



The Cloud Dock Caper

Grade 8 math · Exponents, Square roots, Pythagorean theorem, Order of operations, Two-step equations · Reading level grades 5-6

Detective: _____ Date: _____

The legendary Golden Compass has been stolen from the Cloud Dock! A sneaky Sky Bandit slipped past the wind-turbines and escaped into the clouds. We need to crack the clues, track the rogue airship, and catch the thief before they vanish beyond the storm barrier.

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 Bandit is _____

Possible suspects

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

NAME	ESCAPE GADGET	SECONDARY DEVICE	HANDEDNESS	HAIR COLOR	DISTRACTION
Helena Heli	Pocket Glider	Wind Whistle	Left Handed	Red Hair	Shiny Coins
Cumulus Cole	Zip Line	Bubble Blaster	Left Handed	Red Hair	Sweet Candy
Barnaby Balloon	Zip Line	Steam Shield	Left Handed	Red Hair	Shiny Coins
Thermals Theo	Magnet Boots	Wind Whistle	Left Handed	Black Hair	Squeaky Toys
Amelia Aviator	Smoke Grenade	Flare Gun	Right Handed	Black Hair	Squeaky Toys
Cloudy Clara	Zip Line	Wind Whistle	Right Handed	Black Hair	Sweet Candy
Orville Oliver	Magnet Boots	Flare Gun	Left Handed	Red Hair	Sweet Candy
Cap Captain	Magnet Boots	Steam Shield	Right Handed	Black Hair	Squeaky Toys
Hawk Henry	Zip Line	Wind Whistle	Left Handed	Blonde Hair	Squeaky Toys
Gale Gabriel	Grappling Hook	Wind Whistle	Right Handed	Black Hair	Squeaky Toys
Propeller Pete	Zip Line	Steam Shield	Right Handed	Blonde Hair	Squeaky Toys
Falcon Faye	Grappling Hook	Wind Whistle	Right Handed	Red Hair	Shiny Coins
Zephyr Zach	Magnet Boots	Bubble Blaster	Left Handed	Blonde Hair	Squeaky Toys
Windy Wendy	Grappling Hook	Bubble Blaster	Right Handed	Black Hair	Squeaky Toys
Rotor Ruth	Pocket Glider	Solar Sail	Left Handed	Red Hair	Sweet Candy
Gusty Grace	Magnet Boots	Flare Gun	Left Handed	Black Hair	Shiny Coins
Nimbus Nancy	Magnet Boots	Solar Sail	Left Handed	Blonde Hair	Shiny Coins
SkyScurry Sam	Smoke Grenade	Steam Shield	Left Handed	Red Hair	Sweet Candy
Altimeter Al	Zip Line	Wind Whistle	Right Handed	Black Hair	Shiny Coins
Breezy Bella	Magnet Boots	Bubble Blaster	Right Handed	Black Hair	Squeaky Toys
Barometer Ben	Zip Line	Steam Shield	Left Handed	Red Hair	Squeaky Toys

CLUE 1

The engine room power grid runs on a doubling scale of power cells that we need to calculate.

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

A number line from 0 to 1000. The line is marked with boxes for tens and hundreds. The number 100 is highlighted in orange.

Tens	Hundreds
100	729
27	81
16	36
8	128
100	8
64	27
32	36
169	32
27	

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

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

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

$$2^5 = \boxed{} \rightarrow \boxed{\mathbf{S}}$$

$$8^2 = \boxed{} \rightarrow \boxed{0}$$

$$3^4 = \boxed{} \rightarrow \boxed{\mathbf{B}}$$

$$14^2 = \boxed{} \rightarrow \boxed{\text{R}}$$

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

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

$$16^2 = \boxed{} \rightarrow \boxed{\mathbf{G}}$$

$$4^2 = \boxed{} \rightarrow \boxed{\mathbf{A}}$$

$$13^2 = \boxed{} \rightarrow \boxed{U}$$

$$3^5 = \boxed{} \rightarrow \boxed{\text{L}}$$

$$17^2 = \boxed{} \rightarrow \boxed{\text{F}}$$

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

Scratch space:

CLUE 2 Square roots

To open the sealed archives, we must find the side length of the giant square vault door.

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

T																	
9	25	11	24	10	23	2	15	13	16	19	24	23	19	14	17	16	12
12	4	21	8	11	15	6	14	16	20	4	21	25	9	25	16	8	15

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

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

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

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

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

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

$\sqrt{4} = \square \rightarrow \boxed{\text{U}}$

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

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

$\sqrt{225} = \square \rightarrow \boxed{\text{D}}$

$\sqrt{529} = \square \rightarrow \boxed{\text{O}}$

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

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

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

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

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

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

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

$\sqrt{100} = \square \rightarrow \boxed{\text{L}}$

Scratch space:

CLUE 3

Pythagorean theorem

We need to measure the diagonal shortcut from the main watchtower over to the lower cargo deck.

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

T																			
5	41	85	29	15	30	30	26	15	52	20	41	25	26	52	34	68	25	37	75
26	52	37	15	20	39	20	74	65	85	26	34	39	T						

legs 3 and 4, hypotenuse = → **T**

legs 15 and 36, hypotenuse = → **Y**

legs 12 and 35, hypotenuse = → **O**

legs 20 and 21, hypotenuse = → **V**

legs 18 and 24, hypotenuse = → **L**

legs 25 and 60, hypotenuse = → **U**

legs 40 and 75, hypotenuse = → **E**

legs 20 and 48, hypotenuse = → **N**

legs 9 and 12, hypotenuse = → **I**

legs 7 and 24, hypotenuse = → **R**

legs 10 and 24, hypotenuse = → **A**

legs 16 and 30, hypotenuse = → **K**

legs 12 and 16, hypotenuse = → **S**

legs 21 and 72, hypotenuse = → **M**

legs 9 and 40, hypotenuse = → **H**

legs 24 and 70, hypotenuse = → **Q**

legs 32 and 60, hypotenuse = → **F**

Scratch space:

CLUE 4 Order of operations

The bandit cockpit keypad only unlocks if we punch in the code using the strict order of mathematical steps.

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

A 2x10 grid of boxes. The top row contains the following sequence: an orange box with 'S', followed by four empty boxes with numbers 21, 16, 27, 108 below them; four empty boxes with numbers 112, 108, 97 below them; four empty boxes with numbers 64, 31, 11, 69, 115 below them; an orange box with 'S', followed by four empty boxes with numbers 21, 97, 56, 11, 52, 36, 21 below them; and an orange box with 'S' at the end. The bottom row contains: four empty boxes with numbers 111, 108, 56, 108 below them; four empty boxes with numbers 31, 108, 40, 97 below them; two empty boxes with numbers 16, 52 below them; two empty boxes with numbers 97, 61 below them; one empty box with number 108 below it; an orange box with 'S', followed by three empty boxes with numbers 21, 108, 11, 97 below them.

$$9 \times 3 - 6 = \boxed{} \rightarrow \boxed{\text{S}}$$

$$9 \times 10 - 26 = \boxed{} \rightarrow \boxed{\mathbf{B}}$$

$9 \times 7 - 23 = \boxed{} \rightarrow \boxed{\text{F}}$

$15 + 2 \times 6 = \boxed{} \rightarrow \boxed{\text{M}}$

$$11 \times 11 - 9 = \boxed{} \rightarrow \boxed{\mathbf{J}}$$

$$51 + 8 \times 8 = \boxed{} \rightarrow \boxed{\text{K}}$$

$$6 \times 12 - 3 = \boxed{} \rightarrow \boxed{\text{C}}$$

$$11 \times 3 - 22 = \boxed{} \rightarrow \boxed{\text{A}}$$

$$24 + 8 \times 4 = \boxed{} \rightarrow \boxed{\text{R}}$$

$7 + 3 \times 3 = \square \rightarrow \boxed{0}$

$$21 + 2 \times 5 = \boxed{} \rightarrow \boxed{\text{L}}$$

$$96 + 5 \times 3 = \boxed{} \rightarrow \boxed{\text{W}}$$

$$96 + 4 \times 3 = \boxed{} \rightarrow \boxed{\text{E}}$$

$$6 \times 11 - 5 = \boxed{} \rightarrow \boxed{\text{H}}$$

$$79 + 2 \times 9 = \boxed{} \rightarrow \boxed{\text{T}}$$

$9 + 9 \times 3 = \square \rightarrow \boxed{\text{D}}$

$$36 + 4 \times 4 = \boxed{} \rightarrow \boxed{\text{N}}$$

Scratch space:

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

We can track the pirate ship by setting up a rate problem using the remaining fuel and the extra weight of the cargo.

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:

$3x + 6 = 33, x = \boxed{}$

$5x + 7 = 47, x = \boxed{}$

$3x + 9 = 24, x = \boxed{}$

$3x + 12 = 24, x = \boxed{}$

$4x + 10 = 14, x = \boxed{}$

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

$5x + 8 = 58, x = \boxed{}$

$3x + 5 = 26, x = \boxed{}$

$6x + 3 = 21, x = \boxed{}$

$6x + 9 = 45, x = \boxed{}$

$3x + 7 = 43, x = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain slides down a high-altitude zip line, then escapes using a solar sail.
2. The villain stomps across the deck in magnet boots, then whistles to summon a gust of wind.
3. The villain drops a blinding smoke grenade, then blocks the pursuit with a steam shield.
4. The villain sails silently using a pocket glider, then whistles to summon a gust of wind.
5. The villain swings down with a grappling hook, then traps the guards with a bubble blaster.
6. The villain swings down with a grappling hook, then fires a flare gun into the sky.
7. The villain stomps across the deck in magnet boots, then fires a flare gun into the sky.
8. The villain stomps across the deck in magnet boots, then traps the guards with a bubble blaster.
9. The villain stomps across the deck in magnet boots, then blocks the pursuit with a steam shield.
10. The villain drops a blinding smoke grenade, then fires a flare gun into the sky.
11. The villain swings down with a grappling hook, then whistles to summon a gust of wind.
12. The villain drops a blinding smoke grenade, then traps the guards with a bubble blaster.

Answer Key

The Cloud Dock Caper

Culprit: Gale Gabriel

Grappling Hook · Wind Whistle · Right Handed · Black Hair · Squeaky Toys

Trail: Start 21 → Clue 1 18 → Clue 2 8 → Clue 3 5 → Clue 4 4 → Clue 5 1

Clue 1 (Exponents): "THE BANDIT DOES NOT USE A FLARE GUN"

$10^2 = 100$ (T) · $6^2 = 36$ (N) · $2^3 = 8$ (D) · $2^5 = 32$ (S) · $8^2 = 64$ (O) · $3^4 = 81$ (B) · $14^2 = 196$ (R) · $3^3 = 27$ (E) · $3^6 = 729$ (H) · $16^2 = 256$ (G) · $4^2 = 16$ (A) · $13^2 = 169$ (U) · $3^5 = 243$ (L) · $17^2 = 289$ (F) · $2^7 = 128$ (I)

Clue 2 (Square roots): "THE CLOUD MAP COPY WAS SIGNED BY A RIGHT HAND"

$\sqrt{81} = 9$ (T) · $\sqrt{16} = 4$ (I) · $\sqrt{196} = 14$ (Y) · $\sqrt{256} = 16$ (A) · $\sqrt{121} = 11$ (E) · $\sqrt{64} = 8$ (N) · $\sqrt{4} = 2$ (U) · $\sqrt{441} = 21$ (G) · $\sqrt{361} = 19$ (P) · $\sqrt{225} = 15$ (D) · $\sqrt{529} = 23$ (O) · $\sqrt{144} = 12$ (S) · $\sqrt{289} = 17$ (W) · $\sqrt{36} = 6$ (B) · $\sqrt{169} = 13$ (M) · $\sqrt{576} = 24$ (C) · $\sqrt{400} = 20$ (R) · $\sqrt{625} = 25$ (H) · $\sqrt{100} = 10$ (L)

Clue 3 (Pythagorean theorem): "THE VILLAIN SHRANK FROM A NOISY SQUEAKY TOY"

legs 3 and 4, hypotenuse = 5 (T) · legs 15 and 36, hypotenuse = 39 (Y) · legs 12 and 35, hypotenuse = 37 (O) · legs 20 and 21, hypotenuse = 29 (V) · legs 18 and 24, hypotenuse = 30 (L) · legs 25 and 60, hypotenuse = 65 (U) · legs 40 and 75, hypotenuse = 85 (E) · legs 20 and 48, hypotenuse = 52 (N) · legs 9 and 12, hypotenuse = 15 (I) · legs 7 and 24, hypotenuse = 25 (R) · legs 10 and 24, hypotenuse = 26 (A) · legs 16 and 30, hypotenuse = 34 (K) · legs 12 and 16, hypotenuse = 20 (S) · legs 21 and 72, hypotenuse = 75 (M) · legs 9 and 40, hypotenuse = 41 (H) · legs 24 and 70, hypotenuse = 74 (Q) · legs 32 and 60, hypotenuse = 68 (F)

Clue 4 (Order of operations): "SOME JET BLACK STRANDS WERE LEFT ON THE SEAT"

$9 \times 3 - 6 = 21$ (S) · $9 \times 10 - 26 = 64$ (B) · $9 \times 7 - 23 = 40$ (F) · $15 + 2 \times 6 = 27$ (M) · $11 \times 11 - 9 = 112$ (J) · $51 + 8 \times 8 = 115$ (K) · $6 \times 12 - 3 = 69$ (C) · $11 \times 3 - 22 = 11$ (A) · $24 + 8 \times 4 = 56$ (R) · $7 + 3 \times 3 = 16$ (O) · $21 + 2 \times 5 = 31$ (L) · $96 + 5 \times 3 = 111$ (W) · $96 + 4 \times 3 = 108$ (E) · $6 \times 11 - 5 = 61$ (H) · $79 + 2 \times 9 = 97$ (T) · $9 + 9 \times 3 = 36$ (D) · $36 + 4 \times 4 = 52$ (N)

Clue 5 (Two-step equations): surviving statement is box 11 → Gale Gabriel

$3x + 6 = 33, x = 9$ · $5x + 7 = 47, x = 8$ · $3x + 9 = 24, x = 5$ · $3x + 12 = 24, x = 4$ · $4x + 10 = 14, x = 1$ · $3x + 11 = 17, x = 2$ · $5x + 8 = 58, x = 10$ · $3x + 5 = 26, x = 7$ · $6x + 3 = 21, x = 3$ · $6x + 9 = 45, x = 6$ · $3x + 7 = 43, x = 12$