



The Great Barkminster Heist

Grade 10 math · Pythagorean theorem, Bar models, Square roots, Exponents, Division · Reading level grades 7-9

Detective: _____ **Date:** _____

The prestigious Golden Bone Trophy has been stolen right from the central podium just before the Best in Show announcement! A trail of muddy pawprints and discarded chew toys leads away from the scene. It is up to you to crack the case, identify the Rogue Showdog, and retrieve the championship trophy.

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 Showdog is _____

Possible suspects

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

NAME	SIGNATURE TRICK	SCENT SPECIALIZATION	LEAD PAW	COAT COLOR	DISTRACTION TOY
Perdita	Double Spin	Peppermint Detection	Left Paw Dominant	Snowy White	Bouncing Tennis Ball
Hachiko	Double Spin	Vanilla Locating	Right Paw Dominant	Midnight Black	Bouncing Tennis Ball
Toto	Triple Hurdle	Cinnamon Hunting	Left Paw Dominant	Golden Brindle	Squeaky Hedgehog
Blue	Silent Vault	Aniseed Tracking	Left Paw Dominant	Midnight Black	Bouncing Tennis Ball
Tramp	Backflip Catch	Cinnamon Hunting	Left Paw Dominant	Golden Brindle	Bouncing Tennis Ball
Winn-Dixie	Backflip Catch	Aniseed Tracking	Left Paw Dominant	Golden Brindle	Bouncing Tennis Ball
Scooby	High-Speed Slalom	Lavender Sensing	Right Paw Dominant	Golden Brindle	Squeaky Hedgehog
Pongo	Triple Hurdle	Lavender Sensing	Right Paw Dominant	Midnight Black	Crinkly Duck
Snoopy	Triple Hurdle	Vanilla Locating	Left Paw Dominant	Midnight Black	Squeaky Hedgehog
Clifford	Silent Vault	Lavender Sensing	Left Paw Dominant	Golden Brindle	Bouncing Tennis Ball
Shiloh	Triple Hurdle	Vanilla Locating	Left Paw Dominant	Snowy White	Bouncing Tennis Ball
Slinky	Backflip Catch	Vanilla Locating	Right Paw Dominant	Midnight Black	Crinkly Duck
Lady	Double Spin	Vanilla Locating	Left Paw Dominant	Midnight Black	Crinkly Duck
Wishbone	High-Speed Slalom	Aniseed Tracking	Right Paw Dominant	Midnight Black	Bouncing Tennis Ball
Balto	Silent Vault	Cinnamon Hunting	Left Paw Dominant	Midnight Black	Bouncing Tennis Ball
Dug	Triple Hurdle	Vanilla Locating	Left Paw Dominant	Midnight Black	Bouncing Tennis Ball
Odie	Triple Hurdle	Lavender Sensing	Left Paw Dominant	Midnight Black	Bouncing Tennis Ball
Buddy	Double Spin	Lavender Sensing	Left Paw Dominant	Midnight Black	Bouncing Tennis Ball
Marley	Silent Vault	Vanilla Locating	Left Paw Dominant	Golden Brindle	Squeaky Hedgehog
Copper	Triple Hurdle	Cinnamon Hunting	Left Paw Dominant	Golden Brindle	Crinkly Duck
Nana	Triple Hurdle	Aniseed Tracking	Left Paw Dominant	Golden Brindle	Bouncing Tennis Ball

CLUE 1

Pythagorean theorem

We analyze the layout of the grooming tent. By setting up a bar model comparing the weights of grooming bags to the missing trophy, we determine our first clue about the thief's scent specialty.

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

T			T															
37	58	20	37	58	26	20	75	116	29	20	87	25	29	T	87	20	20	123
15	26	25	25	13	52	29	25											

legs 12 and 35, hypotenuse = → **T**

legs 20 and 48, hypotenuse = → **M**

legs 5 and 12, hypotenuse = → **A**

legs 12 and 16, hypotenuse = → **E**

legs 80 and 84, hypotenuse = → **D**

legs 10 and 24, hypotenuse = → **I**

legs 21 and 72, hypotenuse = → **F**

legs 9 and 12, hypotenuse = → **C**

legs 60 and 63, hypotenuse = → **S**

legs 20 and 21, hypotenuse = → **O**

legs 15 and 20, hypotenuse = → **N**

legs 40 and 42, hypotenuse = → **H**

legs 27 and 120, hypotenuse = → **K**

Scratch space:

CLUE 2

Bar model word problems

The security team spots a diagonal trail of treats from the podium to the doggy door. Using the Pythagorean theorem to calculate the exact straight-line distance reveals the villain's dominant paw.

Draw a bar model to solve each word problem, then write its letter in the boxes to fill in the missing word.

A witness saw the villain was

L

D
O
M
I
N

N

 .

22 13 32 89 121 78 107 78 89

There were 23 dog treats in all. 1 dog treats were used. How many dog treats are left?

draw a bar model

Answer: → L

Agility Trainer shares 224 dog treats equally among 7 teams. How many dog treats does each team get?

draw a bar model

Answer: → F

The red team has 114 agility cones and the blue team has 7 agility cones. How many more agility cones does the red team have?

draw a bar model

Answer: → W

Agility Trainer shares 234 tennis balls equally among 3 teams. How many tennis balls does each team get?

draw a bar model

Answer: → A

One group collected 67 squeaky bones and another group collected 22 squeaky bones. How many squeaky bones in all?

draw a bar model

Answer: → T

One group collected 10 agility cones and another group collected 3 agility cones. How many agility cones in all?

draw a bar model

Answer: → E

The red team has 127 dog treats and the blue team has 6 dog treats. How many more dog treats does the red team have?

draw a bar model

Answer: → P

CLUE 3 Square roots

We discover a perfectly square grid of puppy agility training pads on the field. Taking the square root of the total area points us directly to the scent track containing stray fur fibers.

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

14 12 8 15 7 4 14 5 23 23 10 20 2 4 11 11 14 15

14 8 4 16 14 12 5 24 15 5

sqrt(196) = → **T**

sqrt(25) = → **E**

sqrt(529) = → **N**

sqrt(576) = → **F**

sqrt(225) = → **0**

sqrt(49) = → **W**

sqrt(16) = → **A**

sqrt(100) = →

sqrt(4) = → **B**

sqrt(400) = → **S**

sqrt(256) = → **P**

sqrt(144) = → **H**

sqrt(121) = → **L**

sqrt(64) = → **R**

Scratch space:

CLUE 4 Exponents

The thief left behind a digital collar lock that doubles its security code complexity with every incorrect attempt. Calculating the exponential growth of the lock's patterns cracks the code and reveals the villain's favorite toy.

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

W																			
81	32	361	512	243	8	49	125	128	49	8	128	64	289	16	196	9	441	144	225
361	243	484	512	8	16	289	32	484	243	64									

$3^4 = \square \rightarrow \text{W}$	$12^2 = \square \rightarrow \text{C}$	$15^2 = \square \rightarrow \text{K}$	$2^5 = \square \rightarrow \text{E}$
$4^2 = \square \rightarrow \text{T}$	$7^2 = \square \rightarrow \text{D}$	$2^7 = \square \rightarrow \text{I}$	$4^3 = \square \rightarrow \text{G}$
$3^5 = \square \rightarrow \text{U}$	$3^2 = \square \rightarrow \text{L}$	$2^3 = \square \rightarrow \text{N}$	$21^2 = \square \rightarrow \text{A}$
$5^3 = \square \rightarrow \text{M}$	$14^2 = \square \rightarrow \text{B}$	$19^2 = \square \rightarrow \text{F}$	$2^9 = \square \rightarrow \text{O}$
$17^2 = \square \rightarrow \text{H}$	$22^2 = \square \rightarrow \text{R}$		

Scratch space:

CLUE 5**Division facts (1-12) - the last clue**

We find a stash of stolen treats hidden behind the grandstands. Dividing the treats equally among the local search dogs helps us clear the final suspect and isolate the culprit.

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:

$11 \div 1 = \boxed{}$

$16 \div 8 = \boxed{}$

$18 \div 2 = \boxed{}$

$30 \div 10 = \boxed{}$

$24 \div 6 = \boxed{}$

$1 \div 1 = \boxed{}$

$10 \div 1 = \boxed{}$

$20 \div 4 = \boxed{}$

$77 \div 11 = \boxed{}$

$54 \div 9 = \boxed{}$

$132 \div 11 = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain performed a dazzling double spin to confuse the guards, then sniffed out the aniseed trail along the exit path.
2. The villain cleared the high wall with a silent vault, then sniffed out the aniseed trail along the exit path.
3. The villain cleared the high wall with a silent vault, then tracked the sweet aroma of vanilla to the docks.
4. The villain performed a dazzling double spin to confuse the guards, then followed the peppermint trail to the getaway van.
5. The villain leaped clean over the triple hurdle barrier, then used cinnamon scent cues to navigate the dark alley.
6. The villain performed a dazzling double spin to confuse the guards, then tracked the sweet aroma of vanilla to the docks.
7. The villain executed a flawless backflip catch to snatch the prize, then sniffed out the aniseed trail along the exit path.
8. The villain leaped clean over the triple hurdle barrier, then followed a soothing lavender path into the park.
9. The villain leaped clean over the triple hurdle barrier, then tracked the sweet aroma of vanilla to the docks.
10. The villain weaved through the high-speed slalom course to escape, then sniffed out the aniseed trail along the exit path.
11. The villain performed a dazzling double spin to confuse the guards, then followed a soothing lavender path into the park.
12. The villain leaped clean over the triple hurdle barrier, then followed the peppermint trail to the getaway van.

Answer Key

The Great Barkminster Heist

Culprit: Odie

Triple Hurdle · Lavender Sensing · Left Paw Dominant · Midnight Black · Bouncing Tennis Ball

Trail: Start 21 → Clue 1 17 → Clue 2 12 → Clue 3 9 → Clue 4 4 → Clue 5 1

Clue 1 (Pythagorean theorem): "THE THIEF DOES NOT SEEK CINNAMON"

legs 12 and 35, hypotenuse = 37 (T) · legs 20 and 48, hypotenuse = 52 (M) · legs 5 and 12, hypotenuse = 13 (A) · legs 12 and 16, hypotenuse = 20 (E) · legs 80 and 84, hypotenuse = 116 (D) · legs 10 and 24, hypotenuse = 26 (I) · legs 21 and 72, hypotenuse = 75 (F) · legs 9 and 12, hypotenuse = 15 (C) · legs 60 and 63, hypotenuse = 87 (S) · legs 20 and 21, hypotenuse = 29 (O) · legs 15 and 20, hypotenuse = 25 (N) · legs 40 and 42, hypotenuse = 58 (H) · legs 27 and 120, hypotenuse = 123 (K)

Clue 2 (Bar model word problems): "LEFT PAW DOMINANT"

There were 23 dog treats in all. 1 dog treats were used. How many dog treats are left? = 22 (L) · Agility Trainer shares 224 dog treats equally among 7 teams. How many dog treats does each team get? = 32 (F) · The red team has 114 agility cones and the blue team has 7 agility cones. How many more agility cones does the red team have? = 107 (W) · Agility Trainer shares 234 tennis balls equally among 3 teams. How many tennis balls does each team get? = 78 (A) · One group collected 67 squeaky bones and another group collected 22 squeaky bones. How many squeaky bones in all? = 89 (T) · One group collected 10 agility cones and another group collected 3 agility cones. How many agility cones in all? = 13 (E) · The red team has 127 dog treats and the blue team has 6 dog treats. How many more dog treats does the red team have? = 121 (P)

Clue 3 (Square roots): "THROW A TENNIS BALL TO TRAP THE FOE"

$\sqrt{196} = 14$ (T) · $\sqrt{25} = 5$ (E) · $\sqrt{529} = 23$ (N) · $\sqrt{576} = 24$ (F) · $\sqrt{225} = 15$ (O) · $\sqrt{49} = 7$ (W) · $\sqrt{16} = 4$ (A) · $\sqrt{100} = 10$ (I) · $\sqrt{4} = 2$ (B) · $\sqrt{400} = 20$ (S) · $\sqrt{256} = 16$ (P) · $\sqrt{144} = 12$ (H) · $\sqrt{121} = 11$ (L) · $\sqrt{64} = 8$ (R)

Clue 4 (Exponents): "WE FOUND MIDNIGHT BLACK FUR ON THE RUG"

$3^4 = 81$ (W) · $12^2 = 144$ (C) · $15^2 = 225$ (K) · $2^5 = 32$ (E) · $4^2 = 16$ (T) · $7^2 = 49$ (D) · $2^7 = 128$ (I) · $4^3 = 64$ (G) · $3^5 = 243$ (U) · $3^2 = 9$ (L) · $2^3 = 8$ (N) · $21^2 = 441$ (A) · $5^3 = 125$ (M) · $14^2 = 196$ (B) · $19^2 = 361$ (F) · $2^9 = 512$ (O) · $17^2 = 289$ (H) · $22^2 = 484$ (R)

Clue 5 (Division facts (1-12)): surviving statement is box 8 → Odie

$11 \div 1 = 11$ · $16 \div 8 = 2$ · $18 \div 2 = 9$ · $30 \div 10 = 3$ · $24 \div 6 = 4$ · $1 \div 1 = 1$ · $10 \div 1 = 10$ · $20 \div 4 = 5$ · $77 \div 11 = 7$ · $54 \div 9 = 6$ · $132 \div 11 = 12$