



The Golden Ball Heist

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

Detective: _____ Date: _____

The golden tennis ball trophy has vanished from the main court's display case! Without it, the Bark Cup championship cannot begin. Clues are scattered across the grass courts, and we need your mathematical skills to track down the sporty culprit.

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 tennis thief is _____

Possible suspects

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

NAME	SIGNATURE SHOT	COURT AGILITY	RACQUET HAND	FUR TYPE	MAJOR DISTRACTION
Andre Aussie	slice backhand	squeaky ball distraction	right handed racquet	sleek terrier fur	squeaky duck toy
Serena Spaniel	slice backhand	laser focus	right handed racquet	sleek terrier fur	tennis ball machine
Ons Otterhound	drop shot	clay court slide	left handed racquet	curly poodle fur	peanut butter treat
Coco Collie	trick lob	high jump	right handed racquet	shaggy golden fur	tennis ball machine
Roger Retriever	trick lob	laser focus	right handed racquet	sleek terrier fur	peanut butter treat
Ash Bartyhound	drop shot	super fetch	left handed racquet	shaggy golden fur	tennis ball machine
Pete Pug	slice backhand	high jump	right handed racquet	curly poodle fur	tennis ball machine
Casper Chihuahua	slice backhand	super fetch	right handed racquet	curly poodle fur	squeaky duck toy
Carlos Corgi	baseline volley	squeaky ball distraction	left handed racquet	sleek terrier fur	squeaky duck toy
Billie Jean Beagle	baseline volley	high jump	left handed racquet	shaggy golden fur	squeaky duck toy
Iga Whippet	baseline volley	clay court slide	right handed racquet	sleek terrier fur	tennis ball machine
Bjorn Boxer	baseline volley	super fetch	left handed racquet	shaggy golden fur	tennis ball machine
Taylor Terrier	power serve	super fetch	left handed racquet	shaggy golden fur	tennis ball machine
Venus Vizsla	slice backhand	high jump	right handed racquet	curly poodle fur	squeaky duck toy
Jannik Husky	power serve	clay court slide	right handed racquet	curly poodle fur	tennis ball machine
Novak Newfie	slice backhand	high jump	left handed racquet	sleek terrier fur	peanut butter treat
Boris Bulldog	drop shot	clay court slide	left handed racquet	curly poodle fur	tennis ball machine
Rafa Retriever	baseline volley	laser focus	left handed racquet	sleek terrier fur	squeaky duck toy
Daniil Dalmatian	baseline volley	super fetch	left handed racquet	sleek terrier fur	tennis ball machine
Martina Malinois	drop shot	high jump	left handed racquet	shaggy golden fur	tennis ball machine
Steffi Shepherd	drop shot	laser focus	left handed racquet	shaggy golden fur	tennis ball machine

CLUE 1 Exponents

We found a digital lock on the trophy case that multiplies its security code exponentially every minute.

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

9 36 100 9 36 64 100 343 121 4 100 324 8 4 9 36 16 125 100

225 16 324 100 400 343 4 625 32 324

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

$$11^2 = \boxed{} \rightarrow \boxed{\text{D}}$$

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

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

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

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

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

$$4^3 = \boxed{} \rightarrow \boxed{I}$$

$$5^4 = \boxed{} \rightarrow \boxed{\text{C}}$$

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

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

$$18^2 = \boxed{} \rightarrow \boxed{\text{S}}$$

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

$$15^2 = \boxed{} \rightarrow \boxed{\text{L}}$$

$$20^2 = \boxed{} \rightarrow \boxed{\mathbf{R}}$$

Scratch space:

CLUE 2 Square roots

The thief escaped across a perfectly square clay court, and we must find the side length from the total area.

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

T			T															T
14	2	21	14	2	19	21	17	2	20	7	9	13	22	7	21	17	14	

												T
2	22	8	9	21	9	4	22	12	3	11	21	14

$\sqrt{196} = \square \rightarrow \text{[T]}$	$\sqrt{144} = \square \rightarrow \text{[C]}$	$\sqrt{64} = \square \rightarrow \text{[N]}$
$\sqrt{81} = \square \rightarrow \text{[D]}$	$\sqrt{361} = \square \rightarrow \text{[I]}$	$\sqrt{9} = \square \rightarrow \text{[Q]}$
$\sqrt{441} = \square \rightarrow \text{[E]}$	$\sqrt{16} = \square \rightarrow \text{[R]}$	$\sqrt{49} = \square \rightarrow \text{[L]}$
$\sqrt{484} = \square \rightarrow \text{[A]}$	$\sqrt{4} = \square \rightarrow \text{[H]}$	$\sqrt{400} = \square \rightarrow \text{[O]}$
$\sqrt{289} = \square \rightarrow \text{[F]}$	$\sqrt{169} = \square \rightarrow \text{[S]}$	$\sqrt{121} = \square \rightarrow \text{[U]}$

Scratch space:

CLUE 3

Pythagorean theorem

We trace the thief's path from the referee chair to the ball machine, forming a right triangle across the grass.

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

T			T										T			
75	34	58	75	34	65	58	20	20	58	50	37	5	75	34	58	
T																
75	58	68	68	65	5	41	50	26	26	25	50	74	34	65	68	58

legs 21 and 72, hypotenuse = → **T**

legs 12 and 16, hypotenuse = → **F**

legs 15 and 20, hypotenuse = → **M**

legs 12 and 35, hypotenuse = → **R**

legs 40 and 42, hypotenuse = → **E**

legs 16 and 30, hypotenuse = → **H**

legs 10 and 24, hypotenuse = → **L**

legs 24 and 70, hypotenuse = → **C**

legs 25 and 60, hypotenuse = → **I**

legs 9 and 40, hypotenuse = → **B**

legs 32 and 60, hypotenuse = → **N**

legs 3 and 4, hypotenuse = → **S**

legs 30 and 40, hypotenuse = → **A**

Scratch space:

CLUE 4 Order of operations

To decode the security system logs, we must follow the strict priority order of the tennis club's mainframe operations.

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

W																		
106	32	119	76	112	94	20	22	12	55	77	77	88	77	76	63	20	32	94
119	112	59	76	94	7	12	32	94	32	7								

$25 + 9 \times 9 = \square \rightarrow \text{W}$	$35 + 4 \times 5 = \square \rightarrow \text{A}$	$34 + 7 \times 6 = \square \rightarrow \text{O}$
$5 \times 8 - 28 = \square \rightarrow \text{H}$	$37 + 8 \times 5 = \square \rightarrow \text{G}$	$9 \times 2 - 11 = \square \rightarrow \text{T}$
$5 + 3 \times 5 = \square \rightarrow \text{D}$	$51 + 2 \times 4 = \square \rightarrow \text{R}$	$9 \times 3 - 5 = \square \rightarrow \text{S}$
$98 + 2 \times 7 = \square \rightarrow \text{U}$	$24 + 8 \times 8 = \square \rightarrow \text{Y}$	$10 \times 11 - 16 = \square \rightarrow \text{N}$
$10 \times 12 - 1 = \square \rightarrow \text{F}$	$12 + 5 \times 4 = \square \rightarrow \text{E}$	$12 \times 6 - 9 = \square \rightarrow \text{L}$

Scratch space:

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

We analyze the weight of the empty tennis can and the remaining tennis balls to find the unknown weight of the missing trophy.

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:

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

$5x + 6 = 46, x = \boxed{}$

$2x + 10 = 20, x = \boxed{}$

$2x + 5 = 13, x = \boxed{}$

$4x + 3 = 27, x = \boxed{}$

$5x + 11 = 56, x = \boxed{}$

$4x + 3 = 7, x = \boxed{}$

$3x + 6 = 12, x = \boxed{}$

$6x + 1 = 19, x = \boxed{}$

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

$3x + 4 = 40, x = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain runs up for a baseline volley, then escapes with a high jump.
2. The villain runs up for a baseline volley, then throws a squeaky ball distraction.
3. The villain smiles and hits a power serve, then slopes off with a clay court slide.
4. The villain leaps to play a trick lob, then throws a squeaky ball distraction.
5. The villain sneaks forward for a drop shot, then escapes with a high jump.
6. The villain leaps to play a trick lob, then speeds away using super fetch.
7. The villain spins and uses a slice backhand, then throws a squeaky ball distraction.
8. The villain smiles and hits a power serve, then speeds away using super fetch.
9. The villain spins and uses a slice backhand, then speeds away using super fetch.
10. The villain sneaks forward for a drop shot, then speeds away using super fetch.
11. The villain runs up for a baseline volley, then speeds away using super fetch.
12. The villain sneaks forward for a drop shot, then slopes off with a clay court slide.

Answer Key

The Golden Ball Heist

Culprit: Ash Bartyhound

drop shot · super fetch · left handed racquet · shaggy golden fur · tennis ball machine

Trail: Start 21 → Clue 1 17 → Clue 2 10 → Clue 3 6 → Clue 4 4 → Clue 5 1

Clue 1 (Exponents): "THE THIEF DOES NOT HAVE LASER FOCUS"

$3^2 = 9$ (T) · $11^2 = 121$ (D) · $10^2 = 100$ (E) · $2^2 = 4$ (O) · $6^2 = 36$ (H) · $5^3 = 125$ (V) · $7^3 = 343$ (F) · $4^3 = 64$ (I) · $5^4 = 625$ (C) · $2^3 = 8$ (N) · $2^4 = 16$ (A) · $18^2 = 324$ (S) · $2^5 = 32$ (U) · $15^2 = 225$ (L) · $20^2 = 400$ (R)

Clue 2 (Square roots): "THE THIEF HOLDS A LEFT HANDED RACQUET"

$\sqrt{196} = 14$ (T) · $\sqrt{144} = 12$ (C) · $\sqrt{64} = 8$ (N) · $\sqrt{81} = 9$ (D) · $\sqrt{361} = 19$ (I) · $\sqrt{9} = 3$ (Q) · $\sqrt{441} = 21$ (E) · $\sqrt{16} = 4$ (R) · $\sqrt{49} = 7$ (L) · $\sqrt{484} = 22$ (A) · $\sqrt{4} = 2$ (H) · $\sqrt{400} = 20$ (O) · $\sqrt{289} = 17$ (F) · $\sqrt{169} = 13$ (S) · $\sqrt{121} = 11$ (U)

Clue 3 (Pythagorean theorem): "THE THIEF FEARS THE TENNIS BALL MACHINE"

legs 21 and 72, hypotenuse = 75 (T) · legs 12 and 16, hypotenuse = 20 (F) · legs 15 and 20, hypotenuse = 25 (M) · legs 12 and 35, hypotenuse = 37 (R) · legs 40 and 42, hypotenuse = 58 (E) · legs 16 and 30, hypotenuse = 34 (H) · legs 10 and 24, hypotenuse = 26 (L) · legs 24 and 70, hypotenuse = 74 (C) · legs 25 and 60, hypotenuse = 65 (I) · legs 9 and 40, hypotenuse = 41 (B) · legs 32 and 60, hypotenuse = 68 (N) · legs 3 and 4, hypotenuse = 5 (S) · legs 30 and 40, hypotenuse = 50 (A)

Clue 4 (Order of operations): "WE FOUND SHAGGY GOLDEN FUR ON THE NET"

$25 + 9 \times 9 = 106$ (W) · $35 + 4 \times 5 = 55$ (A) · $34 + 7 \times 6 = 76$ (O) · $5 \times 8 - 28 = 12$ (H) · $37 + 8 \times 5 = 77$ (G) · $9 \times 2 - 11 = 7$ (T) · $5 + 3 \times 5 = 20$ (D) · $51 + 2 \times 4 = 59$ (R) · $9 \times 3 - 5 = 22$ (S) · $98 + 2 \times 7 = 112$ (U) · $24 + 8 \times 8 = 88$ (Y) · $10 \times 11 - 16 = 94$ (N) · $10 \times 12 - 1 = 119$ (F) · $12 + 5 \times 4 = 32$ (E) · $12 \times 6 - 9 = 63$ (L)

Clue 5 (Two-step equations): surviving statement is box 10 → Ash Bartyhound

$3x + 9 = 42, x = 11$ · $5x + 6 = 46, x = 8$ · $2x + 10 = 20, x = 5$ · $2x + 5 = 13, x = 4$ · $4x + 3 = 27, x = 6$ · $5x + 11 = 56, x = 9$ · $4x + 3 = 7, x = 1$ · $3x + 6 = 12, x = 2$ · $6x + 1 = 19, x = 3$ · $6x + 12 = 54, x = 7$ · $3x + 4 = 40, x = 12$