



The Mystery of the Golden Compass

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

Detective: _____ **Date:** _____

The shiny Golden Compass is missing from the main lodge! Someone snuck inside during the campfire sing-along. The Camp Director needs the Adventure Club to crack the case. Find the suspect who matches all the clues before the camp gates close!

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 Ranger is _____

Possible suspects

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

NAME	FAVORITE TOOL	ADVENTURE SKILL	GLOVE HAND	HAIR STYLE	CAMP HAZARD
Ruby	grapple hook	trail marking	left handed glove	bright red cap	allergic to pine
Chloe	zipline pulley	trail marking	left handed glove	neat blonde braid	hates loud whistles
Sofi	zipline pulley	knot tying	right handed glove	messy brown hair	allergic to pine
Wyatt	night goggles	animal calling	right handed glove	neat blonde braid	allergic to pine
Toby	pocket drone	quick climbing	right handed glove	neat blonde braid	hates loud whistles
Zack	night goggles	map reading	left handed glove	bright red cap	hates loud whistles
Leo	pocket drone	map reading	right handed glove	bright red cap	allergic to pine
Maya	night goggles	animal calling	left handed glove	messy brown hair	allergic to pine
Tyler	zipline pulley	quick climbing	left handed glove	neat blonde braid	allergic to pine
Lily	grapple hook	animal calling	left handed glove	neat blonde braid	allergic to pine
Ella	night goggles	knot tying	left handed glove	bright red cap	allergic to pine
Sammy	pocket drone	map reading	left handed glove	messy brown hair	afraid of frogs
Benny	grapple hook	knot tying	left handed glove	messy brown hair	allergic to pine
Nico	pocket drone	knot tying	right handed glove	bright red cap	allergic to pine
Mia	zipline pulley	quick climbing	left handed glove	messy brown hair	allergic to pine
Emma	pocket drone	quick climbing	right handed glove	neat blonde braid	allergic to pine
Jack	zipline pulley	quick climbing	left handed glove	messy brown hair	afraid of frogs
Ava	zipline pulley	animal calling	left handed glove	messy brown hair	allergic to pine
Oliver	pocket drone	trail marking	left handed glove	messy brown hair	allergic to pine
Grace	pocket drone	knot tying	left handed glove	messy brown hair	afraid of frogs
Harper	zipline pulley	knot tying	left handed glove	bright red cap	hates loud whistles

CLUE 1

Two-step equations

We found a box of mystery gear. Inside were several packs of rope plus five extra boots. If we undo this simple math puzzle, we can read the first clue on the bottom of the box!

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

T			T					T											T			
9	10	21	9	16	19	3	21	9	2	17	21	8	5	17	9	7	8	21				

T												
9	19	16	12	14	11	16	19	4	12	5	3	

$9x + 6 = 87, x = \square \rightarrow \boxed{\text{T}}$

$5x + 1 = 21, x = \square \rightarrow \boxed{\text{K}}$

$8x + 3 = 83, x = \square \rightarrow \boxed{\text{H}}$

$4x + 6 = 90, x = \square \rightarrow \boxed{\text{E}}$

$7x + 2 = 100, x = \square \rightarrow \boxed{\text{L}}$

$2x + 9 = 31, x = \square \rightarrow \boxed{\text{M}}$

$8x + 1 = 41, x = \square \rightarrow \boxed{\text{N}}$

$3x + 2 = 26, x = \square \rightarrow \boxed{\text{S}}$

$5x + 10 = 20, x = \square \rightarrow \boxed{\text{D}}$

$6x + 1 = 43, x = \square \rightarrow \boxed{\text{U}}$

$3x + 1 = 58, x = \square \rightarrow \boxed{\text{R}}$

$9x + 9 = 36, x = \square \rightarrow \boxed{\text{G}}$

$2x + 7 = 39, x = \square \rightarrow \boxed{\text{A}}$

$2x + 11 = 35, x = \square \rightarrow \boxed{\text{I}}$

$6x + 2 = 104, x = \square \rightarrow \boxed{\text{O}}$

Scratch space:

CLUE 2

The security keypad on the treehouse locker multiplies its code numbers very quickly. Solving this power-of-two riddle unlocks the next hint.

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

The diagram consists of two rows of boxes. The top row has 18 boxes, and the bottom row has 11 boxes. Some boxes are orange and contain the letter 'T', while others are white and empty. Below each box is a number.

Row	Box Index	Box Color	Box Content	Value
Top Row	1	Orange	T	100
	2	White		25
	3	White		27
	4	White		216
	5	White		9
	6	White		216
	7	White		128
	8	White		27
	9	White		49
	10	Orange	T	100
	11	White		484
	12	White		361
	13	White		512
	14	White		27
	15	White		121
	16	White		8
	17	White		27
	18	Orange	T	100
Bottom Row	1	White		25
	2	White		121
	3	White		4
	4	White		400
	5	White		27
	6	White		400
	7	White		243
	8	White		8
	9	White		361
	10	White		32
	11	White		27

$$10^2 = \boxed{} \rightarrow \boxed{\text{T}}$$

$$19^2 = \boxed{} \rightarrow \boxed{0}$$

$$5^2 = \boxed{} \rightarrow \boxed{\text{H}}$$

$$3^5 = \boxed{} \rightarrow \boxed{\mathbf{G}}$$

$$22^2 = \boxed{} \rightarrow \boxed{W}$$

$$3^2 = \boxed{} \rightarrow \boxed{\text{U}}$$

$$6^3 = \boxed{} \rightarrow \boxed{\text{S}}$$

$$2^5 = \boxed{} \rightarrow \boxed{\text{V}}$$

$$2^2 = \boxed{} \rightarrow \boxed{\text{N}}$$

$$11^2 = \boxed{} \rightarrow \boxed{\mathbf{A}}$$

$$20^2 = \boxed{} \rightarrow \boxed{\text{D}}$$

$$2^3 = \boxed{} \rightarrow \boxed{\text{L}}$$

$$3^3 = \boxed{} \rightarrow \boxed{\text{E}}$$

$2^6 = \boxed{} \rightarrow \boxed{\text{F}}$

$$2^9 = \boxed{} \rightarrow \boxed{\text{R}}$$

$$2^7 = \boxed{} \rightarrow \boxed{\text{P}}$$

$$7^2 = \boxed{} \rightarrow \boxed{\text{C}}$$

Scratch space:

CLUE 3 Square roots

To find the next note, we must measure the square grid map of the forest. Finding the side length of this giant square area gives us the exact coordinates.

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

T																
18	24	15	8	17	25	21	9	21	10	3	25	15	15	19	15	2
6	8	16	4	6	8	15	3	24	11	12	25	15				

$\text{sqrt}(324) = \square \rightarrow \boxed{\text{T}}$	$\text{sqrt}(225) = \square \rightarrow \boxed{\text{E}}$	$\text{sqrt}(100) = \square \rightarrow \boxed{\text{Y}}$
$\text{sqrt}(9) = \square \rightarrow \boxed{\text{S}}$	$\text{sqrt}(441) = \square \rightarrow \boxed{\text{A}}$	$\text{sqrt}(625) = \square \rightarrow \boxed{\text{N}}$
$\text{sqrt}(121) = \square \rightarrow \boxed{\text{P}}$	$\text{sqrt}(4) = \square \rightarrow \boxed{\text{D}}$	$\text{sqrt}(576) = \square \rightarrow \boxed{\text{H}}$
$\text{sqrt}(144) = \square \rightarrow \boxed{\text{I}}$	$\text{sqrt}(81) = \square \rightarrow \boxed{\text{W}}$	$\text{sqrt}(16) = \square \rightarrow \boxed{\text{M}}$
$\text{sqrt}(289) = \square \rightarrow \boxed{\text{U}}$	$\text{sqrt}(256) = \square \rightarrow \boxed{\text{O}}$	$\text{sqrt}(36) = \square \rightarrow \boxed{\text{F}}$
$\text{sqrt}(361) = \square \rightarrow \boxed{\text{Z}}$	$\text{sqrt}(64) = \square \rightarrow \boxed{\text{R}}$	

Scratch space:

CLUE 4 Integers

We checked the elevation tracker. The runner went high up into the canopy and then deep down into the rocky canyon. This climb and drop tells us where they dropped a clue.

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

A																			
14	35	8	13	13	12	7	2	19	27	5	15	14	31	2	27	14	13		
								A											
19	5	16	15	8	7	2	14	5	23	15									

$2 - (-12) = \square \rightarrow \text{A}$	$(-14) + 49 = \square \rightarrow \text{M}$	$(-9) + 21 = \square \rightarrow \text{Y}$
$(-6) + 22 = \square \rightarrow \text{T}$	$(-5) + 18 = \square \rightarrow \text{S}$	$(-7) + 14 = \square \rightarrow \text{B}$
$(-13) + 18 = \square \rightarrow \text{N}$	$(-11) + 26 = \square \rightarrow \text{H}$	$(-4) + 31 = \square \rightarrow \text{W}$
$(-12) + 14 = \square \rightarrow \text{R}$	$22 - (-9) = \square \rightarrow \text{I}$	$13 - (-10) = \square \rightarrow \text{C}$
$(-5) + 13 = \square \rightarrow \text{E}$	$(-7) + 26 = \square \rightarrow \text{O}$	

Scratch space:

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

The final puzzle is carved on a wooden sign. If we take the total number of camp badges, double it, and add three, we can work backward to find the clue.

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:

$8x + 8 = 88, x = \boxed{}$

$8x + 2 = 58, x = \boxed{}$

$2x + 3 = 9, x = \boxed{}$

$3x + 9 = 42, x = \boxed{}$

$7x + 7 = 63, x = \boxed{}$

$7x + 8 = 43, x = \boxed{}$

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

$6x + 8 = 80, x = \boxed{}$

$5x + 3 = 23, x = \boxed{}$

$3x + 8 = 26, x = \boxed{}$

$7x + 11 = 18, x = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain searched the dark tent with night goggles, then planned a fast getaway using map reading.
2. The villain slid down the main cable with a zipline pulley, then confused the camp guard using animal calling.
3. The villain slid down the main cable with a zipline pulley, then escaped the scene using quick climbing.
4. The villain swung across the creek with a grapple hook, then escaped the scene using quick climbing.
5. The villain scouted the path with a pocket drone, then marked a secret path using trail marking.
6. The villain scouted the path with a pocket drone, then secured the cabin door using knot tying.
7. The villain searched the dark tent with night goggles, then confused the camp guard using animal calling.
8. The villain searched the dark tent with night goggles, then secured the cabin door using knot tying.
9. The villain slid down the main cable with a zipline pulley, then marked a secret path using trail marking.
10. The villain swung across the creek with a grapple hook, then secured the cabin door using knot tying.
11. The villain scouted the path with a pocket drone, then planned a fast getaway using map reading.
12. The villain swung across the creek with a grapple hook, then marked a secret path using trail marking.

Answer Key

The Mystery of the Golden Compass

Culprit: Ava

zipline pulley · animal calling · left handed glove · messy brown hair · allergic to pine

Trail: Start 21 → Clue 1 18 → Clue 2 12 → Clue 3 7 → Clue 4 4 → Clue 5 1

Clue 1 (Two-step equations): "THE TARGET DOES NOT USE TRAIL MARKING"

$9x + 6 = 87, x = 9$ (T) · $5x + 1 = 21, x = 4$ (K) · $8x + 3 = 83, x = 10$ (H) · $4x + 6 = 90, x = 21$ (E) · $7x + 2 = 100, x = 14$ (L) · $2x + 9 = 31, x = 11$ (M) · $8x + 1 = 41, x = 5$ (N) · $3x + 2 = 26, x = 8$ (S) · $5x + 10 = 20, x = 2$ (D) · $6x + 1 = 43, x = 7$ (U) · $3x + 1 = 58, x = 19$ (R) · $9x + 9 = 36, x = 3$ (G) · $2x + 7 = 39, x = 16$ (A) · $2x + 11 = 35, x = 12$ (I) · $6x + 2 = 104, x = 17$ (O)

Clue 2 (Exponents): "THE SUSPECT WORE A LEFT HANDED GLOVE"

$10^2 = 100$ (T) · $19^2 = 361$ (O) · $5^2 = 25$ (H) · $3^5 = 243$ (G) · $22^2 = 484$ (W) · $3^2 = 9$ (U) · $6^3 = 216$ (S) · $2^5 = 32$ (V) · $2^2 = 4$ (N) · $11^2 = 121$ (A) · $20^2 = 400$ (D) · $2^3 = 8$ (L) · $3^3 = 27$ (E) · $2^6 = 64$ (F) · $2^9 = 512$ (R) · $2^7 = 128$ (P) · $7^2 = 49$ (C)

Clue 3 (Square roots): "THE RUNAWAY SNEEZED FROM FRESH PINE"

$\sqrt{324} = 18$ (T) · $\sqrt{225} = 15$ (E) · $\sqrt{100} = 10$ (Y) · $\sqrt{9} = 3$ (S) · $\sqrt{441} = 21$ (A) · $\sqrt{625} = 25$ (N) · $\sqrt{121} = 11$ (P) · $\sqrt{4} = 2$ (D) · $\sqrt{576} = 24$ (H) · $\sqrt{144} = 12$ (I) · $\sqrt{81} = 9$ (W) · $\sqrt{16} = 4$ (M) · $\sqrt{289} = 17$ (U) · $\sqrt{256} = 16$ (O) · $\sqrt{36} = 6$ (F) · $\sqrt{361} = 19$ (Z) · $\sqrt{64} = 8$ (R)

Clue 4 (Integers): "A MESSY BROWN HAIR WAS ON THE BRANCH"

$2 - (-12) = 14$ (A) · $(-14) + 49 = 35$ (M) · $(-9) + 21 = 12$ (Y) · $(-6) + 22 = 16$ (T) · $(-5) + 18 = 13$ (S) · $(-7) + 14 = 7$ (B) · $(-13) + 18 = 5$ (N) · $(-11) + 26 = 15$ (H) · $(-4) + 31 = 27$ (W) · $(-12) + 14 = 2$ (R) · $22 - (-9) = 31$ (I) · $13 - (-10) = 23$ (C) · $(-5) + 13 = 8$ (E) · $(-7) + 26 = 19$ (O)

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

$8x + 8 = 88, x = 10$ · $8x + 2 = 58, x = 7$ · $2x + 3 = 9, x = 3$ · $3x + 9 = 42, x = 11$ · $7x + 7 = 63, x = 8$ · $7x + 8 = 43, x = 5$ · $2x + 2 = 20, x = 9$ · $6x + 8 = 80, x = 12$ · $5x + 3 = 23, x = 4$ · $3x + 8 = 26, x = 6$ · $7x + 11 = 18, x = 1$