



The Sky-Schooner Showdown

Grade 8 math · Exponents, Multi-step word problems, Square roots, Pythagorean theorem, Two-step equations · Reading level grades 7-9

Detective: _____ Date: _____

The Golden Compass has been stolen from the Grand Observatory of Zephyria! A rogue sky-captain broke in during the midnight cloud-shift. The Chief Cartographer needs your help to track down the thief before they navigate to the Edge of the World.

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-captain is _____

Possible suspects

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

NAME	PRIMARY SKY-ABILITY	SPECIALIST GADGET	GLOVE CONTROL HAND	HELMET PLUME COLOR	WEATHER VULNERABILITY
Isabella Bird	Storm Calling	Spyglass Drone	Left-handed grip	Bright orange plume	Bright lightning
George Mallory	Glider Flight	Spyglass Drone	Right-handed grip	Neon green plume	Bright lightning
Roald Amundsen	Cloud Stealth	Magnet Boots	Left-handed grip	Bright orange plume	Soggy clouds
Hiram Bingham	Wind Hooking	Grappling Arm	Right-handed grip	Neon green plume	High winds
Nellie Bly	Cloud Stealth	Sonic Horn	Right-handed grip	Deep violet plume	Bright lightning
Ferdinand Magellan	Glider Flight	Magnet Boots	Right-handed grip	Neon green plume	Soggy clouds
Mary Kingsley	Glider Flight	Spark Pistol	Left-handed grip	Neon green plume	Soggy clouds
Sacagawea	Glider Flight	Spyglass Drone	Right-handed grip	Neon green plume	Soggy clouds
Richard Byrd	Cloud Stealth	Spark Pistol	Right-handed grip	Neon green plume	Soggy clouds
Robert Peary	Steam Jetting	Grappling Arm	Right-handed grip	Neon green plume	Bright lightning
Leif Erikson	Cloud Stealth	Sonic Horn	Right-handed grip	Neon green plume	Soggy clouds
Ibn Battuta	Cloud Stealth	Spark Pistol	Right-handed grip	Bright orange plume	High winds
James Cook	Glider Flight	Grappling Arm	Right-handed grip	Neon green plume	Bright lightning
Marco Polo	Cloud Stealth	Spark Pistol	Left-handed grip	Neon green plume	Soggy clouds
Bessie Coleman	Wind Hooking	Sonic Horn	Left-handed grip	Bright orange plume	High winds
Jacques Cousteau	Cloud Stealth	Spark Pistol	Left-handed grip	Deep violet plume	High winds
Amelia Earhart	Storm Calling	Sonic Horn	Right-handed grip	Deep violet plume	Soggy clouds
Jeanne Baret	Storm Calling	Grappling Arm	Right-handed grip	Bright orange plume	Soggy clouds
Gertrude Bell	Glider Flight	Grappling Arm	Left-handed grip	Deep violet plume	Bright lightning
Matthew Henson	Glider Flight	Spyglass Drone	Right-handed grip	Deep violet plume	High winds
David Livingstone	Steam Jetting	Spark Pistol	Right-handed grip	Neon green plume	Soggy clouds

CLUE 1 Exponents

We intercepted a series of complex shipping manifests from the docks. By calculating the total fuel crates loaded across multiple decks and subtracting the spoiled cargo, we found a hidden flight path coordinate.

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

T											T								
8	64	49	400	216	169	128	49	361	4	25	8	4	32	196	484	216	49	243	

		T									T				T				
196	216	8	16	49	4	400	256	4	169	196	49	8	729	216	216	8	243		

$2^3 = \square \rightarrow \text{T}$	$7^2 = \square \rightarrow \text{E}$	$3^6 = \square \rightarrow \text{B}$	$20^2 = \square \rightarrow \text{R}$
$22^2 = \square \rightarrow \text{D}$	$13^2 = \square \rightarrow \text{G}$	$2^5 = \square \rightarrow \text{I}$	$14^2 = \square \rightarrow \text{N}$
$6^3 = \square \rightarrow \text{O}$	$4^3 = \square \rightarrow \text{H}$	$2^7 = \square \rightarrow \text{U}$	$2^4 = \square \rightarrow \text{W}$
$5^2 = \square \rightarrow \text{P}$	$19^2 = \square \rightarrow \text{C}$	$16^2 = \square \rightarrow \text{M}$	$3^5 = \square \rightarrow \text{S}$
$2^2 = \square \rightarrow \text{A}$			

Scratch space:

CLUE 2

Multi-step word problems

The airship's altimeter works on an exponential scale. By calculating the power of the altitude sensor at its peak elevation, we managed to isolate the frequency of the villain's radio.

Solve each problem, then write its letter in the boxes to fill in the missing word.

A witness saw the villain was

R									D	E	D		R		P
40	32	76	69	73	69	77	58					76	40	32	

Skychaser collected 3 brass gears in the morning and 157 brass gears in the afternoon, then split them equally among 4 Cloud Patrol. How many brass gears did each get?

Answer: → **R**

Skychaser collected 24 star maps in the morning and 40 star maps in the afternoon, then split them equally among 2 Cloud Patrol. How many star maps did each get?

Answer: → **I**

Skychaser earned 6 star maps in each of 5 rounds, plus 55 bonus star maps. Then 9 star maps were lost. How many star maps are left?

Answer: → **G**

Skychaser earned 4 spyglasses in each of 5 rounds, plus 53 bonus spyglasses. Then 15 spyglasses were lost. How many spyglasses are left?

Answer: → **N**

There were 320 brass gears in all. 1 Cloud Patrol used 12 brass gears each. The other 4 Cloud Patrol shared the rest equally. How many brass gears did each of the other Cloud Patrol get?

Answer: → **A**

Skychaser filled 9 boxes with 3 star maps each, then found 42 more star maps. How many star maps are there in all?

Answer: → **H**

Skychaser collected 14 compasses in the morning and 132 compasses in the afternoon, then split them equally among 2 Cloud Patrol. How many compasses did each get?

Answer: → **T**

Scratch space:

CLUE 3
Square roots

The Grand Observatory has a square docking bay tiled with perfect square dimensions. Finding the side length of this area revealed which escape hatch the intruder used.

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

T			T							T							
11	14	13	11	14	4	13	12	7	11	17	24	22	22	3	13	20	
4	9	7	4	20	13	7	6	22	22	18	16	3	6	24	20	7	

$\sqrt{121} = \square \rightarrow \boxed{\text{T}}$

$\sqrt{289} = \square \rightarrow \boxed{\text{R}}$

$\sqrt{196} = \square \rightarrow \boxed{\text{H}}$

$\sqrt{49} = \square \rightarrow \boxed{\text{S}}$

$\sqrt{144} = \square \rightarrow \boxed{\text{F}}$

$\sqrt{484} = \square \rightarrow \boxed{\text{G}}$

$\sqrt{16} = \square \rightarrow \boxed{\text{I}}$

$\sqrt{36} = \square \rightarrow \boxed{\text{O}}$

$\sqrt{169} = \square \rightarrow \boxed{\text{E}}$

$\sqrt{9} = \square \rightarrow \boxed{\text{L}}$

$\sqrt{256} = \square \rightarrow \boxed{\text{C}}$

$\sqrt{400} = \square \rightarrow \boxed{\text{D}}$

$\sqrt{324} = \square \rightarrow \boxed{\text{Y}}$

$\sqrt{576} = \square \rightarrow \boxed{\text{U}}$

$\sqrt{81} = \square \rightarrow \boxed{\text{N}}$

Scratch space:

CLUE 4

Pythagorean theorem

The thief shot a zip-line from the high mast to the lower platform. We can calculate the exact diagonal distance of their escape slide to determine how fast they traveled.

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

A												A				
5	74	58	75	74	65	29	58	58	74	52	58	5	51	39	58	29

	A									A				
50	5	87	13	29	75	82	82	58	13	5	51	51	39	58

87	15	58	74	58

legs 3 and 4, hypotenuse = → **A**

legs 21 and 72, hypotenuse = → **O**

legs 20 and 48, hypotenuse = → **F**

legs 15 and 36, hypotenuse = → **H**

legs 60 and 63, hypotenuse = → **S**

legs 14 and 48, hypotenuse = → **W**

legs 24 and 45, hypotenuse = → **T**

legs 9 and 12, hypotenuse = → **C**

legs 25 and 60, hypotenuse = → **G**

legs 40 and 42, hypotenuse = → **E**

legs 24 and 70, hypotenuse = → **N**

legs 5 and 12, hypotenuse = → **D**

legs 18 and 80, hypotenuse = → **P**

legs 20 and 21, hypotenuse = → **R**

Scratch space:

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

The generator consumes fuel at a steady rate minus the reserve tank backup. We set up a balance equation to figure out how many hours of flight time the thief has left.

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:

$6x + 12 = 42, x = \boxed{}$

$5x + 3 = 63, x = \boxed{}$

$3x + 2 = 29, x = \boxed{}$

$3x + 11 = 17, x = \boxed{}$

$4x + 1 = 25, x = \boxed{}$

$2x + 4 = 18, x = \boxed{}$

$5x + 2 = 17, x = \boxed{}$

$6x + 11 = 71, x = \boxed{}$

$6x + 10 = 34, x = \boxed{}$

$2x + 7 = 23, x = \boxed{}$

$4x + 12 = 56, x = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain soared away using glider flight, then mapped the escape route using a spyglass drone.
2. The villain blasted off using high-pressure steam jetting, then swung over the wall with a grappling arm.
3. The villain blasted off using high-pressure steam jetting, then scaled the metal hull with magnet boots.
4. The villain slipped past the guards using cloud stealth, then scaled the metal hull with magnet boots.
5. The villain slipped past the guards using cloud stealth, then shattered the vault window with a sonic horn.
6. The villain swung through the rigging using wind hooking, then scaled the metal hull with magnet boots.
7. The villain soared away using glider flight, then swung over the wall with a grappling arm.
8. The villain escaped into the fog using storm calling, then mapped the escape route using a spyglass drone.
9. The villain blasted off using high-pressure steam jetting, then zapped the alarm locks with a spark pistol.
10. The villain escaped into the fog using storm calling, then swung over the wall with a grappling arm.
11. The villain soared away using glider flight, then scaled the metal hull with magnet boots.
12. The villain slipped past the guards using cloud stealth, then zapped the alarm locks with a spark pistol.

Answer Key

The Sky-Schooner Showdown

Culprit: Sacagawea

Glider Flight · Spyglass Drone · Right-handed grip · Neon green plume · Soggy clouds

Trail: Start 21 → Clue 1 19 → Clue 2 13 → Clue 3 6 → Clue 4 4 → Clue 5 1

Clue 1 (Exponents): "THE ROGUE CAPTAIN DOES NOT WEAR MAGNET BOOTS"

$2^3 = 8$ (T) · $7^2 = 49$ (E) · $3^6 = 729$ (B) · $20^2 = 400$ (R) · $22^2 = 484$ (D) · $13^2 = 169$ (G) · $2^5 = 32$ (I) · $14^2 = 196$ (N) · $6^3 = 216$ (O) · $4^3 = 64$ (H) · $2^7 = 128$ (U) · $2^4 = 16$ (W) · $5^2 = 25$ (P) · $19^2 = 361$ (C) · $16^2 = 256$ (M) · $3^5 = 243$ (S) · $2^2 = 4$ (A)

Clue 2 (Multi-step word problems): "RIGHT HANDED GRIP"

Skychaser collected 3 brass gears in the morning and 157 brass gears in the afternoon, then split them equally among 4 Cloud Patrol. How many brass gears did each get? = 40 (R) · Skychaser collected 24 star maps in the morning and 40 star maps in the afternoon, then split them equally among 2 Cloud Patrol. How many star maps did each get? = 32 (I) · Skychaser earned 6 star maps in each of 5 rounds, plus 55 bonus star maps. Then 9 star maps were lost. How many star maps are left? = 76 (G) · Skychaser earned 4 spyglasses in each of 5 rounds, plus 53 bonus spyglasses. Then 15 spyglasses were lost. How many spyglasses are left? = 58 (N) · There were 320 brass gears in all. 1 Cloud Patrol used 12 brass gears each. The other 4 Cloud Patrol shared the rest equally. How many brass gears did each of the other Cloud Patrol get? = 77 (A) · Skychaser filled 9 boxes with 3 star maps each, then found 42 more star maps. How many star maps are there in all? = 69 (H) · Skychaser collected 14 compasses in the morning and 132 compasses in the afternoon, then split them equally among 2 Cloud Patrol. How many compasses did each get? = 73 (T)

Clue 3 (Square roots): "THE THIEF STRUGGLED INSIDE SOGGY CLOUDS"

$\sqrt{121} = 11$ (T) · $\sqrt{289} = 17$ (R) · $\sqrt{196} = 14$ (H) · $\sqrt{49} = 7$ (S) · $\sqrt{144} = 12$ (F) · $\sqrt{484} = 22$ (G) · $\sqrt{16} = 4$ (I) · $\sqrt{36} = 6$ (O) · $\sqrt{169} = 13$ (E) · $\sqrt{9} = 3$ (L) · $\sqrt{256} = 16$ (C) · $\sqrt{400} = 20$ (D) · $\sqrt{324} = 18$ (Y) · $\sqrt{576} = 24$ (U) · $\sqrt{81} = 9$ (N)

Clue 4 (Pythagorean theorem): "A NEON GREEN FEATHER WAS DROPPED AT THE SCENE"

legs 3 and 4, hypotenuse = 5 (A) · legs 21 and 72, hypotenuse = 75 (O) · legs 20 and 48, hypotenuse = 52 (F) · legs 15 and 36, hypotenuse = 39 (H) · legs 60 and 63, hypotenuse = 87 (S) · legs 14 and 48, hypotenuse = 50 (W) · legs 24 and 45, hypotenuse = 51 (T) · legs 9 and 12, hypotenuse = 15 (C) · legs 25 and 60, hypotenuse = 65 (G) · legs 40 and 42, hypotenuse = 58 (E) · legs 24 and 70, hypotenuse = 74 (N) · legs 5 and 12, hypotenuse = 13 (D) · legs 18 and 80, hypotenuse = 82 (P) · legs 20 and 21, hypotenuse = 29 (R)

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

$6x + 12 = 42, x = 5$ · $5x + 3 = 63, x = 12$ · $3x + 2 = 29, x = 9$ · $3x + 11 = 17, x = 2$ · $4x + 1 = 25, x = 6$ · $2x + 4 = 18, x = 7$ · $5x + 2 = 17, x = 3$ · $6x + 11 = 71, x = 10$ · $6x + 10 = 34, x = 4$ · $2x + 7 = 23, x = 8$ · $4x + 12 = 56, x = 11$