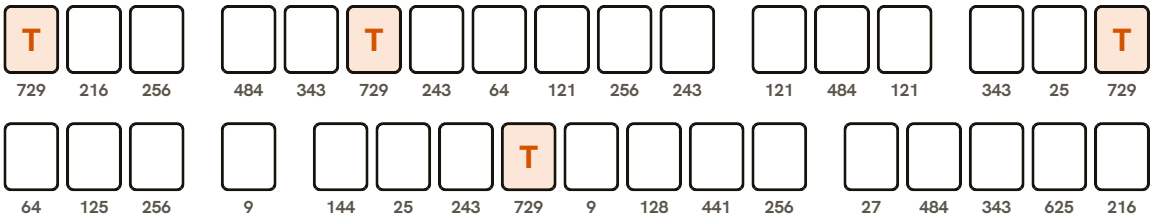
NAME	SPECIALIST GEAR	SECONDARY TOOL	DOMINANT HAND	HAIRSTYLE	VULNERABILITY
Jacques Cousteau	sonic whistle	decoy flare	left handed	braid hairstyle	loud sound
Howard Carter	night goggles	climbing pick	left handed	short crop hair	bright light
Cruz Coronado	grappling hook	torch light	right handed	short crop hair	water spray
Evie Carnahan	grappling hook	decoy flare	right handed	ponytail hair	water spray
Thor Heyerdahl	grappling hook	climbing pick	right handed	ponytail hair	loud sound
Nathan Drake	grappling hook	torch light	left handed	braid hairstyle	loud sound
Lara Stone	night goggles	torch light	left handed	braid hairstyle	water spray
Sylvia Earle	zipline kit	map compass	left handed	ponytail hair	water spray
Rex Conquest	zipline kit	climbing pick	right handed	short crop hair	water spray
Roy Chapman	zipline kit	decoy flare	left handed	short crop hair	bright light
Maya Lin	sonic whistle	decoy flare	left handed	short crop hair	water spray
Carter Kane	grappling hook	climbing pick	left handed	braid hairstyle	loud sound
Ruby Roundhouse	night goggles	torch light	right handed	braid hairstyle	water spray
Sam Swift	sonic whistle	decoy flare	right handed	ponytail hair	water spray
Amelia Gear	smoke bomb	climbing pick	right handed	ponytail hair	water spray
Percy Fawcett	grappling hook	climbing pick	right handed	ponytail hair	water spray
Charles Darwin	sonic whistle	decoy flare	right handed	ponytail hair	bright light
Gertrude Bell	grappling hook	torch light	left handed	short crop hair	bright light
Mary Leakey	smoke bomb	portable winch	right handed	ponytail hair	water spray
Rick Oconnell	grappling hook	portable winch	right handed	short crop hair	bright light
Henry Jones	grappling hook	climbing pick	right handed	braid hairstyle	bright light

make your own at mathcrackers.com

CLUE 1 Exponents

> The vault door is secured with a digital keypad that evaluates power levels using exponential growth patterns to verify override codes.

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



9^3 = ☐ → T

4^3 = ☐ → U

3^2 = ☐ → A

5^2 = ☐ → O

3^3 = ☐ → W

12^2 = ☐ → P

6^3 = ☐ → H

11^2 = ☐ → D

21^2 = ☐ → L

22^2 = ☐ → I

2^7 = ☐ → B

7^3 = ☐ → N

5^4 = ☐ → C

3^5 = ☐ → R

5^3 = ☐ → S

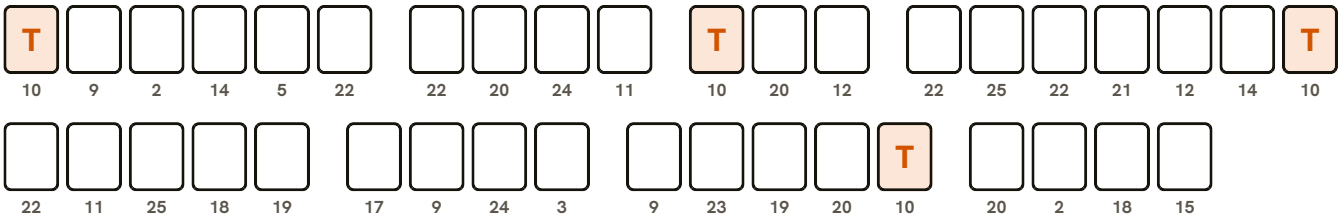
4^4 = ☐ → E

Scratch space:

CLUE 2 Square roots

> To determine the precise dimensions of the breached stone wall, the field team uses grid measurements requiring square roots.

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



sqrt(100) = ☐ → T

sqrt(529) = ☐ → I

sqrt(625) = ☐ → U

sqrt(196) = ☐ → C

sqrt(144) = ☐ → E

sqrt(289) = ☐ → F

sqrt(361) = ☐ → G

sqrt(4) = ☐ → A

sqrt(9) = ☐ → M

sqrt(225) = ☐ → D

sqrt(400) = ☐ → H

sqrt(576) = ☐ → O

sqrt(324) = ☐ → N

sqrt(121) = ☐ → W

sqrt(484) = ☐ → S

sqrt(81) = ☐ → R

sqrt(25) = ☐ → K

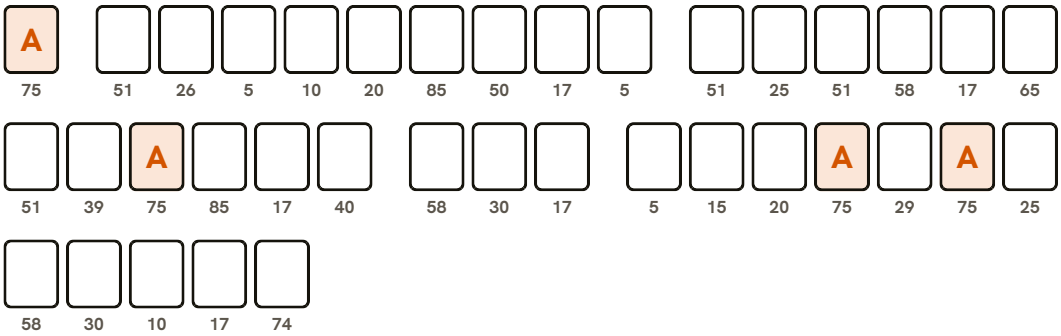
sqrt(441) = ☐ → P

Scratch space:

CLUE 3 Pythagorean theorem

> The escape path cuts directly across a right-angled ravine, requiring you to compute the diagonal distance using the Pythagorean theorem.

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



legs 21 and 72, hypotenuse = ☐ → A

legs 25 and 60, hypotenuse = ☐ → M

legs 15 and 36, hypotenuse = ☐ → O

legs 15 and 20, hypotenuse = ☐ → Y

legs 24 and 32, hypotenuse = ☐ → D

legs 10 and 24, hypotenuse = ☐ → P

legs 24 and 70, hypotenuse = ☐ → F

legs 30 and 40, hypotenuse = ☐ → L

legs 6 and 8, hypotenuse = ☐ → I

legs 9 and 12, hypotenuse = ☐ → U

legs 12 and 16, hypotenuse = ☐ → N

legs 8 and 15, hypotenuse = ☐ → E

legs 40 and 42, hypotenuse = ☐ → T

legs 40 and 75, hypotenuse = ☐ → K

legs 20 and 21, hypotenuse = ☐ → W

legs 24 and 45, hypotenuse = ☐ → S

legs 3 and 4, hypotenuse = ☐ → R

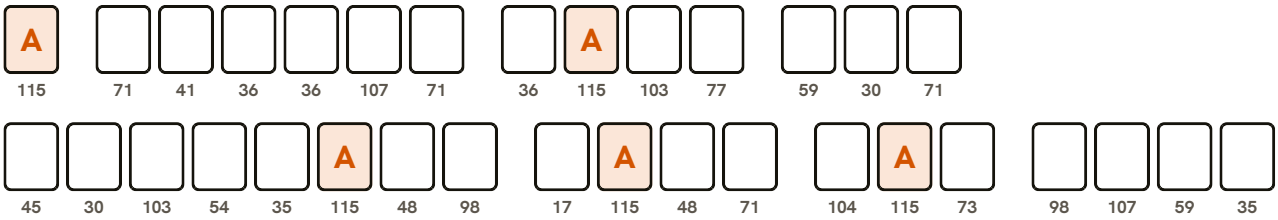
legs 18 and 24, hypotenuse = ☐ → H

Scratch space:

CLUE 4 Order of operations

> A damaged expedition log recovered from the campsite must be decrypted by solving numeric expressions in the correct order of operations.

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



11 × 12 - 17 = ☐ → A	5 × 12 - 6 = ☐ → Y	8 × 10 - 7 = ☐ → S
10 × 6 - 19 = ☐ → U	12 × 5 - 12 = ☐ → I	9 × 12 - 5 = ☐ → N
12 × 9 - 4 = ☐ → W	22 + 2 × 7 = ☐ → B	11 + 6 × 4 = ☐ → T
59 + 6 × 2 = ☐ → R	12 × 9 - 1 = ☐ → E	86 + 6 × 2 = ☐ → L
31 + 7 × 4 = ☐ → F	10 × 9 - 13 = ☐ → D	35 + 5 × 2 = ☐ → P
13 + 2 × 2 = ☐ → H	4 × 9 - 6 = ☐ → O	

Scratch space:

CLUE 5 Two-step equations - the last clue

> Tracking the suspect's remaining fuel supply requires solving balanced two-step equations to reveal the exact distance traveled.

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 + 3 = 38, x = ☐	4x + 10 = 22, x = ☐	5x + 5 = 45, x = ☐	6x + 3 = 63, x = ☐
5x + 12 = 42, x = ☐	4x + 10 = 30, x = ☐	2x + 6 = 14, x = ☐	6x + 4 = 58, x = ☐
5x + 9 = 69, x = ☐	3x + 2 = 35, x = ☐	5x + 9 = 14, x = ☐	

Step 2 - cross out the sentence with each answer:

1. The villain zipped down the cable, then swung a climbing pick.
2. The villain threw a smoke bomb, then swung a climbing pick.
3. The villain swung across the chasm, then swung a climbing pick.
4. The villain put on night goggles, then cranked a portable winch.
5. The villain blew a sonic whistle, then swung a climbing pick.
6. The villain swung across the chasm, then lit up a torch light.
7. The villain swung across the chasm, then launched a decoy flare.
8. The villain blew a sonic whistle, then launched a decoy flare.
9. The villain zipped down the cable, then launched a decoy flare.
10. The villain blew a sonic whistle, then cranked a portable winch.
11. The villain swung across the chasm, then cranked a portable winch.
12. The villain zipped down the cable, then cranked a portable winch.

TEACHER / PARENT

Answer Key

The Case of the Missing Golden Sun Disk

Culprit: Amelia Gear

smoke bomb · climbing pick · right handed · ponytail hair · water spray

Trail: Start 21 → Clue 1 19 → Clue 2 10 → Clue 3 7 → Clue 4 4 → Clue 5 1

Clue 1 (Exponents): "THE INTRUDER DID NOT USE A PORTABLE WINCH"

9^3 = 729 (T) · 4^3 = 64 (U) · 3^2 = 9 (A) · 5^2 = 25 (O) · 3^3 = 27 (W) · 12^2 = 144 (P) · 6^3 = 216 (H) · 11^2 = 121 (D) · 21^2 = 441 (L) · 22^2 = 484 (I) · 2^7 = 128 (B) · 7^3 = 343 (N) · 5^4 = 625 (C) · 3^5 = 243 (R) · 5^3 = 125 (S) · 4^4 = 256 (E)

Clue 2 (Square roots): "TRACKS SHOW THE SUSPECT SWUNG FROM RIGHT HAND"

sqrt(100) = 10 (T) · sqrt(529) = 23 (I) · sqrt(625) = 25 (U) · sqrt(196) = 14 (C) · sqrt(144) = 12 (E) · sqrt(289) = 17 (F) · sqrt(361) = 19 (G) · sqrt(4) = 2 (A) · sqrt(9) = 3 (M) · sqrt(225) = 15 (D) · sqrt(400) = 20 (H) · sqrt(576) = 24 (O) · sqrt(324) = 18 (N) · sqrt(121) = 11 (W) · sqrt(484) = 22 (S) · sqrt(81) = 9 (R) · sqrt(25) = 5 (K) · sqrt(441) = 21 (P)

Clue 3 (Pythagorean theorem): "A SPRINKLER SYSTEM SOAKED THE RUNAWAY THIEF"

legs 21 and 72, hypotenuse = 75 (A) · legs 25 and 60, hypotenuse = 65 (M) · legs 15 and 36, hypotenuse = 39 (O) · legs 15 and 20, hypotenuse = 25 (Y) · legs 24 and 32, hypotenuse = 40 (D) · legs 10 and 24, hypotenuse = 26 (P) · legs 24 and 70, hypotenuse = 74 (F) · legs 30 and 40, hypotenuse = 50 (L) · legs 6 and 8, hypotenuse = 10 (I) · legs 9 and 12, hypotenuse = 15 (U) · legs 12 and 16, hypotenuse = 20 (N) · legs 8 and 15, hypotenuse = 17 (E) · legs 40 and 42, hypotenuse = 58 (T) · legs 40 and 75, hypotenuse = 85 (K) · legs 20 and 21, hypotenuse = 29 (W) · legs 24 and 45, hypotenuse = 51 (S) · legs 3 and 4, hypotenuse = 5 (R) · legs 18 and 24, hypotenuse = 30 (H)

Clue 4 (Order of operations): "A RUBBER BAND FOR PONYTAIL HAIR WAS LEFT"

11 × 12 - 17 = 115 (A) · 5 × 12 - 6 = 54 (Y) · 8 × 10 - 7 = 73 (S) · 10 × 6 - 19 = 41 (U) · 12 × 5 - 12 = 48 (I) · 9 × 12 - 5 = 103 (N) · 12 × 9 - 4 = 104 (W) · 22 + 2 × 7 = 36 (B) · 11 + 6 × 4 = 35 (T) · 59 + 6 × 2 = 71 (R) · 12 × 9 - 1 = 107 (E) · 86 + 6 × 2 = 98 (L) · 31 + 7 × 4 = 59 (F) · 10 × 9 - 13 = 77 (D) · 35 + 5 × 2 = 45 (P) · 13 + 2 × 2 = 17 (H) · 4 × 9 - 6 = 30 (O)

Clue 5 (Two-step equations): surviving statement is box 2 → Amelia Gear

5x + 3 = 38, x = 7 · 4x + 10 = 22, x = 3 · 5x + 5 = 45, x = 8 · 6x + 3 = 63, x = 10 · 5x + 12 = 42, x = 6 · 4x + 10 = 30, x = 5 · 2x + 6 = 14, x = 4 · 6x + 4 = 58, x = 9 · 5x + 9 = 69, x = 12 · 3x + 2 = 35, x = 11 · 5x + 9 = 14, x = 1