The Case of the Missing Cloud Crystal

Grade 10 math · Pythagorean theorem, Square roots, Exponents, Order of operations · Reading level grades 7-9

Detective: _____ **Date:** _____

During the annual Sky Citadel Regatta, someone sabotaged the main power grid and pinched the hyper-crystal powering the flagship. You must examine the flight logs and physical evidence left at the hangar bay to narrow down the suspects before the culprit escapes into the slipstream.

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 Sky Bandit is _____

Possible suspects

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

NAME	AIRSHIP GEAR	GADGET	GLOVE HAND	GOGGLE STRAP COLOR	TRICKED BY
Pilot Clara	Magnetic Boots	Smoke Canister	Left Handed	Copper Strap	Net Trap
Stoker Oscar	Brass Compass	Thermal Scanner	Left Handed	Leather Strap	Net Trap
Spotter Willa	Steam Jetpack	Signal Whistle	Left Handed	Copper Strap	Net Trap
Officer Greta	Glider Wings	Signal Whistle	Left Handed	Leather Strap	Whistle Blast
Scout Elena	Brass Compass	Smoke Canister	Left Handed	Copper Strap	Net Trap
Tracker Yael	Glider Wings	Signal Whistle	Left Handed	Leather Strap	Net Trap
Sailor Stella	Grapple Launcher	Decoy Flare	Right Handed	Silver Strap	Mirror Reflection
Signalman Maya	Glider Wings	Flash Beacon	Right Handed	Silver Strap	Whistle Blast
Quartermaster Cora	Brass Compass	Smoke Canister	Right Handed	Silver Strap	Net Trap
Mechanic Felix	Grapple Launcher	Signal Whistle	Right Handed	Leather Strap	Net Trap
Cadet Quinn	Steam Jetpack	Smoke Canister	Right Handed	Silver Strap	Whistle Blast
Archer Reed	Grapple Launcher	Signal Whistle	Right Handed	Copper Strap	Net Trap
Rigging Iris	Steam Jetpack	Smoke Canister	Left Handed	Copper Strap	Net Trap
Scholar Una	Magnetic Boots	Thermal Scanner	Left Handed	Leather Strap	Whistle Blast
Vanguard Vance	Steam Jetpack	Signal Whistle	Left Handed	Leather Strap	Net Trap
Helmsman Jasper	Brass Compass	Signal Whistle	Left Handed	Leather Strap	Mirror Reflection
Engineer Drake	Grapple Launcher	Signal Whistle	Left Handed	Silver Strap	Net Trap
Rigger Leo	Glider Wings	Thermal Scanner	Left Handed	Copper Strap	Net Trap
Lookout Piper	Grapple Launcher	Smoke Canister	Left Handed	Leather Strap	Net Trap
Captain Avery	Glider Wings	Smoke Canister	Right Handed	Copper Strap	Mirror Reflection
Tinker Theo	Brass Compass	Decoy Flare	Left Handed	Leather Strap	Net Trap

CLUE 1 Pythagorean theorem

You plot the airship flight path on a grid to find the diagonal distance between the hangar towers.

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

T									T								T		
74	26	116	10	51	10	20	116	5	74	15	30	116	10	75	30	74			
51	10	116	82	15	116	5	30	87	123	39	82	40	116						

legs 24 and 70, hypotenuse = ☐ → T

legs 10 and 24, hypotenuse = ☐ → H

legs 21 and 72, hypotenuse = ☐ → N

legs 18 and 24, hypotenuse = ☐ → O

legs 80 and 84, hypotenuse = ☐ → E

legs 60 and 63, hypotenuse = ☐ → Y

legs 6 and 8, hypotenuse = ☐ → S

legs 12 and 16, hypotenuse = ☐ → P

legs 24 and 32, hypotenuse = ☐ → R

legs 15 and 36, hypotenuse = ☐ → L

legs 27 and 120, hypotenuse = ☐ → F

legs 18 and 80, hypotenuse = ☐ → A

legs 24 and 45, hypotenuse = ☐ → U

legs 9 and 12, hypotenuse = ☐ → D

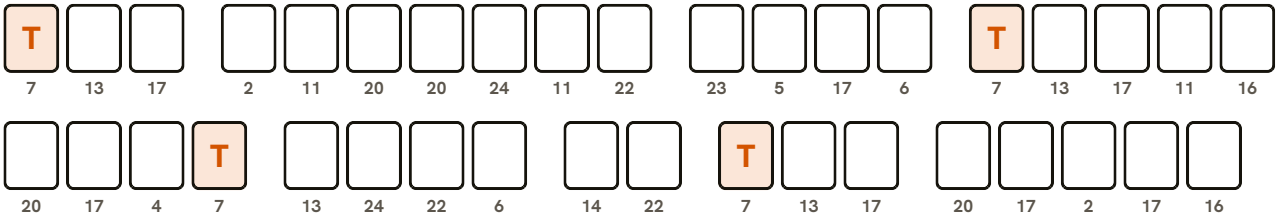
legs 3 and 4, hypotenuse = ☐ → C

Scratch space:

CLUE 2 Square roots

To unlock the deck vault, you must find the side length of the square landing pad.

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



sqrt(49) = ☐ → T

sqrt(25) = ☐ → S

sqrt(289) = ☐ → E

sqrt(400) = ☐ → L

sqrt(529) = ☐ → U

sqrt(121) = ☐ → I

sqrt(196) = ☐ → O

sqrt(36) = ☐ → D

sqrt(576) = ☐ → A

sqrt(169) = ☐ → H

sqrt(484) = ☐ → N

sqrt(16) = ☐ → F

sqrt(4) = ☐ → V

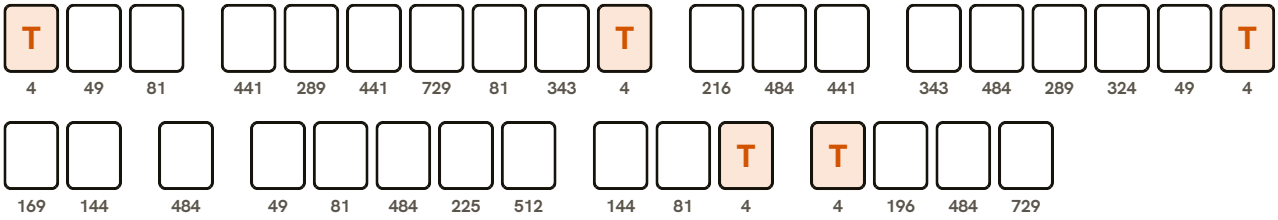
sqrt(256) = ☐ → R

Scratch space:

CLUE 3 Exponents

> The pressure sensor logs reveal energy output rising by powers of two during the breach.

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



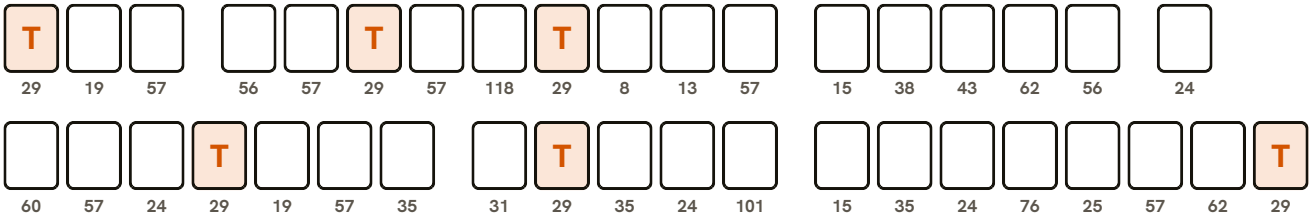
- 2^2 = ☐ → T
- 22^2 = ☐ → A
- 3^4 = ☐ → E
- 21^2 = ☐ → S
- 13^2 = ☐ → I
- 8^3 = ☐ → Y
- 15^2 = ☐ → V
- 18^2 = ☐ → G
- 6^3 = ☐ → W
- 7^3 = ☐ → C
- 14^2 = ☐ → R
- 3^6 = ☐ → P
- 7^2 = ☐ → H
- 17^2 = ☐ → U
- 12^2 = ☐ → N

Scratch space:

CLUE 4 Order of operations

Decoding the vault logs requires evaluating the multi-step security sequence.

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



8 × 4 - 3 = ☐ → T	7 × 12 - 27 = ☐ → E	25 + 3 × 6 = ☐ → U
5 × 7 - 4 = ☐ → S	4 + 9 × 8 = ☐ → G	11 + 4 × 2 = ☐ → H
74 + 9 × 3 = ☐ → P	12 × 4 - 24 = ☐ → A	55 + 7 × 9 = ☐ → C
11 + 2 × 7 = ☐ → M	3 + 6 × 2 = ☐ → F	22 + 8 × 2 = ☐ → O
4 × 6 - 16 = ☐ → I	11 × 6 - 6 = ☐ → L	6 × 10 - 25 = ☐ → R
9 + 2 × 2 = ☐ → V	14 + 7 × 6 = ☐ → D	34 + 7 × 4 = ☐ → N

Scratch space:

CLUE 5 Square roots - the last clue

> Measuring the area of the stolen crystal room gives the side dimension of its square base.

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:

sqrt(36) = ☐ sqrt(121) = ☐ sqrt(1) = ☐ sqrt(9) = ☐ sqrt(4) = ☐

sqrt(25) = ☐ sqrt(49) = ☐ sqrt(144) = ☐ sqrt(64) = ☐ sqrt(81) = ☐

sqrt(16) = ☐

Step 2 - cross out the sentence with each answer:

1. The villain deployed glider wings, then signaled allies with a whistle.
2. The villain checked a brass compass, then blinded guards with a flash beacon.
3. The villain blasted a steam jetpack, then blinded guards with a flash beacon.
4. The villain marched with magnetic boots, then blinded guards with a flash beacon.
5. The villain checked a brass compass, then signaled allies with a whistle.
6. The villain fired a grapple launcher, then vanished behind a smoke canister.
7. The villain fired a grapple launcher, then signaled allies with a whistle.
8. The villain marched with magnetic boots, then vanished behind a smoke canister.
9. The villain deployed glider wings, then blinded guards with a flash beacon.
10. The villain checked a brass compass, then tracked targets with a thermal scanner.
11. The villain blasted a steam jetpack, then signaled allies with a whistle.
12. The villain blasted a steam jetpack, then tracked targets with a thermal scanner.

TEACHER / PARENT

Answer Key

The Case of the Missing Cloud Crystal

Culprit: Stoker Oscar

Brass Compass · Thermal Scanner · Left Handed · Leather Strap · Net Trap

Trail: Start 21 → Clue 1 19 → Clue 2 13 → Clue 3 10 → Clue 4 4 → Clue 5 1

Clue 1 (Pythagorean theorem): "THE SUSPECT DOES NOT USE A DECOY FLARE"

legs 24 and 70, hypotenuse = 74 (T) · legs 10 and 24, hypotenuse = 26 (H) · legs 21 and 72, hypotenuse = 75 (N) · legs 18 and 24, hypotenuse = 30 (O) · legs 80 and 84, hypotenuse = 116 (E) · legs 60 and 63, hypotenuse = 87 (Y) · legs 6 and 8, hypotenuse = 10 (S) · legs 12 and 16, hypotenuse = 20 (P) · legs 24 and 32, hypotenuse = 40 (R) · legs 15 and 36, hypotenuse = 39 (L) · legs 27 and 120, hypotenuse = 123 (F) · legs 18 and 80, hypotenuse = 82 (A) · legs 24 and 45, hypotenuse = 51 (U) · legs 9 and 12, hypotenuse = 15 (D) · legs 3 and 4, hypotenuse = 5 (C)

Clue 2 (Square roots): "THE VILLAIN USED THEIR LEFT HAND ON THE LEVER"

sqrt(49) = 7 (T) · sqrt(25) = 5 (S) · sqrt(289) = 17 (E) · sqrt(400) = 20 (L) · sqrt(529) = 23 (U) · sqrt(121) = 11 (I) · sqrt(196) = 14 (O) · sqrt(36) = 6 (D) · sqrt(576) = 24 (A) · sqrt(169) = 13 (H) · sqrt(484) = 22 (N) · sqrt(16) = 4 (F) · sqrt(4) = 2 (V) · sqrt(256) = 16 (R)

Clue 3 (Exponents): "THE SUSPECT WAS CAUGHT IN A HEAVY NET TRAP"

2^2 = 4 (T) · 22^2 = 484 (A) · 3^4 = 81 (E) · 21^2 = 441 (S) · 13^2 = 169 (I) · 8^3 = 512 (Y) · 15^2 = 225 (V) · 18^2 = 324 (G) · 6^3 = 216 (W) · 7^3 = 343 (C) · 14^2 = 196 (R) · 3^6 = 729 (P) · 7^2 = 49 (H) · 17^2 = 289 (U) · 12^2 = 144 (N)

Clue 4 (Order of operations): "THE DETECTIVE FOUND A LEATHER STRAP FRAGMENT"

8 × 4 - 3 = 29 (T) · 7 × 12 - 27 = 57 (E) · 25 + 3 × 6 = 43 (U) · 5 × 7 - 4 = 31 (S) · 4 + 9 × 8 = 76 (G) · 11 + 4 × 2 = 19 (H) · 74 + 9 × 3 = 101 (P) · 12 × 4 - 24 = 24 (A) · 55 + 7 × 9 = 118 (C) · 11 + 2 × 7 = 25 (M) · 3 + 6 × 2 = 15 (F) · 22 + 8 × 2 = 38 (O) · 4 × 6 - 16 = 8 (I) · 11 × 6 - 6 = 60 (L) · 6 × 10 - 25 = 35 (R) · 9 + 2 × 2 = 13 (V) · 14 + 7 × 6 = 56 (D) · 34 + 7 × 4 = 62 (N)

Clue 5 (Square roots): surviving statement is box 10 → Stoker Oscar

sqrt(36) = 6 · sqrt(121) = 11 · sqrt(1) = 1 · sqrt(9) = 3 · sqrt(4) = 2 · sqrt(25) = 5 · sqrt(49) = 7 · sqrt(144) = 12 · sqrt(64) = 8 · sqrt(81) = 9 · sqrt(16) = 4