



The Lost Compass of the Sky-Isles

Grade 7 math · Integers, Percentages, Order of operations, Exponents, Two-step equations · Reading level grades 5-6

Detective: _____ Date: _____

Someone has stolen the legendary Windstone Compass from the floating archives of Zephyr Valley! Without it, our airships will get lost in the endless storm clouds. The Chief Cartographer needs your help to track down 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 rogue sky-pirate 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	SKY-SHIP BADGE	MAP CASE STRAP	GOGGLE BAND COLOR	FEAR OF
Finn	Magnetic Harpoon	Ruby Lightning Badge	Right shoulder strap	Neon orange band	High-voltage static
Orville	Magnetic Harpoon	Golden Anchor Badge	Left shoulder strap	Forest green band	Strong lemon juice
Aero Alice	Solar-Sail Parachute	Silver Propeller Badge	Right shoulder strap	Neon orange band	Strong lemon juice
Sterling	Wind-Powered Glider	Silver Propeller Badge	Right shoulder strap	Neon orange band	High-voltage static
Sienna	Magnetic Harpoon	Ruby Lightning Badge	Left shoulder strap	Forest green band	Strong lemon juice
Zephyr Jack	Solar-Sail Parachute	Emerald Feather Badge	Left shoulder strap	Neon orange band	Strong lemon juice
Cyrus	Wind-Powered Glider	Golden Anchor Badge	Left shoulder strap	Forest green band	High-voltage static
Marina	Brass Grappling Hook	Silver Propeller Badge	Left shoulder strap	Forest green band	Strong lemon juice
Gale	Solar-Sail Parachute	Bronze Compass Badge	Left shoulder strap	Forest green band	Strong lemon juice
Daisy	Magnetic Harpoon	Bronze Compass Badge	Left shoulder strap	Sky blue band	Squeaking mechanical bats
Wilbur	Wind-Powered Glider	Silver Propeller Badge	Left shoulder strap	Forest green band	Strong lemon juice
Hudson	Magnetic Harpoon	Golden Anchor Badge	Left shoulder strap	Neon orange band	Squeaking mechanical bats
Jet	Solar-Sail Parachute	Emerald Feather Badge	Right shoulder strap	Sky blue band	Strong lemon juice
Skye	Solar-Sail Parachute	Silver Propeller Badge	Right shoulder strap	Forest green band	High-voltage static
Pilot Pete	Magnetic Harpoon	Emerald Feather Badge	Left shoulder strap	Neon orange band	Strong lemon juice
Baron Von Cloud	Magnetic Harpoon	Bronze Compass Badge	Right shoulder strap	Forest green band	Strong lemon juice
Breezy Blake	Solar-Sail Parachute	Silver Propeller Badge	Right shoulder strap	Sky blue band	High-voltage static
Captain Amelia	Brass Grappling Hook	Emerald Feather Badge	Left shoulder strap	Forest green band	High-voltage static
Nimbus Nick	Steam-Charged Jetpack	Silver Propeller Badge	Left shoulder strap	Neon orange band	Squeaking mechanical bats
Earhart	Wind-Powered Glider	Golden Anchor Badge	Left shoulder strap	Neon orange band	Squeaking mechanical bats
Willa	Wind-Powered Glider	Ruby Lightning Badge	Left shoulder strap	Sky blue band	Squeaking mechanical bats

CLUE 1 Integers

We checked the main altitude log to find where the thief boarded. Add and subtract these positive and negative elevations to find our first real clue.

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

T			T										T		
18	24	25	18	24	13	25	19	20	23	14	3	2	18	24	25
6	16	4	27	20	13	5	24	18	7	13	7	5	4	23	29

$17 - (-1) = \square \rightarrow$ T	$11 - (-9) = \square \rightarrow$ L	$(-11) + 36 = \square \rightarrow$ E
$(-4) + 11 = \square \rightarrow$ N	$(-9) + 14 = \square \rightarrow$ G	$2 - (-11) = \square \rightarrow$ I
$1 - (-2) = \square \rightarrow$ K	$2 - (-12) = \square \rightarrow$ C	$21 - (-3) = \square \rightarrow$ H
$(-15) + 44 = \square \rightarrow$ D	$(-1) + 3 = \square \rightarrow$ S	$(-3) + 26 = \square \rightarrow$ A
$(-14) + 41 = \square \rightarrow$ Y	$3 - (-13) = \square \rightarrow$ U	$(-7) + 13 = \square \rightarrow$ R
$(-1) + 5 = \square \rightarrow$ B	$11 - (-8) = \square \rightarrow$ F	

Scratch space:

CLUE 2 Percentages

The runaway glider left a trail of spent fuel cells. Figure out what percentage of the tank was used so we can narrow down our search grid.

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

T				T													
48	55	38	17	48	42	18	49	50	18	17	50	60	42	28	60	28	
T						T											
48	55	38	27	38	53	48	17	55	60	33	27	31	38	42			

40% of 120 = → T	40% of 70 = → N	10% of 310 = → D
10% of 180 = → A	20% of 210 = → R	20% of 135 = → L
10% of 500 = → W	25% of 220 = → H	10% of 380 = → E
20% of 165 = → U	10% of 170 = → S	75% of 80 = → O
20% of 245 = → P	50% of 106 = → F	

Scratch space:

CLUE 3

Order of operations

Our deckhand found a scrambled lockbox on the floor. Follow the strict order of mathematical operations to unlock the box and read the note inside.

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

T													T							
50	119	16	13	31	99	90	83	46	16	109	100	50	38	73	90	74	74	16	109	
74	16	85	70	83	64	8	90	31	16											

$34 + 2 \times 8 = \square \rightarrow \boxed{\text{T}}$

$82 + 6 \times 3 = \square \rightarrow \boxed{\text{A}}$

$10 \times 8 - 16 = \square \rightarrow \boxed{\text{J}}$

$10 \times 10 - 30 = \square \rightarrow \boxed{\text{O}}$

$74 + 9 \times 5 = \square \rightarrow \boxed{\text{H}}$

$3 + 4 \times 7 = \square \rightarrow \boxed{\text{C}}$

$39 + 7 \times 5 = \square \rightarrow \boxed{\text{L}}$

$4 + 2 \times 2 = \square \rightarrow \boxed{\text{U}}$

$51 + 4 \times 8 = \square \rightarrow \boxed{\text{N}}$

$12 \times 5 - 22 = \square \rightarrow \boxed{\text{S}}$

$3 + 2 \times 5 = \square \rightarrow \boxed{\text{Y}}$

$2 \times 12 - 8 = \square \rightarrow \boxed{\text{E}}$

$8 \times 7 - 10 = \square \rightarrow \boxed{\text{G}}$

$27 + 8 \times 9 = \square \rightarrow \boxed{\text{R}}$

$10 \times 9 - 17 = \square \rightarrow \boxed{\text{P}}$

$10 \times 11 - 1 = \square \rightarrow \boxed{\text{D}}$

$11 \times 9 - 14 = \square \rightarrow \boxed{\text{M}}$

$8 \times 12 - 6 = \square \rightarrow \boxed{\text{I}}$

Scratch space:

CLUE 4 Exponents

The thief used a signal jammer that doubles its power with every extra antenna. Solve this exponent problem to locate the signal source.

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

W																		
9	216	49	27	169	128	100	32	289	324	216	216	128	361	32	128	100	125	128
8	343	216	243	32	361	125	128											

$3^2 = \square \rightarrow \text{W}$	$18^2 = \square \rightarrow \text{R}$	$7^3 = \square \rightarrow \text{H}$	$13^2 = \square \rightarrow \text{U}$
$6^3 = \square \rightarrow \text{E}$	$5^3 = \square \rightarrow \text{I}$	$17^2 = \square \rightarrow \text{G}$	$10^2 = \square \rightarrow \text{D}$
$19^2 = \square \rightarrow \text{B}$	$2^7 = \square \rightarrow \text{N}$	$7^2 = \square \rightarrow \text{F}$	$2^5 = \square \rightarrow \text{A}$
$2^3 = \square \rightarrow \text{T}$	$3^5 = \square \rightarrow \text{C}$	$3^3 = \square \rightarrow \text{O}$	

Scratch space:

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

We found a balanced cargo scale with heavy gear left on one side. Solve this two-step equation to determine the exact weight of the thief's gear.

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:

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

$5x + 6 = 56, x = \boxed{}$

$3x + 6 = 9, x = \boxed{}$

$6x + 2 = 50, x = \boxed{}$

$4x + 1 = 13, x = \boxed{}$

$2x + 2 = 12, x = \boxed{}$

$2x + 12 = 20, x = \boxed{}$

$4x + 10 = 46, x = \boxed{}$

$6x + 5 = 47, x = \boxed{}$

$5x + 1 = 11, x = \boxed{}$

$2x + 12 = 36, x = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain swung through the cargo hatch, then sailed away on a fast skiff.
2. The villain snagged the compass with a hook, then zipped down a zipline to safety.
3. The villain snagged the compass with a hook, then sailed away on a fast skiff.
4. The villain snagged the compass with a hook, then leaped onto a passing airship.
5. The villain floated in through the skylight, then sailed away on a fast skiff.
6. The villain drifted down on a glider, then sailed away on a fast skiff.
7. The villain swung through the cargo hatch, then zipped down a zipline to safety.
8. The villain drifted down on a glider, then leaped onto a passing airship.
9. The villain swung through the cargo hatch, then vanished over the horizon.
10. The villain floated in through the skylight, then leaped onto a passing airship.
11. The villain snagged the compass with a hook, then escaped into the storm clouds.
12. The villain swung through the cargo hatch, then escaped into the storm clouds.

Answer Key

The Lost Compass of the Sky-Isles

Culprit: Wilbur

Wind-Powered Glider · Silver Propeller Badge · Left shoulder strap · Forest green band · Strong lemon juice

Trail: Start 21 → Clue 1 18 → Clue 2 12 → Clue 3 6 → Clue 4 4 → Clue 5 1

Clue 1 (Integers): "THE THIEF LACKS THE RUBY LIGHTNING BADGE"

$17 - (-1) = 18$ (T) · $11 - (-9) = 20$ (L) · $(-11) + 36 = 25$ (E) · $(-4) + 11 = 7$ (N) · $(-9) + 14 = 5$ (G) · $2 - (-11) = 13$ (I) · $1 - (-2) = 3$ (K) · $2 - (-12) = 14$ (C) · $21 - (-3) = 24$ (H) · $(-15) + 44 = 29$ (D) · $(-1) + 3 = 2$ (S) · $(-3) + 26 = 23$ (A) · $(-14) + 41 = 27$ (Y) · $3 - (-13) = 16$ (U) · $(-7) + 13 = 6$ (R) · $(-1) + 5 = 4$ (B) · $11 - (-8) = 19$ (F)

Clue 2 (Percentages): "THE STRAP WAS WORN ON THE LEFT SHOULDER"

40% of 120 = 48 (T) · 40% of 70 = 28 (N) · 10% of 310 = 31 (D) · 10% of 180 = 18 (A) · 20% of 210 = 42 (R) · 20% of 135 = 27 (L) · 10% of 500 = 50 (W) · 25% of 220 = 55 (H) · 10% of 380 = 38 (E) · 20% of 165 = 33 (U) · 10% of 170 = 17 (S) · 75% of 80 = 60 (O) · 20% of 245 = 49 (P) · 50% of 106 = 53 (F)

Clue 3 (Order of operations): "THEY CRINGED AT SPILLED LEMON JUICE"

$34 + 2 \times 8 = 50$ (T) · $82 + 6 \times 3 = 100$ (A) · $10 \times 8 - 16 = 64$ (J) · $10 \times 10 - 30 = 70$ (O) · $74 + 9 \times 5 = 119$ (H) · $3 + 4 \times 7 = 31$ (C) · $39 + 7 \times 5 = 74$ (L) · $4 + 2 \times 2 = 8$ (U) · $51 + 4 \times 8 = 83$ (N) · $12 \times 5 - 22 = 38$ (S) · $3 + 2 \times 5 = 13$ (Y) · $2 \times 12 - 8 = 16$ (E) · $8 \times 7 - 10 = 46$ (G) · $27 + 8 \times 9 = 99$ (R) · $10 \times 9 - 17 = 73$ (P) · $10 \times 11 - 1 = 109$ (D) · $11 \times 9 - 14 = 85$ (M) · $8 \times 12 - 6 = 90$ (I)

Clue 4 (Exponents): "WE FOUND A GREEN BAND IN THE CABIN"

$3^2 = 9$ (W) · $18^2 = 324$ (R) · $7^3 = 343$ (H) · $13^2 = 169$ (U) · $6^3 = 216$ (E) · $5^3 = 125$ (I) · $17^2 = 289$ (G) · $10^2 = 100$ (D) · $19^2 = 361$ (B) · $2^7 = 128$ (N) · $7^2 = 49$ (F) · $2^5 = 32$ (A) · $2^3 = 8$ (T) · $3^5 = 243$ (C) · $3^3 = 27$ (O)

Clue 5 (Two-step equations): surviving statement is box 6 → Wilbur

$3x + 11 = 44, x = 11$ · $5x + 6 = 56, x = 10$ · $3x + 6 = 9, x = 1$ · $6x + 2 = 50, x = 8$ · $4x + 1 = 13, x = 3$ · $2x + 2 = 12, x = 5$ · $2x + 12 = 20, x = 4$ · $4x + 10 = 46, x = 9$ · $6x + 5 = 47, x = 7$ · $5x + 1 = 11, x = 2$ · $2x + 12 = 36, x = 12$