



The Skydom Reach Heist

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

Detective: _____ Date: _____

A rogue sky-thief has swiped the ancient Golden Astrolabe from the Lead Cartographer's floating workshop! The Academy needs our best junior detectives to analyze the flight logs, track the culprit's gear, and crack the codes before they vanish into the storm clouds.

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 sky-thief is _____

Possible suspects

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

NAME	PRIMARY GEAR	BACKUP GADGET	HAND GRIP	GOGGLES STYLE	VULNERABILITY
Cadet Wren	magnetic glider	gravel launcher	left handed grip	bright orange visor	high pitch sirens
Cadet Jade	rocket boots	laser pointer	right handed grip	neon green goggles	high pitch sirens
Cadet Leo	sonic whistle	smoke bombs	left handed grip	silver aviators	high pitch sirens
Pilot Gage	rocket boots	decoy drones	left handed grip	neon green goggles	bright flashlights
Cadet Nova	sonic whistle	plasma torch	left handed grip	bright orange visor	bright flashlights
Cadet Zoe	rocket boots	gravel launcher	right handed grip	bright orange visor	sticky foam nets
Pilot Dash	stealth cloak	gravel launcher	right handed grip	bright orange visor	sticky foam nets
Explorer Tess	grappling gauntlet	gravel launcher	right handed grip	bright orange visor	high pitch sirens
Explorer Cole	stealth cloak	plasma torch	left handed grip	silver aviators	bright flashlights
Cadet Chase	magnetic glider	smoke bombs	right handed grip	silver aviators	bright flashlights
Cadet Clay	stealth cloak	decoy drones	left handed grip	silver aviators	sticky foam nets
Explorer Finn	stealth cloak	gravel launcher	right handed grip	silver aviators	sticky foam nets
Cadet Ruby	grappling gauntlet	laser pointer	left handed grip	silver aviators	sticky foam nets
Explorer Knox	stealth cloak	smoke bombs	left handed grip	bright orange visor	sticky foam nets
Cadet Toby	grappling gauntlet	smoke bombs	left handed grip	silver aviators	sticky foam nets
Pilot Vance	grappling gauntlet	gravel launcher	left handed grip	neon green goggles	sticky foam nets
Pilot Skye	stealth cloak	gravel launcher	right handed grip	bright orange visor	bright flashlights
Explorer Jett	grappling gauntlet	plasma torch	left handed grip	silver aviators	sticky foam nets
Cadet Reese	rocket boots	gravel launcher	left handed grip	silver aviators	bright flashlights
Cadet Maya	stealth cloak	gravel launcher	left handed grip	silver aviators	sticky foam nets
Pilot Piper	rocket boots	plasma torch	right handed grip	silver aviators	sticky foam nets

CLUE 1 Exponents

The thief's escape glider operates on a variable frequency engine. To track the energy output, we must calculate the power level using an exponential growth formula. Solve this exponent problem to narrow down the backup gear list.

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

T			T															
125	144	36	125	144	441	36	361	100	324	36	4	64	324	125	289	4	36	225

						T				
169	216	225	4	625	225	125	324	49	400	144

$5^3 = \square \rightarrow \text{T}$	$10^2 = \square \rightarrow \text{D}$	$20^2 = \square \rightarrow \text{C}$	$13^2 = \square \rightarrow \text{P}$
$21^2 = \square \rightarrow \text{I}$	$2^6 = \square \rightarrow \text{N}$	$2^2 = \square \rightarrow \text{S}$	$15^2 = \square \rightarrow \text{A}$
$19^2 = \square \rightarrow \text{F}$	$5^4 = \square \rightarrow \text{M}$	$18^2 = \square \rightarrow \text{O}$	$6^2 = \square \rightarrow \text{E}$
$17^2 = \square \rightarrow \text{U}$	$7^2 = \square \rightarrow \text{R}$	$12^2 = \square \rightarrow \text{H}$	$6^3 = \square \rightarrow \text{L}$

Scratch space:

CLUE 2 Square roots

We mapped the landing zone on our coordinate grid, but the signal analyzer only shows the area of the square sector. Find the side length of this square patch using a square root to identify the thief's flight visor.

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

A number line from 0 to 30. The boxes for the numbers 14 and 29 are highlighted in orange and labeled with 'T'.

Number	Label
14	T
15	
20	
10	
20	
4	
3	
12	
15	
17	
5	
14	T
6	
20	
22	
20	
3	
21	
4	
12	
2	
16	
6	
6	
20	
25	
6	
20	
5	
14	T

sqrt(196) = →

sqrt(289) = →

sqrt(9) = → **R**

sqrt(225) = → **H**

sqrt(400) = → **E**

sqrt(4) = → **P**

sqrt(484) = →

$\text{sqrt}(441) = \square \rightarrow \boxed{\text{W}}$

$\text{sqrt}(625) = \boxed{} \rightarrow \boxed{\text{D}}$

sqrt(100) = → **G**

sqrt(25) = → **F**

sqrt(36) = → **L**

$\text{sqrt}(16) =$ $\rightarrow$ **A**

sqrt(256) = → **U**

sqrt(144) = → **S**

Scratch space:

CLUE 3

Pythagorean theorem

The thief escaped by launching a zip-line from a high platform to a cargo ship. By calculating the diagonal distance of the line using the Pythagorean theorem, we can trace where they landed and find their primary gear.

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

T																		
40	30	13	68	37	75	17	51	17	34	51	17	20	20	87	25	51	13	58
			T															
26	34	20	40	39	50	74	34	10	25	17	15							

legs 24 and 32, hypotenuse = → **T**

legs 5 and 12, hypotenuse = → **E**

legs 12 and 35, hypotenuse = → **U**

legs 21 and 72, hypotenuse = → **N**

legs 32 and 60, hypotenuse = → **R**

legs 10 and 24, hypotenuse = → **B**

legs 40 and 42, hypotenuse = → **D**

legs 14 and 48, hypotenuse = → **C**

legs 24 and 45, hypotenuse = → **W**

legs 12 and 16, hypotenuse = → **S**

legs 18 and 24, hypotenuse = → **H**

legs 9 and 12, hypotenuse = → **M**

legs 60 and 63, hypotenuse = → **L**

legs 6 and 8, hypotenuse = → **F**

legs 8 and 15, hypotenuse = → **A**

legs 7 and 24, hypotenuse = → **O**

legs 16 and 30, hypotenuse = → **Y**

legs 15 and 36, hypotenuse = → **I**

legs 24 and 70, hypotenuse = → **K**

Scratch space:

CLUE 4

Order of operations

Our security console has a scrambled lockout code with multiple mathematical signs. We must follow the strict order of operations to solve the multi-step equation and reveal the hand-grip tell left behind.

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

T			T															
27	14	104	27	14	38	104	50	116	120	115	27	19	107	19	38	66	120	50
115	38	116	71	104	66	41	116	19	115	115	104	115						

$11 \times 4 - 17 = \boxed{} \rightarrow \boxed{\text{T}}$

$6 \times 9 - 4 = \boxed{} \rightarrow \boxed{\text{F}}$

$88 + 4 \times 7 = \boxed{} \rightarrow \boxed{\text{L}}$

$14 + 6 \times 4 = \boxed{} \rightarrow \boxed{\text{I}}$

$55 + 2 \times 8 = \boxed{} \rightarrow \boxed{\text{V}}$

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

$88 + 3 \times 9 = \boxed{} \rightarrow \boxed{\text{S}}$

$10 \times 6 - 19 = \boxed{} \rightarrow \boxed{\text{G}}$

$9 \times 4 - 22 = \boxed{} \rightarrow \boxed{\text{H}}$

$12 \times 11 - 28 = \boxed{} \rightarrow \boxed{\text{E}}$

$6 \times 12 - 6 = \boxed{} \rightarrow \boxed{\text{R}}$

$65 + 7 \times 6 = \boxed{} \rightarrow \boxed{\text{P}}$

$6 \times 8 - 29 = \boxed{} \rightarrow \boxed{\text{A}}$

Scratch space:

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

The automatic defense turrets need to be calibrated to the thief's speed. Solve this two-step equation to balance the power grids and determine the thief's ultimate weakness.

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:

$6x + 11 = 29, x = \boxed{}$

$6x + 3 = 51, x = \boxed{}$

$4x + 7 = 23, x = \boxed{}$

$5x + 2 = 62, x = \boxed{}$

$5x + 2 = 27, x = \boxed{}$

$4x + 12 = 36, x = \boxed{}$

$5x + 8 = 53, x = \boxed{}$

$6x + 8 = 50, x = \boxed{}$

$3x + 11 = 44, x = \boxed{}$

$4x + 12 = 16, x = \boxed{}$

$5x + 12 = 22, x = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain jammed the radar, then zipped away on a glider.
2. The villain unlocked the vault, then vanished into the mist.
3. The villain unlocked the vault, then zipped away on a glider.
4. The villain swiped the compass, then bounded across the rooftops.
5. The villain jammed the radar, then bounded across the rooftops.
6. The villain sabotaged the engine, then zipped away on a glider.
7. The villain nabbed the blueprints, then zipped away on a glider.
8. The villain swiped the compass, then escaped via zip-line.
9. The villain nabbed the blueprints, then vanished into the mist.
10. The villain unlocked the vault, then skydived into the clouds.
11. The villain swiped the compass, then zipped away on a glider.
12. The villain unlocked the vault, then escaped via zip-line.

Answer Key

The Skydom Reach Heist

Culprit: Cadet Maya

stealth cloak · gravel launcher · left handed grip · silver aviators · sticky foam nets

Trail: Start 21 → Clue 1 17 → Clue 2 10 → Clue 3 6 → Clue 4 4 → Clue 5 1

Clue 1 (Exponents): "THE THIEF DOES NOT USE A PLASMA TORCH"

$5^3 = 125$ (T) · $10^2 = 100$ (D) · $20^2 = 400$ (C) · $13^2 = 169$ (P) · $21^2 = 441$ (I) · $2^6 = 64$ (N) · $2^2 = 4$ (S) · $15^2 = 225$ (A) · $19^2 = 361$ (F) · $5^4 = 625$ (M) · $18^2 = 324$ (O) · $6^2 = 36$ (E) · $17^2 = 289$ (U) · $7^2 = 49$ (R) · $12^2 = 144$ (H) · $6^3 = 216$ (L)

Clue 2 (Square roots): "THE GEAR SHIFT LEVER WAS PULLED LEFT"

$\sqrt{196} = 14$ (T) · $\sqrt{289} = 17$ (I) · $\sqrt{9} = 3$ (R) · $\sqrt{225} = 15$ (H) · $\sqrt{400} = 20$ (E) · $\sqrt{4} = 2$ (P) · $\sqrt{484} = 22$ (V) · $\sqrt{441} = 21$ (W) · $\sqrt{625} = 25$ (D) · $\sqrt{100} = 10$ (G) · $\sqrt{25} = 5$ (F) · $\sqrt{36} = 6$ (L) · $\sqrt{16} = 4$ (A) · $\sqrt{256} = 16$ (U) · $\sqrt{144} = 12$ (S)

Clue 3 (Pythagorean theorem): "THE RUNAWAY WAS SLOWED BY STICKY FOAM"

legs 24 and 32, hypotenuse = 40 (T) · legs 5 and 12, hypotenuse = 13 (E) · legs 12 and 35, hypotenuse = 37 (U) · legs 21 and 72, hypotenuse = 75 (N) · legs 32 and 60, hypotenuse = 68 (R) · legs 10 and 24, hypotenuse = 26 (B) · legs 40 and 42, hypotenuse = 58 (D) · legs 14 and 48, hypotenuse = 50 (C) · legs 24 and 45, hypotenuse = 51 (W) · legs 12 and 16, hypotenuse = 20 (S) · legs 18 and 24, hypotenuse = 30 (H) · legs 9 and 12, hypotenuse = 15 (M) · legs 60 and 63, hypotenuse = 87 (L) · legs 6 and 8, hypotenuse = 10 (F) · legs 8 and 15, hypotenuse = 17 (A) · legs 7 and 24, hypotenuse = 25 (O) · legs 16 and 30, hypotenuse = 34 (Y) · legs 15 and 36, hypotenuse = 39 (I) · legs 24 and 70, hypotenuse = 74 (K)

Clue 4 (Order of operations): "THE THIEF LOST A PAIR OF SILVER GLASSES"

$11 \times 4 - 17 = 27$ (T) · $6 \times 9 - 4 = 50$ (F) · $88 + 4 \times 7 = 116$ (L) · $14 + 6 \times 4 = 38$ (I) · $55 + 2 \times 8 = 71$ (V) · $11 \times 12 - 12 = 120$ (O) · $88 + 3 \times 9 = 115$ (S) · $10 \times 6 - 19 = 41$ (G) · $9 \times 4 - 22 = 14$ (H) · $12 \times 11 - 28 = 104$ (E) · $6 \times 12 - 6 = 66$ (R) · $65 + 7 \times 6 = 107$ (P) · $6 \times 8 - 29 = 19$ (A)

Clue 5 (Two-step equations): surviving statement is box 10 → Cadet Maya

$6x + 11 = 29, x = 3$ · $6x + 3 = 51, x = 8$ · $4x + 7 = 23, x = 4$ · $5x + 2 = 62, x = 12$ · $5x + 2 = 27, x = 5$ · $4x + 12 = 36, x = 6$ · $5x + 8 = 53, x = 9$ · $6x + 8 = 50, x = 7$ · $3x + 11 = 44, x = 11$ · $4x + 12 = 16, x = 1$ · $5x + 12 = 22, x = 2$