



The Cloudburst Heist

Grade 10 math · Pythagorean theorem, Square roots, Exponents, Order of operations · Reading level grades 7-9

Detective: _____ Date: _____

The golden Chronos Compass has been snatched from the floating Grand Library! Winds are picking up, and the suspect is fleeing across the cloud-islands. You must analyze the evidence before the storm washes away all clues.

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 is _____

Possible suspects

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

NAME	AETHERIC POWER	SUPPORT GEAR	SIGHTING DETAIL	STRAND EVIDENCE	TACTICAL FLAW
Marco	wind-gliding	sonar-whispering	wears leather visor	blue streak hair	distracted by shiny gears
Ernest	metal-bending	grapple-hooking	wears leather visor	windblown auburn hair	fears high-voltage sparks
Alexandra	lightning-taming	clockwork repair	wears brass goggles	windblown auburn hair	fears high-voltage sparks
Sacagawea	star-mapping	sonar-whispering	wears leather visor	windblown auburn hair	distracted by shiny gears
Vasco	cloud-shaping	grapple-hooking	wears brass goggles	windblown auburn hair	fears high-voltage sparks
Jeanne	cloud-shaping	feather-falling	wears brass goggles	windblown auburn hair	fears high-voltage sparks
Jacques	star-mapping	feather-falling	wears leather visor	silver spiked hair	fears high-voltage sparks
Roald	metal-bending	feather-falling	wears leather visor	windblown auburn hair	fears high-voltage sparks
Zheng	wind-gliding	grapple-hooking	wears brass goggles	silver spiked hair	allergic to cloudberryes
Krystyna	star-mapping	sonar-whispering	wears brass goggles	blue streak hair	distracted by shiny gears
Nellie	wind-gliding	feather-falling	wears brass goggles	silver spiked hair	fears high-voltage sparks
Ibn	cloud-shaping	gale-force whistling	wears leather visor	silver spiked hair	allergic to cloudberryes
Thor	lightning-taming	clockwork repair	wears leather visor	windblown auburn hair	distracted by shiny gears
Charles	wind-gliding	clockwork repair	wears brass goggles	silver spiked hair	fears high-voltage sparks
Harriet	metal-bending	feather-falling	wears brass goggles	windblown auburn hair	fears high-voltage sparks
Isabella	cloud-shaping	sonar-whispering	wears leather visor	windblown auburn hair	fears high-voltage sparks
Matthew	metal-bending	sonar-whispering	wears brass goggles	windblown auburn hair	fears high-voltage sparks
Leif	metal-bending	feather-falling	wears brass goggles	windblown auburn hair	distracted by shiny gears
Bessie	star-mapping	gale-force whistling	wears leather visor	blue streak hair	distracted by shiny gears
Gertrude	star-mapping	sonar-whispering	wears brass goggles	blue streak hair	fears high-voltage sparks
Fridtjof	lightning-taming	gale-force whistling	wears leather visor	blue streak hair	distracted by shiny gears

CLUE 1

Pythagorean theorem

To measure the distance your airship must jump to reach the culprit's floating escape dock, you calculate the diagonal path between the two highest towers.

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

26 20 37 85 50 10 10 123 50 74 34 100 37 75 74 100 26

75 100 74 123 5 65 20 50 75 125 37 5

75 100 74 123 5

65 20 50 75 125 37 5

legs 10 and 24, hypotenuse = $\rightarrow$ **T**

legs 6 and 8, hypotenuse = $\rightarrow$ **L**

legs 3 and 4, hypotenuse = $\rightarrow$ **R**

legs 12 and 35, hypotenuse = $\rightarrow$ **E**

legs 16 and 30, hypotenuse = → **D**

legs 28 and 96, hypotenuse = → **0**

legs 12 and 16, hypotenuse = → **H**

legs 21 and 72, hypotenuse = $\rightarrow$ **S**

legs 25 and 60, hypotenuse = $\rightarrow$ **W**

legs 14 and 48, hypotenuse = $\rightarrow$ |

legs 40 and 75, hypotenuse = $\rightarrow$ **V**

legs 35 and 120, hypotenuse = → **P**

legs 24 and 70, hypotenuse = → **N**

legs 27 and 120, hypotenuse = → **A**

Scratch space:

CLUE 2 Square roots

The airship's square engine core needs a backup seal, but you only know its total area. Finding the side length reveals the correct engine size.

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

T										T								
22	11	16	25	6	25	21	16	4	22	7	5	8	21	21	16	7	9	
21	9	20	5	8	14	3	5	9	25	25	12	8	12	12	19	16	25	

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

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

$\sqrt{625} = \square \rightarrow \boxed{\text{S}}$

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

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

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

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

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

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

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

$\sqrt{25} = \square \rightarrow \boxed{\text{R}}$

$\sqrt{361} = \square \rightarrow \boxed{\text{L}}$

$\sqrt{441} = \square \rightarrow \boxed{\text{P}}$

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

$\sqrt{64} = \square \rightarrow \boxed{\text{O}}$

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

Scratch space:

CLUE 3 Exponents

Your communications array must double its signal power multiple times to pierce the thick storm clouds and receive the next coordinate set.

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

S					S														
484	8	243	361	125	484	32	361	256	324	36	225	441	441	81	216	121	81	441	

S																
484	100	243	361	441	64	36	225	441	289	121	343	343	243	121	81	

$22^2 = \square \rightarrow$ S	$18^2 = \square \rightarrow$ M	$6^2 = \square \rightarrow$ T	$17^2 = \square \rightarrow$ V
$5^3 = \square \rightarrow$ K	$19^2 = \square \rightarrow$ R	$11^2 = \square \rightarrow$ I	$21^2 = \square \rightarrow$ E
$6^3 = \square \rightarrow$ G	$2^3 = \square \rightarrow$ P	$2^6 = \square \rightarrow$ D	$10^2 = \square \rightarrow$ C
$15^2 = \square \rightarrow$ H	$7^3 = \square \rightarrow$ L	$16^2 = \square \rightarrow$ O	$3^4 = \square \rightarrow$ N
$3^5 = \square \rightarrow$ A	$2^5 = \square \rightarrow$ F		

Scratch space:

CLUE 4 Order of operations

To unlock the navigator's secure flight safe, you must follow the correct priority of operations in the mechanical control formula.

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

W							W												
46	36	7	105	42	69	64	46	7	34	48	42	48	82	7	33	34	36	82	
27	69	48	7	57	116	64	116	33	11	26	11	34	116						

$5 \times 11 - 9 = \square \rightarrow \text{W}$	$11 \times 12 - 16 = \square \rightarrow \text{T}$	$55 + 3 \times 9 = \square \rightarrow \text{R}$
$9 \times 8 - 24 = \square \rightarrow \text{U}$	$11 \times 8 - 24 = \square \rightarrow \text{O}$	$22 + 2 \times 7 = \square \rightarrow \text{I}$
$3 + 9 \times 6 = \square \rightarrow \text{G}$	$60 + 3 \times 3 = \square \rightarrow \text{L}$	$7 \times 7 - 7 = \square \rightarrow \text{B}$
$3 \times 11 - 7 = \square \rightarrow \text{S}$	$1 + 2 \times 3 = \square \rightarrow \text{N}$	$21 + 3 \times 2 = \square \rightarrow \text{C}$
$25 + 2 \times 4 = \square \rightarrow \text{H}$	$12 \times 11 - 27 = \square \rightarrow \text{D}$	$5 + 3 \times 2 = \square \rightarrow \text{E}$
$2 + 4 \times 8 = \square \rightarrow \text{A}$		

Scratch space:

CLUE 5**Square roots - the last clue**

The hidden hangar floor is a perfect square grid. Determining its exact dimensions lets you sweep the floor for dropped physical evidence.

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:

$\text{sqrt}(64) = \boxed{}$

$\text{sqrt}(16) = \boxed{}$

$\text{sqrt}(9) = \boxed{}$

$\text{sqrt}(25) = \boxed{}$

$\text{sqrt}(144) = \boxed{}$

$\text{sqrt}(49) = \boxed{}$

$\text{sqrt}(100) = \boxed{}$

$\text{sqrt}(121) = \boxed{}$

$\text{sqrt}(36) = \boxed{}$

$\text{sqrt}(81) = \boxed{}$

$\text{sqrt}(4) = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain channels static electricity into the locks, then rewires the security panel.
2. The villain uses ancient star charts to navigate, then whistles a high-pitched gale.
3. The villain creates thick fog to hide their path, then escapes using a grappling line.
4. The villain creates thick fog to hide their path, then drifts safely down to the lower deck.
5. The villain creates thick fog to hide their path, then rewires the security panel.
6. The villain channels static electricity into the locks, then whistles a high-pitched gale.
7. The villain harnesses the wind to glide silently, then rewires the security panel.
8. The villain bends the iron hull doors open, then drifts safely down to the lower deck.
9. The villain channels static electricity into the locks, then detects the guards by sound.
10. The villain harnesses the wind to glide silently, then whistles a high-pitched gale.
11. The villain harnesses the wind to glide silently, then escapes using a grappling line.
12. The villain uses ancient star charts to navigate, then detects the guards by sound.

Answer Key

The Cloudburst Heist

Culprit: Alexandra

lightning-taming · clockwork repair · wears brass goggles · windblown auburn hair · fears high-voltage sparks

Trail: Start 21 → Clue 1 15 → Clue 2 8 → Clue 3 6 → Clue 4 4 → Clue 5 1

Clue 1 (Pythagorean theorem): "THE VILLAIN DOES NOT SONAR WHISPER"

legs 10 and 24, hypotenuse = 26 (T) · legs 6 and 8, hypotenuse = 10 (L) · legs 3 and 4, hypotenuse = 5 (R) · legs 12 and 35, hypotenuse = 37 (E) · legs 16 and 30, hypotenuse = 34 (D) · legs 28 and 96, hypotenuse = 100 (O) · legs 12 and 16, hypotenuse = 20 (H) · legs 21 and 72, hypotenuse = 75 (S) · legs 25 and 60, hypotenuse = 65 (W) · legs 14 and 48, hypotenuse = 50 (I) · legs 40 and 75, hypotenuse = 85 (V) · legs 35 and 120, hypotenuse = 125 (P) · legs 24 and 70, hypotenuse = 74 (N) · legs 27 and 120, hypotenuse = 123 (A)

Clue 2 (Square roots): "THE SUSPECT DROPPED A PAIR OF BRASS GOGGLES"

$\sqrt{484} = 22$ (T) · $\sqrt{400} = 20$ (I) · $\sqrt{625} = 25$ (S) · $\sqrt{16} = 4$ (C) · $\sqrt{9} = 3$ (B) · $\sqrt{36} = 6$ (U) · $\sqrt{256} = 16$ (E) · $\sqrt{121} = 11$ (H) · $\sqrt{196} = 14$ (F) · $\sqrt{144} = 12$ (G) · $\sqrt{25} = 5$ (R) · $\sqrt{361} = 19$ (L) · $\sqrt{441} = 21$ (P) · $\sqrt{81} = 9$ (A) · $\sqrt{64} = 8$ (O) · $\sqrt{49} = 7$ (D)

Clue 3 (Exponents): "SPARKS FROM THE ENGINE SCARED THE VILLAIN"

$22^2 = 484$ (S) · $18^2 = 324$ (M) · $6^2 = 36$ (T) · $17^2 = 289$ (V) · $5^3 = 125$ (K) · $19^2 = 361$ (R) · $11^2 = 121$ (I) · $21^2 = 441$ (E) · $6^3 = 216$ (G) · $2^3 = 8$ (P) · $2^6 = 64$ (D) · $10^2 = 100$ (C) · $15^2 = 225$ (H) · $7^3 = 343$ (L) · $16^2 = 256$ (O) · $3^4 = 81$ (N) · $3^5 = 243$ (A) · $2^5 = 32$ (F)

Clue 4 (Order of operations): "WINDBLOWN AUBURN HAIR CLUNG TO THE SEAT"

$5 \times 11 - 9 = 46$ (W) · $11 \times 12 - 16 = 116$ (T) · $55 + 3 \times 9 = 82$ (R) · $9 \times 8 - 24 = 48$ (U) · $11 \times 8 - 24 = 64$ (O) · $22 + 2 \times 7 = 36$ (I) · $3 + 9 \times 6 = 57$ (G) · $60 + 3 \times 3 = 69$ (L) · $7 \times 7 - 7 = 42$ (B) · $3 \times 11 - 7 = 26$ (S) · $1 + 2 \times 3 = 7$ (N) · $21 + 3 \times 2 = 27$ (C) · $25 + 2 \times 4 = 33$ (H) · $12 \times 11 - 27 = 105$ (D) · $5 + 3 \times 2 = 11$ (E) · $2 + 4 \times 8 = 34$ (A)

Clue 5 (Square roots): surviving statement is box 1 → Alexandra

$\sqrt{64} = 8$ · $\sqrt{16} = 4$ · $\sqrt{9} = 3$ · $\sqrt{25} = 5$ · $\sqrt{144} = 12$ · $\sqrt{49} = 7$ · $\sqrt{100} = 10$ · $\sqrt{121} = 11$ · $\sqrt{36} = 6$ · $\sqrt{81} = 9$ · $\sqrt{4} = 2$