



The Sky-Islands Heist

Grade 9 math · Two-step equations, Exponents, Square roots, Integers · Reading level grades 7-9

Detective: _____ **Date:** _____

The legendary Golden Astrolabe has been stolen from the Chief Cartographer's sky-tower! A mysterious sky-pirate captain slipped past the wind-sentinels. We must use our flight logs and clue decoders to track down the culprit before they escape into the Endless Void.

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-Pirate Captain is _____

Possible suspects

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

NAME	GLIDING GEAR	CREW COMPANION	NAVIGATION TOOL	HAIR COLOR	CAPTURED BY
Zane Blackburn	Vapor-cloak	Mechanical parrot	Brass compass	Auburn hair	Net-trap
Caspian Sterling	Vapor-cloak	Iron falcon	Brass compass	Auburn hair	Flash-bomb
Zephyr Blackburn	Lightning-rod	Brass monkey	Brass compass	Raven hair	Smoke-screen
Captain Sterling	Lightning-rod	Brass monkey	Brass compass	Silver hair	Flash-bomb
Orion Sterling	Wind-boots	Steam ferret	Brass compass	Silver hair	Smoke-screen
Maeve Drake	Lightning-rod	Clockwork owl	Brass compass	Silver hair	Net-trap
Lyra Blackburn	Lightning-rod	Mechanical parrot	Silver compass	Silver hair	Flash-bomb
Balthazar Drake	Grapple-hook	Steam ferret	Brass compass	Raven hair	Net-trap
Valerie Vance	Lightning-rod	Brass monkey	Brass compass	Auburn hair	Flash-bomb
Kira Sterling	Cloud-glider	Clockwork owl	Silver compass	Silver hair	Smoke-screen
Sariel Drake	Vapor-cloak	Iron falcon	Brass compass	Silver hair	Flash-bomb
Evadne Blackburn	Vapor-cloak	Brass monkey	Brass compass	Raven hair	Net-trap
Vesper Sterling	Cloud-glider	Mechanical parrot	Brass compass	Raven hair	Smoke-screen
Rogan Vance	Wind-boots	Mechanical parrot	Brass compass	Silver hair	Net-trap
Seraphina Drake	Wind-boots	Clockwork owl	Brass compass	Silver hair	Flash-bomb
Jax Blackburn	Cloud-glider	Mechanical parrot	Brass compass	Silver hair	Flash-bomb
Talia Drake	Lightning-rod	Steam ferret	Brass compass	Silver hair	Flash-bomb
Daxon Drake	Wind-boots	Iron falcon	Brass compass	Silver hair	Net-trap
Gideon Vance	Lightning-rod	Mechanical parrot	Brass compass	Silver hair	Smoke-screen
Garrick Vance	Vapor-cloak	Steam ferret	Silver compass	Silver hair	Flash-bomb
Kael Blackburn	Lightning-rod	Iron falcon	Silver compass	Auburn hair	Smoke-screen

CLUE 1 Two-step equations

We found the pirate's fuel canister in the hangar. To calculate the remaining flight range, we must solve a fuel consumption equation involving hours flown and engine reserves.

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

22 15 18 10 2 21 7 4 6 22 5 16 18 20 8 16 22

16 3 8 13 14 4 13 20 20 12 16 8 19 18 9

$$8x + 1 = 177, x = \boxed{} \rightarrow \boxed{\text{T}}$$

$$7x + 7 = 154, x = \boxed{} \rightarrow \boxed{\text{L}}$$

$$2x + 8 = 40, x = \boxed{} \rightarrow \boxed{0}$$

$$3x + 1 = 31, x = \boxed{} \rightarrow \boxed{\text{C}}$$

$$4x + 4 = 28, x = \boxed{} \rightarrow \boxed{}$$

$$7x + 3 = 24, x = \boxed{} \rightarrow \boxed{\mathbf{W}}$$

$9x + 5 = 77, x = \boxed{} \rightarrow \boxed{\text{N}}$

$$9x + 11 = 47, x = \boxed{} \rightarrow \boxed{\text{R}}$$

$$2x + 7 = 25, x = \boxed{} \rightarrow \mathbf{Y}$$

$$3x + 10 = 31, x = \boxed{} \rightarrow \boxed{\text{P}}$$

$$3x + 12 = 51, x = \boxed{} \rightarrow \boxed{\mathbf{A}}$$

$$2x + 4 = 44, x = \boxed{} \rightarrow \boxed{\mathbf{S}}$$

$$9x + 5 = 23, x = \boxed{} \rightarrow \boxed{\text{U}}$$

$$8x + 5 = 125, x = \boxed{} \rightarrow \boxed{\text{H}}$$

$3x + 9 = 24, x = \boxed{} \rightarrow \boxed{\text{D}}$

$$8x + 1 = 153, x = \boxed{} \rightarrow \boxed{\text{K}}$$

$$5x + 11 = 101, x = \boxed{} \rightarrow \boxed{\text{E}}$$

$2x + 1 = 29, x = \boxed{} \rightarrow \boxed{\text{B}}$

$$9x + 6 = 114, x = \boxed{} \rightarrow \boxed{\text{M}}$$

Scratch space:

CLUE 2 Exponents

The pirate's ship left an energy signature in the clouds. The signal power multiplies exponentially with every altitude level they climb, pointing us to their next hideout.

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

T								T									
4	324	64	125	625	100	216	4	125	27	144	27	169	121	27	125	125	

								T	T							
625	100	25	361	27	125	125	27	4	4	324	64	125	625	64	441	64

$2^2 = \square \rightarrow \text{[T]}$

$5^3 = \square \rightarrow \text{[S]}$

$18^2 = \square \rightarrow \text{[H]}$

$2^6 = \square \rightarrow \text{[E]}$

$12^2 = \square \rightarrow \text{[W]}$

$3^3 = \square \rightarrow \text{[A]}$

$10^2 = \square \rightarrow \text{[O]}$

$21^2 = \square \rightarrow \text{[N]}$

$13^2 = \square \rightarrow \text{[B]}$

$6^3 = \square \rightarrow \text{[U]}$

$5^2 = \square \rightarrow \text{[M]}$

$5^4 = \square \rightarrow \text{[C]}$

$11^2 = \square \rightarrow \text{[R]}$

$19^2 = \square \rightarrow \text{[P]}$

Scratch space:

CLUE 3 Square roots

We recovered a cracked navigation grid from the crime scene. Calculating the exact wind-tunnel width requires us to find the square root of the grid's total area.

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

A			A								A							
20	25	19	20	7	24	15	10	4	15	9	20	7	5	7	12	16	11	10
										A								
7	11	5	22	11	24	12	2	6	17	20	11	12						

$\text{sqrt}(400) = \square \rightarrow \text{A}$	$\text{sqrt}(25) = \square \rightarrow \text{U}$	$\text{sqrt}(625) = \square \rightarrow \text{F}$
$\text{sqrt}(4) = \square \rightarrow \text{P}$	$\text{sqrt}(121) = \square \rightarrow \text{T}$	$\text{sqrt}(576) = \square \rightarrow \text{H}$
$\text{sqrt}(100) = \square \rightarrow \text{O}$	$\text{sqrt}(81) = \square \rightarrow \text{W}$	$\text{sqrt}(36) = \square \rightarrow \text{I}$
$\text{sqrt}(289) = \square \rightarrow \text{R}$	$\text{sqrt}(144) = \square \rightarrow \text{E}$	$\text{sqrt}(484) = \square \rightarrow \text{N}$
$\text{sqrt}(16) = \square \rightarrow \text{M}$	$\text{sqrt}(49) = \square \rightarrow \text{S}$	$\text{sqrt}(361) = \square \rightarrow \text{L}$
$\text{sqrt}(225) = \square \rightarrow \text{B}$	$\text{sqrt}(256) = \square \rightarrow \text{D}$	

Scratch space:

CLUE 4 Integers

Our sky-ship must navigate the thermal drafts. Tracking the temperature changes above and below freezing requires adding and subtracting positive and negative degrees.

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

W																		
23	16	25	36	32	5	33	28	37	31	3	16	26	29	4	37	26	36	5
10	29	16	19	36	19	20	14	37	10	28	16	4	10					

$(-10) + 33 = \square \rightarrow \text{W}$	$35 - (-1) = \square \rightarrow \text{O}$	$17 - (-14) = \square \rightarrow \text{L}$
$(-13) + 18 = \square \rightarrow \text{N}$	$(-10) + 36 = \square \rightarrow \text{R}$	$(-6) + 9 = \square \rightarrow \text{V}$
$(-10) + 43 = \square \rightarrow \text{D}$	$24 - (-13) = \square \rightarrow \text{I}$	$7 - (-9) = \square \rightarrow \text{E}$
$(-10) + 24 = \square \rightarrow \text{P}$	$13 - (-7) = \square \rightarrow \text{K}$	$(-7) + 11 = \square \rightarrow \text{A}$
$(-5) + 37 = \square \rightarrow \text{U}$	$12 - (-13) = \square \rightarrow \text{F}$	$16 - (-12) = \square \rightarrow \text{S}$
$26 - (-3) = \square \rightarrow \text{H}$	$9 - (-1) = \square \rightarrow \text{T}$	$13 - (-6) = \square \rightarrow \text{C}$

Scratch space:

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

The final security vault is locked with a pressure-valve code. Balancing the air pressure requires solving for the mysterious variable before the vault seals forever.

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:

$3x + 11 = 23, x = \boxed{}$

$8x + 2 = 66, x = \boxed{}$

$6x + 7 = 79, x = \boxed{}$

$9x + 9 = 27, x = \boxed{}$

$2x + 5 = 15, x = \boxed{}$

$6x + 1 = 55, x = \boxed{}$

$9x + 5 = 104, x = \boxed{}$

$5x + 3 = 53, x = \boxed{}$

$5x + 5 = 20, x = \boxed{}$

$9x + 7 = 70, x = \boxed{}$

$9x + 11 = 65, x = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain harnesses energy with a lightning-rod, then disables the alarm using a steam ferret.
2. The villain harnesses energy with a lightning-rod, then scouts ahead with a clockwork owl.
3. The villain fades into the mist with a vapor-cloak, then distracts the guards with a mechanical parrot.
4. The villain leaps across the sky-docks in wind-boots, then scouts ahead with a clockwork owl.
5. The villain fades into the mist with a vapor-cloak, then disables the alarm using a steam ferret.
6. The villain swings from ship to ship using a grapple-hook, then scouts ahead with a clockwork owl.
7. The villain sails past on a cloud-glider, then scouts ahead with a clockwork owl.
8. The villain fades into the mist with a vapor-cloak, then snatches the loot using an iron falcon.
9. The villain harnesses energy with a lightning-rod, then distracts the guards with a mechanical parrot.
10. The villain leaps across the sky-docks in wind-boots, then snatches the loot using an iron falcon.
11. The villain swings from ship to ship using a grapple-hook, then distracts the guards with a mechanical parrot.
12. The villain sails past on a cloud-glider, then distracts the guards with a mechanical parrot.

Answer Key

The Sky-Islands Heist

Culprit: Talia Drake

Lightning-rod · Steam ferret · Brass compass · Silver hair · Flash-bomb

Trail: Start 21 → Clue 1 17 → Clue 2 13 → Clue 3 5 → Clue 4 4 → Clue 5 1

Clue 1 (Two-step equations): "THE CULPRIT DOES NOT OWN A BRASS MONKEY"

$8x + 1 = 177, x = 22$ (T) · $7x + 7 = 154, x = 21$ (L) · $2x + 8 = 40, x = 16$ (O) · $3x + 1 = 31, x = 10$ (C) · $4x + 4 = 28, x = 6$ (I) · $7x + 3 = 24, x = 3$ (W) · $9x + 5 = 77, x = 8$ (N) · $9x + 11 = 47, x = 4$ (R) · $2x + 7 = 25, x = 9$ (Y) · $3x + 10 = 31, x = 7$ (P) · $3x + 12 = 51, x = 13$ (A) · $2x + 4 = 44, x = 20$ (S) · $9x + 5 = 23, x = 2$ (U) · $8x + 5 = 125, x = 15$ (H) · $3x + 9 = 24, x = 5$ (D) · $8x + 1 = 153, x = 19$ (K) · $5x + 11 = 101, x = 18$ (E) · $2x + 1 = 29, x = 14$ (B) · $9x + 6 = 114, x = 12$ (M)

Clue 2 (Exponents): "THE SCOUT SAW A BRASS COMPASS AT THE SCENE"

$2^2 = 4$ (T) · $5^3 = 125$ (S) · $18^2 = 324$ (H) · $2^6 = 64$ (E) · $12^2 = 144$ (W) · $3^3 = 27$ (A) · $10^2 = 100$ (O) · $21^2 = 441$ (N) · $13^2 = 169$ (B) · $6^3 = 216$ (U) · $5^2 = 25$ (M) · $5^4 = 625$ (C) · $11^2 = 121$ (R) · $19^2 = 361$ (P)

Clue 3 (Square roots): "A FLASH BOMB WAS USED TO STUN THE PIRATE"

$\sqrt{400} = 20$ (A) · $\sqrt{25} = 5$ (U) · $\sqrt{625} = 25$ (F) · $\sqrt{4} = 2$ (P) · $\sqrt{121} = 11$ (T) · $\sqrt{576} = 24$ (H) · $\sqrt{100} = 10$ (O) · $\sqrt{81} = 9$ (W) · $\sqrt{36} = 6$ (I) · $\sqrt{289} = 17$ (R) · $\sqrt{144} = 12$ (E) · $\sqrt{484} = 22$ (N) · $\sqrt{16} = 4$ (M) · $\sqrt{49} = 7$ (S) · $\sqrt{361} = 19$ (L) · $\sqrt{225} = 15$ (B) · $\sqrt{256} = 16$ (D)

Clue 4 (Integers): "WE FOUND SILVER HAIR ON THE COCKPIT SEAT"

$(-10) + 33 = 23$ (W) · $35 - (-1) = 36$ (O) · $17 - (-14) = 31$ (L) · $(-13) + 18 = 5$ (N) · $(-10) + 36 = 26$ (R) · $(-6) + 9 = 3$ (V) · $(-10) + 43 = 33$ (D) · $24 - (-13) = 37$ (I) · $7 - (-9) = 16$ (E) · $(-10) + 24 = 14$ (P) · $13 - (-7) = 20$ (K) · $(-7) + 11 = 4$ (A) · $(-5) + 37 = 32$ (U) · $12 - (-13) = 25$ (F) · $16 - (-12) = 28$ (S) · $26 - (-3) = 29$ (H) · $9 - (-1) = 10$ (T) · $13 - (-6) = 19$ (C)

Clue 5 (Two-step equations): surviving statement is box 1 → Talia Drake

$3x + 11 = 23, x = 4$ · $8x + 2 = 66, x = 8$ · $6x + 7 = 79, x = 12$ · $9x + 9 = 27, x = 2$ · $2x + 5 = 15, x = 5$ · $6x + 1 = 55, x = 9$ · $9x + 5 = 104, x = 11$ · $5x + 3 = 53, x = 10$ · $5x + 5 = 20, x = 3$ · $9x + 7 = 70, x = 7$ · $9x + 11 = 65, x = 6$