Sky-Pirates of the Stratosphere

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

Detective: _____ **Date:** _____

A rogue airship pirate has stolen the legendary Golden Compass from the Sky Patrol academy. Only you can help trace the coordinates of the getaway vessel and unmask the culprit!

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

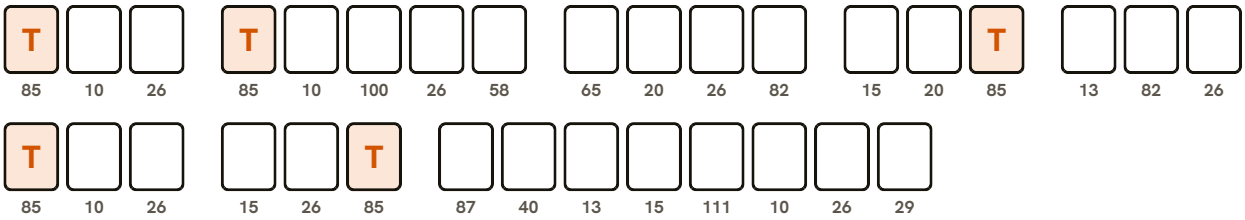
Cross off a row as each clue rules it out. The one left at the end is the culprit.

NAME	FLIGHT GEAR	STOLEN GADGET	SIGNATURE PATCH	HAIR STREAK COLOR	TACTICAL WEAKNESS
Kidd	glider wings	net launcher	right shoulder patch	forest green streak	shrill dog whistles
Drake	rocket boots	cloud bomb	right shoulder patch	forest green streak	shrill dog whistles
Bonnie	glider wings	laser cutter	right shoulder patch	forest green streak	spicy chili snacks
Morgan	glider wings	laser cutter	right shoulder patch	forest green streak	dazzling bright flashes
James	wind sail	laser cutter	right shoulder patch	neon blue streak	spicy chili snacks
Valentina	grappling hook	sonic whistle	left shoulder patch	neon blue streak	shrill dog whistles
Buzz	glider wings	sonic whistle	left shoulder patch	forest green streak	dazzling bright flashes
Bessie	glider wings	cloud bomb	right shoulder patch	bright red streak	shrill dog whistles
Roger	grappling hook	solar decoder	left shoulder patch	forest green streak	spicy chili snacks
Avery	glider wings	sonic whistle	left shoulder patch	forest green streak	shrill dog whistles
Alex	wind sail	cloud bomb	left shoulder patch	neon blue streak	dazzling bright flashes
Steve	wind sail	laser cutter	right shoulder patch	bright red streak	dazzling bright flashes
Mae	magnetic boots	solar decoder	right shoulder patch	forest green streak	shrill dog whistles
Wendy	glider wings	cloud bomb	right shoulder patch	forest green streak	spicy chili snacks
Hook	grappling hook	sonic whistle	right shoulder patch	forest green streak	dazzling bright flashes
Wilbur	grappling hook	net launcher	left shoulder patch	neon blue streak	dazzling bright flashes
Amelia	glider wings	laser cutter	left shoulder patch	neon blue streak	shrill dog whistles
Sally	rocket boots	sonic whistle	left shoulder patch	bright red streak	dazzling bright flashes
Charles	magnetic boots	sonic whistle	right shoulder patch	forest green streak	shrill dog whistles
Yuri	glider wings	laser cutter	left shoulder patch	forest green streak	dazzling bright flashes
Flint	wind sail	sonic whistle	right shoulder patch	forest green streak	shrill dog whistles

CLUE 1 Pythagorean theorem

> Our patrol ship needs to calculate the shortest diagonal path between two floating docks to cut off the escape route.

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



legs 40 and 75, hypotenuse = ☐ → **T**

legs 10 and 24, hypotenuse = ☐ → **E**

legs 36 and 105, hypotenuse = ☐ → **C**

legs 25 and 60, hypotenuse = ☐ → **D**

legs 12 and 16, hypotenuse = ☐ → **O**

legs 6 and 8, hypotenuse = ☐ → **H**

legs 18 and 80, hypotenuse = ☐ → **S**

legs 20 and 21, hypotenuse = ☐ → **R**

legs 28 and 96, hypotenuse = ☐ → **I**

legs 60 and 63, hypotenuse = ☐ → **L**

legs 40 and 42, hypotenuse = ☐ → **F**

legs 9 and 12, hypotenuse = ☐ → **N**

legs 24 and 32, hypotenuse = ☐ → **A**

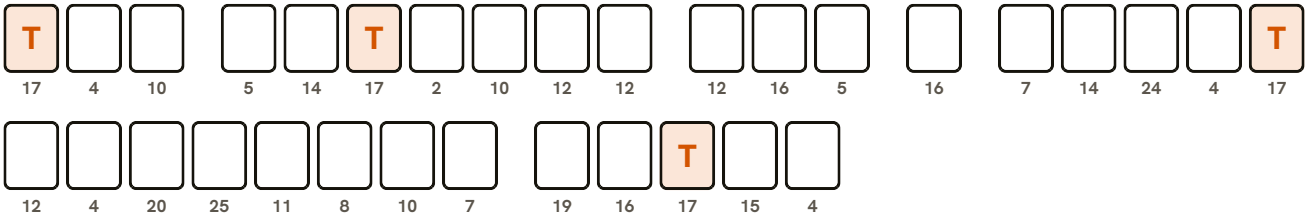
legs 5 and 12, hypotenuse = ☐ → **U**

Scratch space:

CLUE 2 Square roots

The thief left a locked cargo crate with a square grid lock, and we must find the side length from its total area.

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



sqrt(289) = ☐ → T

sqrt(361) = ☐ → P

sqrt(121) = ☐ → L

sqrt(625) = ☐ → U

sqrt(144) = ☐ → S

sqrt(196) = ☐ → I

sqrt(64) = ☐ → D

sqrt(25) = ☐ → W

sqrt(256) = ☐ → A

sqrt(49) = ☐ → R

sqrt(4) = ☐ → N

sqrt(100) = ☐ → E

sqrt(576) = ☐ → G

sqrt(16) = ☐ → H

sqrt(400) = ☐ → O

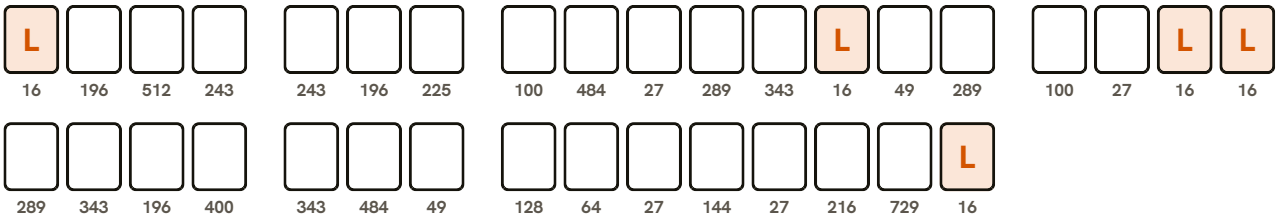
sqrt(225) = ☐ → C

Scratch space:

CLUE 3 Exponents

> A distress beacon is multiplying its signal strength at an exponential rate, and we need to determine its final power output.

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



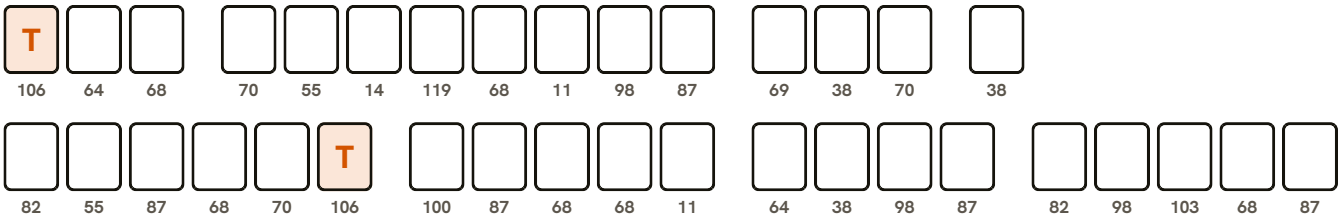
4^2 = ☐ → L	3^6 = ☐ → A	20^2 = ☐ → P	22^2 = ☐ → H
4^3 = ☐ → R	8^3 = ☐ → U	12^2 = ☐ → M	14^2 = ☐ → O
7^3 = ☐ → T	15^2 = ☐ → G	7^2 = ☐ → E	6^3 = ☐ → N
3^3 = ☐ → I	10^2 = ☐ → W	17^2 = ☐ → S	3^5 = ☐ → D
2^7 = ☐ → C			

Scratch space:

CLUE 4 Order of operations

> To bypass the airship's encrypted firewall, we must solve a multi-step equation in the exact mathematical sequence.

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



43 + 9 × 7 = ☐ → T

11 × 9 - 1 = ☐ → I

11 × 12 - 29 = ☐ → B

3 × 8 - 10 = ☐ → U

12 × 5 - 5 = ☐ → O

7 × 12 - 14 = ☐ → S

8 × 10 - 11 = ☐ → W

12 × 9 - 8 = ☐ → G

40 + 7 × 4 = ☐ → E

1 + 2 × 5 = ☐ → N

12 × 10 - 1 = ☐ → V

76 + 3 × 2 = ☐ → F

12 × 7 - 20 = ☐ → H

14 + 8 × 3 = ☐ → A

78 + 3 × 3 = ☐ → R

Scratch space:

CLUE 5 Square roots - the last clue

> We need to analyze the perfect square dimensions of the landing pad where the getaway vessel temporarily docked.

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(49) = ☐ sqrt(121) = ☐ sqrt(1) = ☐ sqrt(64) = ☐ sqrt(100) = ☐

sqrt(16) = ☐ sqrt(36) = ☐ sqrt(9) = ☐ sqrt(144) = ☐ sqrt(81) = ☐

sqrt(4) = ☐

Step 2 - cross out the sentence with each answer:

1. The villain caught the thermal draft, then shattered the alarm glass with a sonic whistle.
2. The villain swung through the rigging, then shattered the alarm glass with a sonic whistle.
3. The villain blasted past the guard towers, then snared the guarding falcons with a net launcher.
4. The villain swung through the rigging, then unlocked the secure safe with a solar decoder.
5. The villain blasted past the guard towers, then blinded the security cameras with a cloud bomb.
6. The villain caught the thermal draft, then snared the guarding falcons with a net launcher.
7. The villain scaled the metallic hull, then shattered the alarm glass with a sonic whistle.
8. The villain glided over the canyon, then sliced open the vault door with a laser cutter.
9. The villain caught the thermal draft, then unlocked the secure safe with a solar decoder.
10. The villain glided over the canyon, then shattered the alarm glass with a sonic whistle.
11. The villain scaled the metallic hull, then unlocked the secure safe with a solar decoder.
12. The villain scaled the metallic hull, then snared the guarding falcons with a net launcher.

TEACHER / PARENT

Answer Key

Sky-Pirates of the Stratosphere

Culprit: Drake

rocket boots · cloud bomb · right shoulder patch · forest green streak · shrill dog whistles

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

Clue 1 (Pythagorean theorem): "THE THIEF DOES NOT USE THE NET LAUNCHER"

legs 40 and 75, hypotenuse = 85 (T) · legs 10 and 24, hypotenuse = 26 (E) · legs 36 and 105, hypotenuse = 111 (C) · legs 25 and 60, hypotenuse = 65 (D) · legs 12 and 16, hypotenuse = 20 (O) · legs 6 and 8, hypotenuse = 10 (H) · legs 18 and 80, hypotenuse = 82 (S) · legs 20 and 21, hypotenuse = 29 (R) · legs 28 and 96, hypotenuse = 100 (I) · legs 60 and 63, hypotenuse = 87 (L) · legs 40 and 42, hypotenuse = 58 (F) · legs 9 and 12, hypotenuse = 15 (N) · legs 24 and 32, hypotenuse = 40 (A) · legs 5 and 12, hypotenuse = 13 (U)

Clue 2 (Square roots): "THE WITNESS SAW A RIGHT SHOULDER PATCH"

sqrt(289) = 17 (T) · sqrt(361) = 19 (P) · sqrt(121) = 11 (L) · sqrt(625) = 25 (U) · sqrt(144) = 12 (S) · sqrt(196) = 14 (I) · sqrt(64) = 8 (D) · sqrt(25) = 5 (W) · sqrt(256) = 16 (A) · sqrt(49) = 7 (R) · sqrt(4) = 2 (N) · sqrt(100) = 10 (E) · sqrt(576) = 24 (G) · sqrt(16) = 4 (H) · sqrt(400) = 20 (O) · sqrt(225) = 15 (C)

Clue 3 (Exponents): "LOUD DOG WHISTLES WILL STOP THE CRIMINAL"

4^2 = 16 (L) · 3^6 = 729 (A) · 20^2 = 400 (P) · 22^2 = 484 (H) · 4^3 = 64 (R) · 8^3 = 512 (U) · 12^2 = 144 (M) · 14^2 = 196 (O) · 7^3 = 343 (T) · 15^2 = 225 (G) · 7^2 = 49 (E) · 6^3 = 216 (N) · 3^3 = 27 (I) · 10^2 = 100 (W) · 17^2 = 289 (S) · 3^5 = 243 (D) · 2^7 = 128 (C)

Clue 4 (Order of operations): "THE SOUVENIR WAS A FOREST GREEN HAIR FIBER"

43 + 9 × 7 = 106 (T) · 11 × 9 - 1 = 98 (I) · 11 × 12 - 29 = 103 (B) · 3 × 8 - 10 = 14 (U) · 12 × 5 - 5 = 55 (O) · 7 × 12 - 14 = 70 (S) · 8 × 10 - 11 = 69 (W) · 12 × 9 - 8 = 100 (G) · 40 + 7 × 4 = 68 (E) · 1 + 2 × 5 = 11 (N) · 12 × 10 - 1 = 119 (V) · 76 + 3 × 2 = 82 (F) · 12 × 7 - 20 = 64 (H) · 14 + 8 × 3 = 38 (A) · 78 + 3 × 3 = 87 (R)

Clue 5 (Square roots): surviving statement is box 5 → Drake

sqrt(49) = 7 · sqrt(121) = 11 · sqrt(1) = 1 · sqrt(64) = 8 · sqrt(100) = 10 · sqrt(16) = 4 · sqrt(36) = 6 · sqrt(9) = 3 · sqrt(144) = 12 · sqrt(81) = 9 · sqrt(4) = 2