



The Cosmic Court Caper

Grade 8 math · Exponents, Square roots, Pythagorean theorem, Order of operations, Two-step equations · Reading level grades 7-9

Detective: _____ Date: _____

The Golden Yarn Cup has been stolen right out of the trophy case at the Blocky Astro-Dome! The thief bypassed the gravity locks and left the arena in shambles. We must analyze the energy spikes and robot trails to find the rogue robo-cat champion before the interstellar championship game is canceled.

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 robo-cat champion is _____

Possible suspects

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

NAME	MAIN POWER	SECONDARY TECH	SHOOTING HAND	CHASSIS FINISH	SYSTEM VULNERABILITY
Kane	Gravity Jump	Tail Whip	Right-handed	Neon Blue LED	Wool Ball
Stampy	Block Placing	Hover Boost	Right-handed	Rusty Red Metal	Wool Ball
Messi	Warp Speed	Solar Recharge	Right-handed	Neon Blue LED	Wool Ball
Felix	Gravity Jump	Tail Whip	Right-handed	Rusty Red Metal	Wool Ball
Rapinoe	Laser Dribble	Obsidian Shield	Right-handed	Neon Blue LED	Wool Ball
Alex	Rocket Kick	Pixel Blast	Left-handed	Rusty Red Metal	Wool Ball
Steve	Block Placing	Obsidian Shield	Right-handed	Rusty Red Metal	Magnet Trap
Garfield	Gravity Jump	Solar Recharge	Right-handed	Rusty Red Metal	Wool Ball
Luna	Block Placing	Pixel Blast	Right-handed	Rusty Red Metal	Wool Ball
Asimov	Laser Dribble	Obsidian Shield	Left-handed	Neon Blue LED	Wool Ball
Grian	Block Placing	Tail Whip	Right-handed	Neon Blue LED	Water Splashes
Armstrong	Block Placing	Obsidian Shield	Right-handed	Rusty Red Metal	Water Splashes
Hal	Warp Speed	Obsidian Shield	Left-handed	Silver Chrome	Water Splashes
Mumbo	Block Placing	Obsidian Shield	Left-handed	Neon Blue LED	Magnet Trap
Marta	Laser Dribble	Hover Boost	Right-handed	Silver Chrome	Wool Ball
Jordan	Warp Speed	Solar Recharge	Right-handed	Silver Chrome	Water Splashes
DanTDM	Gravity Jump	Solar Recharge	Left-handed	Neon Blue LED	Magnet Trap
Giannis	Block Placing	Solar Recharge	Right-handed	Neon Blue LED	Wool Ball
Steph	Warp Speed	Solar Recharge	Right-handed	Rusty Red Metal	Wool Ball
Aldrin	Block Placing	Tail Whip	Right-handed	Neon Blue LED	Magnet Trap
Ada	Laser Dribble	Tail Whip	Right-handed	Silver Chrome	Wool Ball

CLUE 1 Exponents

The power grid at the arena scales exponentially. We need to calculate the base reactor load raised to the power of the server sectors to unlock the first secure security log.

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

128 121 49 289 169 289 64 49 484 128 81 27 49 289 32 27 128

121 361 8 49 361 128 361 512 343 216 121 512 64

$$3^3 = \boxed{} \rightarrow \boxed{0}$$

$7^3 = \boxed{} \rightarrow \boxed{\text{L}}$

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

$$2^3 = \boxed{} \rightarrow \boxed{\mathbf{V}}$$

Scratch space:

CLUE 2 Square roots

The robo-cats played on a perfectly square pixelated pitch. By finding the square root of the total area blocks, we can determine the exact side length and track the suspect's escape route.

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

T			T					T										T
20	16	25	20	11	5	4	25	20	12	6	25	3	11	5	23	4	16	20
16	11	24	3	25	3	6	16	2	20									

$\sqrt{400} = \square \rightarrow \boxed{\text{T}}$	$\sqrt{625} = \square \rightarrow \boxed{\text{E}}$	$\sqrt{576} = \square \rightarrow \boxed{\text{N}}$
$\sqrt{25} = \square \rightarrow \boxed{\text{R}}$	$\sqrt{4} = \square \rightarrow \boxed{\text{O}}$	$\sqrt{9} = \square \rightarrow \boxed{\text{D}}$
$\sqrt{16} = \square \rightarrow \boxed{\text{G}}$	$\sqrt{36} = \square \rightarrow \boxed{\text{S}}$	$\sqrt{121} = \square \rightarrow \boxed{\text{A}}$
$\sqrt{529} = \square \rightarrow \boxed{\text{I}}$	$\sqrt{144} = \square \rightarrow \boxed{\text{U}}$	$\sqrt{256} = \square \rightarrow \boxed{\text{H}}$

Scratch space:

CLUE 3

Pythagorean theorem

A diagonal laser shot was fired from the floor to the high hoop. Use the Pythagorean theorem to calculate the straight-line distance of the beam and locate the shooter's vantage point.

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

T											T					T								
26	29	74	37	15	13	74	50	30	5	26	13	15	87	26	74	50	68	37						
15	34	85	85	52	68	15	52	52																

legs 10 and 24, hypotenuse = → **T**

legs 40 and 75, hypotenuse = → **O**

legs 9 and 12, hypotenuse = → **A**

legs 12 and 35, hypotenuse = → **Y**

legs 60 and 63, hypotenuse = → **C**

legs 16 and 30, hypotenuse = → **W**

legs 5 and 12, hypotenuse = → **R**

legs 32 and 60, hypotenuse = → **B**

legs 20 and 48, hypotenuse = → **L**

legs 3 and 4, hypotenuse = → **S**

legs 24 and 70, hypotenuse = → **E**

legs 30 and 40, hypotenuse = → **D**

legs 20 and 21, hypotenuse = → **H**

legs 18 and 24, hypotenuse = → **I**

Scratch space:

Order of operations

The automated security system requires us to run a diagnostic code. To clear the system override, we must follow the strict order of operations to solve the maintenance formula.

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

65 49 71 66 71 22 66 38 54 81 38 33 22 34 54 33 66 65 116

54 71 34 112 71 65 7 67 34 33 66 65

$$56 + 3 \times 3 = \boxed{} \rightarrow \boxed{\text{T}}$$

$$76 + 6 \times 6 = \boxed{} \rightarrow \boxed{\text{M}}$$

$$33 + 8 \times 6 = \boxed{} \rightarrow \mathbf{F}$$

$3 + 2 \times 2 = \boxed{} \rightarrow \mathbf{A}$

$$42 + 8 \times 3 = \boxed{} \rightarrow \boxed{\text{S}}$$

$$9 + 5 \times 5 = \boxed{} \rightarrow \boxed{\text{D}}$$

$$6 \times 9 - 5 = \boxed{} \rightarrow \boxed{\text{H}}$$

$$14 + 6 \times 4 = \boxed{} \rightarrow \boxed{0}$$

$$5 \times 7 - 13 = \boxed{} \rightarrow \boxed{\text{N}}$$

$$11 \times 5 - 1 = \boxed{} \rightarrow \boxed{\text{R}}$$

$$7 \times 8 - 23 = \boxed{} \rightarrow \boxed{\text{U}}$$

$$8 \times 9 - 5 = \boxed{} \rightarrow \boxed{\text{L}}$$

$$96 + 4 \times 5 = \boxed{} \rightarrow \mathbf{Y}$$

$$36 + 7 \times 5 = \boxed{} \rightarrow \boxed{\text{E}}$$

Scratch space:

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

We need to balance the energy distribution of the stadium's backup batteries. Solve this two-step equation to find the missing charge value and restore the backup cameras.

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:

$3x + 12 = 39, x = \boxed{}$

$2x + 9 = 31, x = \boxed{}$

$3x + 6 = 27, x = \boxed{}$

$2x + 1 = 17, x = \boxed{}$

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

$5x + 2 = 17, x = \boxed{}$

$6x + 1 = 7, x = \boxed{}$

$3x + 12 = 30, x = \boxed{}$

$4x + 1 = 21, x = \boxed{}$

$2x + 10 = 34, x = \boxed{}$

$6x + 2 = 26, x = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain built a massive wall of blocks, then deflected the alarms with an obsidian shield.
2. The villain built a massive wall of blocks, then blinded the cameras with a bright pixel blast.
3. The villain blasted a ball through the vault door, then knocked over the display case with a heavy tail.
4. The villain dribbled energy beams past the guards, then escaped into the ceiling vents using hover boots.
5. The villain built a massive wall of blocks, then knocked over the display case with a heavy tail.
6. The villain warped straight through the defense grid, then knocked over the display case with a heavy tail.
7. The villain built a massive wall of blocks, then escaped into the ceiling vents using hover boots.
8. The villain dribbled energy beams past the guards, then recharged their battery pack from the solar array.
9. The villain warped straight through the defense grid, then recharged their battery pack from the solar array.
10. The villain warped straight through the defense grid, then deflected the alarms with an obsidian shield.
11. The villain floated over the security lasers, then recharged their battery pack from the solar array.
12. The villain blasted a ball through the vault door, then blinded the cameras with a bright pixel blast.

Answer Key

The Cosmic Court Caper

Culprit: Luna

Block Placing · Pixel Blast · Right-handed · Rusty Red Metal · Wool Ball

Trail: Start 21 → Clue 1 16 → Clue 2 11 → Clue 3 8 → Clue 4 4 → Clue 5 1

Clue 1 (Exponents): "THE SUSPECT DOES NOT HAVE A TAIL WHIP"

$2^7 = 128$ (T) · $3^4 = 81$ (D) · $2^9 = 512$ (I) · $3^3 = 27$ (O) · $6^3 = 216$ (W) · $11^2 = 121$ (H) · $8^2 = 64$ (P) · $7^3 = 343$ (L) · $19^2 = 361$ (A) · $7^2 = 49$ (E) · $22^2 = 484$ (C) · $2^5 = 32$ (N) · $17^2 = 289$ (S) · $13^2 = 169$ (U) · $2^3 = 8$ (V)

Clue 2 (Square roots): "THE TARGET USED A RIGHT HANDED SHOT"

$\sqrt{400} = 20$ (T) · $\sqrt{625} = 25$ (E) · $\sqrt{576} = 24$ (N) · $\sqrt{25} = 5$ (R) · $\sqrt{4} = 2$ (O) · $\sqrt{9} = 3$ (D) · $\sqrt{16} = 4$ (G) · $\sqrt{36} = 6$ (S) · $\sqrt{121} = 11$ (A) · $\sqrt{529} = 23$ (I) · $\sqrt{144} = 12$ (U) · $\sqrt{256} = 16$ (H)

Clue 3 (Pythagorean theorem): "THEY ARE DISTRACTED BY A WOOL BALL"

legs 10 and 24, hypotenuse = 26 (T) · legs 40 and 75, hypotenuse = 85 (O) · legs 9 and 12, hypotenuse = 15 (A) · legs 12 and 35, hypotenuse = 37 (Y) · legs 60 and 63, hypotenuse = 87 (C) · legs 16 and 30, hypotenuse = 34 (W) · legs 5 and 12, hypotenuse = 13 (R) · legs 32 and 60, hypotenuse = 68 (B) · legs 20 and 48, hypotenuse = 52 (L) · legs 3 and 4, hypotenuse = 5 (S) · legs 24 and 70, hypotenuse = 74 (E) · legs 30 and 40, hypotenuse = 50 (D) · legs 20 and 21, hypotenuse = 29 (H) · legs 18 and 24, hypotenuse = 30 (I)

Clue 4 (Order of operations): "THE SENSOR FOUND RUSTY RED METAL DUST"

$56 + 3 \times 3 = 65$ (T) · $76 + 6 \times 6 = 112$ (M) · $33 + 8 \times 6 = 81$ (F) · $3 + 2 \times 2 = 7$ (A) · $42 + 8 \times 3 = 66$ (S) · $9 + 5 \times 5 = 34$ (D) · $6 \times 9 - 5 = 49$ (H) · $14 + 6 \times 4 = 38$ (O) · $5 \times 7 - 13 = 22$ (N) · $11 \times 5 - 1 = 54$ (R) · $7 \times 8 - 23 = 33$ (U) · $8 \times 9 - 5 = 67$ (L) · $96 + 4 \times 5 = 116$ (Y) · $36 + 7 \times 5 = 71$ (E)

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

$3x + 12 = 39, x = 9$ · $2x + 9 = 31, x = 11$ · $3x + 6 = 27, x = 7$ · $2x + 1 = 17, x = 8$ · $5x + 6 = 56, x = 10$ · $5x + 2 = 17, x = 3$ · $6x + 1 = 7, x = 1$ · $3x + 12 = 30, x = 6$ · $4x + 1 = 21, x = 5$ · $2x + 10 = 34, x = 12$ · $6x + 2 = 26, x = 4$