



The Golden Wind-Vane Mystery

Grade 9 math · Two-step equations, Exponents, Square roots, Integers · Reading level grades 3-4

Detective: _____ Date: _____

Oh no! Someone has stolen the Golden Wind-Vane from the Sky Patrol Academy! Without it, our floating islands will drift out of control and bump into each other. Commander Leo needs you to find the sneaky Cloud Thief before they fly away forever!

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 Cloud Thief 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	INVENTION	GOGGLES COLOR	HELMET PLUME	FAVORITE SNACK
Val	solar sails	wind net	blue goggles	royal blue helmet	berry tarts
Captain Cooper	solar sails	wind net	green goggles	neon yellow helmet	maple waffles
Kai	propeller boots	wind net	blue goggles	bright orange helmet	maple waffles
Breezy	propeller boots	bubble blaster	blue goggles	neon yellow helmet	lemon drops
Flynn	steam thrusters	magnetic claw	green goggles	neon yellow helmet	lemon drops
Pip	gravity boots	magnetic claw	green goggles	neon yellow helmet	maple waffles
Luna	propeller boots	bubble blaster	blue goggles	bright orange helmet	berry tarts
Quinn	propeller boots	magnetic claw	green goggles	bright orange helmet	berry tarts
Ivy	steam thrusters	bubble blaster	green goggles	neon yellow helmet	lemon drops
Daisy	propeller boots	wind net	blue goggles	neon yellow helmet	lemon drops
Gus	turbo wings	bubble blaster	green goggles	bright orange helmet	lemon drops
Echo	solar sails	wind net	green goggles	bright orange helmet	berry tarts
Zane	turbo wings	magnetic claw	green goggles	bright orange helmet	berry tarts
Toby	solar sails	magnetic claw	blue goggles	neon yellow helmet	berry tarts
Willa	steam thrusters	grappling hook	green goggles	neon yellow helmet	berry tarts
Otis	propeller boots	magnetic claw	blue goggles	royal blue helmet	maple waffles
Skye	steam thrusters	magnetic claw	green goggles	bright orange helmet	berry tarts
Una	steam thrusters	fog generator	blue goggles	royal blue helmet	maple waffles
Ace	solar sails	bubble blaster	green goggles	bright orange helmet	berry tarts
Jax	steam thrusters	wind net	blue goggles	bright orange helmet	maple waffles
Milo	steam thrusters	fog generator	blue goggles	bright orange helmet	lemon drops

CLUE 1

Two-step equations

We found the Cloud Thief's empty fuel crate. The total weight of the wooden crate and several mini fuel canisters helps us calculate how many canisters they used on their getaway ship.

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

T 5	22	17	T 5	22	10	17	21	7	16	17	19	18	16	T 5	8	19	17
T 5	22	17	14	10	18	7	18	17	T 5								

$2x + 6 = 16, x = \boxed{} \rightarrow \boxed{\text{T}}$

$3x + 11 = 77, x = \boxed{} \rightarrow \boxed{\text{H}}$

$8x + 10 = 178, x = \boxed{} \rightarrow \boxed{\text{F}}$

$2x + 6 = 22, x = \boxed{} \rightarrow \boxed{\text{U}}$

$5x + 9 = 89, x = \boxed{} \rightarrow \boxed{\text{O}}$

$9x + 12 = 165, x = \boxed{} \rightarrow \boxed{\text{E}}$

$7x + 4 = 137, x = \boxed{} \rightarrow \boxed{\text{S}}$

$9x + 6 = 132, x = \boxed{} \rightarrow \boxed{\text{W}}$

$6x + 2 = 110, x = \boxed{} \rightarrow \boxed{\text{N}}$

$6x + 12 = 54, x = \boxed{} \rightarrow \boxed{\text{D}}$

$7x + 9 = 79, x = \boxed{} \rightarrow \boxed{\text{I}}$

Scratch space:

CLUE 2 Exponents

Our radar dish is tracking the runaway flight path. Each secret relay beacon triples our scanning strength, so we must calculate the final radar power using exponents.

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

W				W														
9	16	289	4	9	361	625	16	16	125	361	256	361	361	441	16	289	4	243
243	81	16	289	196	16	125	16											

$3^2 = \square \rightarrow \text{W}$	$2^4 = \square \rightarrow \text{E}$	$5^3 = \square \rightarrow \text{N}$	$14^2 = \square \rightarrow \text{C}$
$2^8 = \square \rightarrow \text{O}$	$17^2 = \square \rightarrow \text{S}$	$5^4 = \square \rightarrow \text{R}$	$21^2 = \square \rightarrow \text{L}$
$19^2 = \square \rightarrow \text{G}$	$9^2 = \square \rightarrow \text{H}$	$3^5 = \square \rightarrow \text{T}$	$2^2 = \square \rightarrow \text{A}$

Scratch space:

CLUE 3 Square roots

The patrol team is mapping out a perfectly square grid of search tiles over the clouds. Knowing the total area of the search zone tells us the side length of our flying grid.

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

L																	
3	24	14	4	24	12	19	23	17	24	10	10	7	23	14	10	23	2

23	12	23	10	14	21	23	8	24	11

$\sqrt{9} = \square \rightarrow$ L	$\sqrt{121} = \square \rightarrow$ M	$\sqrt{441} = \square \rightarrow$ P
$\sqrt{16} = \square \rightarrow$ V	$\sqrt{361} = \square \rightarrow$ U	$\sqrt{529} = \square \rightarrow$ T
$\sqrt{576} = \square \rightarrow$ E	$\sqrt{100} = \square \rightarrow$ R	$\sqrt{64} = \square \rightarrow$ H
$\sqrt{49} = \square \rightarrow$ Y	$\sqrt{4} = \square \rightarrow$ S	$\sqrt{196} = \square \rightarrow$ A
$\sqrt{144} = \square \rightarrow$ O	$\sqrt{289} = \square \rightarrow$ B	

Scratch space:

CLUE 4 Integers

The runaway airship went up into the warm air currents and then dropped down into a cold valley. Let's find their final altitude change using positive and negative integers.

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

W															
11	28	19	3	34	39	39	28	20	40	18	24	23	17	36	39

34	24	40	8	17	28	36	28	6	22	28	39

$3 - (-8) = \square \rightarrow \boxed{\text{W}}$

$(-15) + 34 = \square \rightarrow \boxed{\text{S}}$

$(-5) + 13 = \square \rightarrow \boxed{\text{N}}$

$(-10) + 30 = \square \rightarrow \boxed{\text{D}}$

$(-10) + 16 = \square \rightarrow \boxed{\text{L}}$

$(-13) + 52 = \square \rightarrow \boxed{\text{T}}$

$(-12) + 15 = \square \rightarrow \boxed{\text{P}}$

$(-5) + 41 = \square \rightarrow \boxed{\text{H}}$

$(-11) + 29 = \square \rightarrow \boxed{\text{B}}$

$(-11) + 35 = \square \rightarrow \boxed{\text{R}}$

$(-12) + 46 = \square \rightarrow \boxed{\text{O}}$

$(-13) + 30 = \square \rightarrow \boxed{\text{G}}$

$(-2) + 42 = \square \rightarrow \boxed{\text{A}}$

$(-9) + 32 = \square \rightarrow \boxed{\text{I}}$

$(-3) + 31 = \square \rightarrow \boxed{\text{E}}$

$(-4) + 26 = \square \rightarrow \boxed{\text{M}}$

Scratch space:

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

We checked the local sky shop ledger. The thief bought a map and several climbing clips for a set total price, so we must find the cost of a single clip to prove who checked out.

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:

$7x + 5 = 82, x = \boxed{}$

$2x + 12 = 18, x = \boxed{}$

$9x + 5 = 59, x = \boxed{}$

$4x + 9 = 49, x = \boxed{}$

$3x + 7 = 10, x = \boxed{}$

$8x + 12 = 68, x = \boxed{}$

$6x + 7 = 55, x = \boxed{}$

$5x + 11 = 71, x = \boxed{}$

$6x + 7 = 31, x = \boxed{}$

$6x + 11 = 65, x = \boxed{}$

$6x + 1 = 31, x = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain zips past the guard tower, then swings away using a grappling hook.
2. The villain glides under the sky bridge, then snatches the prize with a magnetic claw.
3. The villain zooms over the cloud wall, then snatches the prize with a magnetic claw.
4. The villain levitates above the town square, then snatches the prize with a magnetic claw.
5. The villain levitates above the town square, then swings away using a grappling hook.
6. The villain zips past the guard tower, then shoots a sticky bubble blaster.
7. The villain glides under the sky bridge, then swings away using a grappling hook.
8. The villain glides under the sky bridge, then shoots a sticky bubble blaster.
9. The villain soars through the grand canyon, then scoops up the treasure with a wind net.
10. The villain glides under the sky bridge, then scoops up the treasure with a wind net.
11. The villain soars through the grand canyon, then snatches the prize with a magnetic claw.
12. The villain zooms over the cloud wall, then hides inside a thick fog generator cloud.

Answer Key

The Golden Wind-Vane Mystery

Culprit: Zane

turbo wings · magnetic claw · green goggles · bright orange helmet · berry tarts

Trail: Start 21 → Clue 1 15 → Clue 2 9 → Clue 3 5 → Clue 4 4 → Clue 5 1

Clue 1 (Two-step equations): "THE THIEF DOES NOT USE THE WIND NET"

$2x + 6 = 16, x = 5$ (T) · $3x + 11 = 77, x = 22$ (H) · $8x + 10 = 178, x = 21$ (F) · $2x + 6 = 22, x = 8$ (U) · $5x + 9 = 89, x = 16$ (O) · $9x + 12 = 165, x = 17$ (E) · $7x + 4 = 137, x = 19$ (S) · $9x + 6 = 132, x = 14$ (W) · $6x + 2 = 110, x = 18$ (N) · $6x + 12 = 54, x = 7$ (D) · $7x + 9 = 79, x = 10$ (I)

Clue 2 (Exponents): "WE SAW GREEN GOGGLES AT THE SCENE"

$3^2 = 9$ (W) · $2^4 = 16$ (E) · $5^3 = 125$ (N) · $14^2 = 196$ (C) · $2^8 = 256$ (O) · $17^2 = 289$ (S) · $5^4 = 625$ (R) · $21^2 = 441$ (L) · $19^2 = 361$ (G) · $9^2 = 81$ (H) · $3^5 = 243$ (T) · $2^2 = 4$ (A)

Clue 3 (Square roots): "LEAVE OUT BERRY TARTS TO TRAP THEM"

$\sqrt{9} = 3$ (L) · $\sqrt{121} = 11$ (M) · $\sqrt{441} = 21$ (P) · $\sqrt{16} = 4$ (V) · $\sqrt{361} = 19$ (U) · $\sqrt{529} = 23$ (T) · $\sqrt{576} = 24$ (E) · $\sqrt{100} = 10$ (R) · $\sqrt{64} = 8$ (H) · $\sqrt{49} = 7$ (Y) · $\sqrt{4} = 2$ (S) · $\sqrt{196} = 14$ (A) · $\sqrt{144} = 12$ (O) · $\sqrt{289} = 17$ (B)

Clue 4 (Integers): "WE SPOTTED A BRIGHT ORANGE HELMET"

$3 - (-8) = 11$ (W) · $(-15) + 34 = 19$ (S) · $(-5) + 13 = 8$ (N) · $(-10) + 30 = 20$ (D) · $(-10) + 16 = 6$ (L) · $(-13) + 52 = 39$ (T) · $(-12) + 15 = 3$ (P) · $(-5) + 41 = 36$ (H) · $(-11) + 29 = 18$ (B) · $(-11) + 35 = 24$ (R) · $(-12) + 46 = 34$ (O) · $(-13) + 30 = 17$ (G) · $(-2) + 42 = 40$ (A) · $(-9) + 32 = 23$ (I) · $(-3) + 31 = 28$ (E) · $(-4) + 26 = 22$ (M)

Clue 5 (Two-step equations): surviving statement is box 2 → Zane

$7x + 5 = 82, x = 11$ · $2x + 12 = 18, x = 3$ · $9x + 5 = 59, x = 6$ · $4x + 9 = 49, x = 10$ · $3x + 7 = 10, x = 1$ · $8x + 12 = 68, x = 7$ · $6x + 7 = 55, x = 8$ · $5x + 11 = 71, x = 12$ · $6x + 7 = 31, x = 4$ · $6x + 11 = 65, x = 9$ · $6x + 1 = 31, x = 5$