The Great Yarn Ball Mystery

Grade 10 math · Place value, Pythagorean theorem, Square roots, Exponents · Reading level grades 1-2

Detective: _____ **Date:** _____

The Golden Yarn Ball is gone! The Toy Keeper is very sad. The Whisker Patrol must find the Yarn Bandit. We need to look for clues around the Meow Mansion!

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 Yarn Bandit is _____

Possible suspects

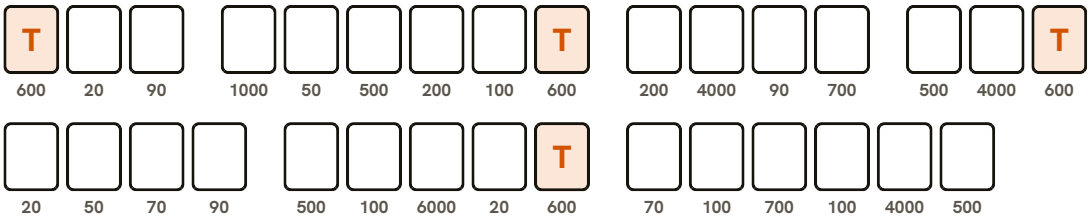
Cross off a row as each clue rules it out. The one left at the end is the culprit.

NAME	MEOW SKILL	CAT TRICK	FAVORITE PAW	COAT STYLE	DISTRACTION
Garfield	Silent Walk	Yarn Tangle	Right Pawed	Calico Patches	Squeaky Toy
Simba	Fast Scratch	High Balance	Right Pawed	Black Fur	Shiny Laser
Felix	Fast Scratch	Box Squeeze	Right Pawed	Calico Patches	Squeaky Toy
Oreo	Fast Scratch	Night Vision	Left Pawed	Black Fur	Squeaky Toy
Loki	Silent Walk	High Balance	Left Pawed	Orange Stripes	Squeaky Toy
Ziggy	Super Jump	Nap Anywhere	Left Pawed	Black Fur	Squeaky Toy
Sylvester	Mega Meow	Nap Anywhere	Right Pawed	Black Fur	Shiny Laser
Jasper	Laser Chase	High Balance	Left Pawed	Black Fur	Squeaky Toy
Mittens	Silent Walk	Yarn Tangle	Right Pawed	Orange Stripes	Tuna Treat
Smokey	Fast Scratch	Nap Anywhere	Right Pawed	Calico Patches	Tuna Treat
Milo	Silent Walk	Yarn Tangle	Left Pawed	Calico Patches	Tuna Treat
Tom	Silent Walk	High Balance	Right Pawed	Orange Stripes	Squeaky Toy
Daisy	Mega Meow	Yarn Tangle	Left Pawed	Black Fur	Squeaky Toy
Cleo	Laser Chase	Night Vision	Left Pawed	Black Fur	Squeaky Toy
Luna	Mega Meow	Box Squeeze	Right Pawed	Black Fur	Squeaky Toy
Boots	Mega Meow	Box Squeeze	Left Pawed	Orange Stripes	Squeaky Toy
Fluffy	Super Jump	Night Vision	Left Pawed	Black Fur	Tuna Treat
Oliver	Fast Scratch	Box Squeeze	Left Pawed	Black Fur	Squeaky Toy
Bella	Super Jump	Yarn Tangle	Left Pawed	Orange Stripes	Squeaky Toy
Shadow	Super Jump	Nap Anywhere	Left Pawed	Black Fur	Shiny Laser
Chloe	Mega Meow	High Balance	Left Pawed	Calico Patches	Tuna Treat

CLUE 1 Place value

> The detective checks the security code. The digital lock has tens and ones columns. We must look at the digits to open it.

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



What is the value of the 6 in 37,619? ☐ → **T**

What is the value of the 1 in 521,672? ☐ → **B**

What is the value of the 5 in 74,589? ☐ → **N**

What is the value of the 9 in 27,894? ☐ → **E**

What is the value of the 7 in 860,782? ☐ → **S**

What is the value of the 4 in 374,250? ☐ → **O**

What is the value of the 2 in 59,320? ☐ → **H**

What is the value of the 5 in 72,256? ☐ → **A**

What is the value of the 7 in 419,479? ☐ → **V**

What is the value of the 2 in 76,253? ☐ → **D**

What is the value of the 1 in 39,130? ☐ → **I**

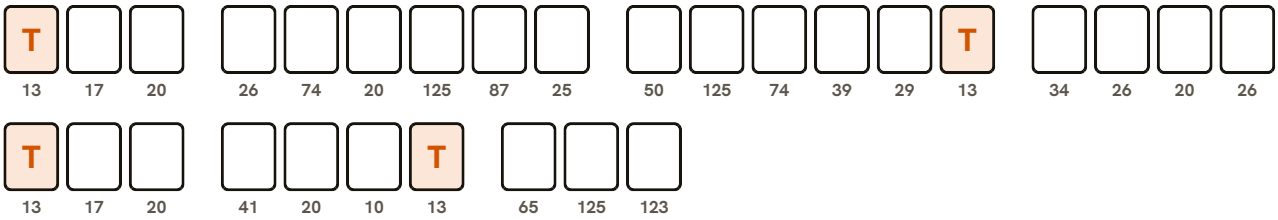
What is the value of the 6 in 536,588? ☐ → **G**

Scratch space:

CLUE 2 Pythagorean theorem

> The bandit ran diagonally across the yard. We know the length of the fence and the garden wall. We must find the shortest path.

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



- legs 5 and 12, hypotenuse = ☐ → T
- legs 15 and 36, hypotenuse = ☐ → D
- legs 25 and 60, hypotenuse = ☐ → P
- legs 12 and 16, hypotenuse = ☐ → E
- legs 15 and 20, hypotenuse = ☐ → Y
- legs 8 and 15, hypotenuse = ☐ → H
- legs 24 and 70, hypotenuse = ☐ → N
- legs 16 and 30, hypotenuse = ☐ → U
- legs 27 and 120, hypotenuse = ☐ → W
- legs 20 and 21, hypotenuse = ☐ → I
- legs 9 and 40, hypotenuse = ☐ → L
- legs 14 and 48, hypotenuse = ☐ → B
- legs 60 and 63, hypotenuse = ☐ → K
- legs 10 and 24, hypotenuse = ☐ → S
- legs 6 and 8, hypotenuse = ☐ → F
- legs 35 and 120, hypotenuse = ☐ → A

Scratch space:

CLUE 3

Square roots

We found a square patch of missing grass. The area of the square is on the map. We need to find the length of one side.

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

T										T																			
20	5	19		10	7	4	16	12	20		12	14		14	24	7	18	19	16		6	25							

								T			
14	2	11	19	7	15	22		20	6	22	14

sqrt(400) = ☐ → T

sqrt(361) = ☐ → E

sqrt(36) = ☐ → O

sqrt(25) = ☐ → H

sqrt(225) = ☐ → K

sqrt(484) = ☐ → Y

sqrt(121) = ☐ → U

sqrt(576) = ☐ → C

sqrt(49) = ☐ → A

sqrt(4) = ☐ → Q

sqrt(324) = ☐ → R

sqrt(144) = ☐ → I

sqrt(256) = ☐ → D

sqrt(196) = ☐ → S

sqrt(100) = ☐ → B

sqrt(16) = ☐ → N

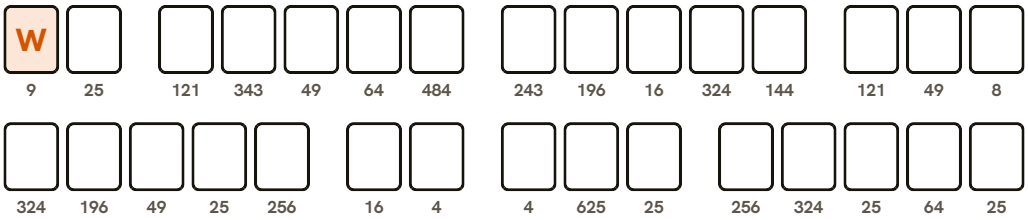
sqrt(625) = ☐ → F

Scratch space:

CLUE 4 Exponents

> The catnip plants are growing super fast. Every hour the plants double in size. We must calculate the power of the growth.

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



3^2 = ☐ → W	2^2 = ☐ → T	7^2 = ☐ → U	18^2 = ☐ → C
5^4 = ☐ → H	14^2 = ☐ → L	4^2 = ☐ → A	5^2 = ☐ → E
12^2 = ☐ → K	3^5 = ☐ → B	22^2 = ☐ → D	8^2 = ☐ → N
11^2 = ☐ → F	2^3 = ☐ → R	2^8 = ☐ → S	7^3 = ☐ → O

Scratch space:

CLUE 5 Square roots - the last clue

> The bandit left a square grid of muddy paw prints. We count the total square area of the mud. Let us find the side length.

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:

sqrt(4) = ☐ sqrt(36) = ☐ sqrt(64) = ☐ sqrt(16) = ☐ sqrt(81) = ☐

sqrt(1) = ☐ sqrt(144) = ☐ sqrt(121) = ☐ sqrt(25) = ☐ sqrt(100) = ☐

sqrt(9) = ☐

Step 2 - cross out the sentence with each answer:

1. The villain makes a fast scratch, then naps on the rug.
2. The villain gives a mega meow, then tangles up the yarn.
3. The villain gives a mega meow, then balances on the fence.
4. The villain does a silent walk, then balances on the fence.
5. The villain does a silent walk, then squeezes into a box.
6. The villain does a laser chase, then balances on the fence.
7. The villain makes a super jump, then naps on the rug.
8. The villain makes a fast scratch, then squeezes into a box.
9. The villain does a laser chase, then naps on the rug.
10. The villain does a silent walk, then sneaks through the dark.
11. The villain makes a super jump, then tangles up the yarn.
12. The villain does a laser chase, then tangles up the yarn.

TEACHER / PARENT

Answer Key

The Great Yarn Ball Mystery

Culprit: Ziggy

Super Jump · Nap Anywhere · Left Pawed · Black Fur · Squeaky Toy

Trail: Start 21 → Clue 1 18 → Clue 2 10 → Clue 3 7 → Clue 4 4 → Clue 5 1

Clue 1 (Place value): "THE BANDIT DOES NOT HAVE NIGHT VISION"

What is the value of the 6 in 37,619? = 600 (T) · What is the value of the 1 in 521,672? = 1000 (B) · What is the value of the 5 in 74,589? = 500 (N) · What is the value of the 9 in 27,894? = 90 (E) · What is the value of the 7 in 860,782? = 700 (S) · What is the value of the 4 in 374,250? = 4000 (O) · What is the value of the 2 in 59,320? = 20 (H) · What is the value of the 5 in 72,256? = 50 (A) · What is the value of the 7 in 419,479? = 70 (V) · What is the value of the 2 in 76,253? = 200 (D) · What is the value of the 1 in 39,130? = 100 (I) · What is the value of the 6 in 536,588? = 6000 (G)

Clue 2 (Pythagorean theorem): "THE SNEAKY BANDIT USES THE LEFT PAW"

legs 5 and 12, hypotenuse = 13 (T) · legs 15 and 36, hypotenuse = 39 (D) · legs 25 and 60, hypotenuse = 65 (P) · legs 12 and 16, hypotenuse = 20 (E) · legs 15 and 20, hypotenuse = 25 (Y) · legs 8 and 15, hypotenuse = 17 (H) · legs 24 and 70, hypotenuse = 74 (N) · legs 16 and 30, hypotenuse = 34 (U) · legs 27 and 120, hypotenuse = 123 (W) · legs 20 and 21, hypotenuse = 29 (I) · legs 9 and 40, hypotenuse = 41 (L) · legs 14 and 48, hypotenuse = 50 (B) · legs 60 and 63, hypotenuse = 87 (K) · legs 10 and 24, hypotenuse = 26 (S) · legs 6 and 8, hypotenuse = 10 (F) · legs 35 and 120, hypotenuse = 125 (A)

Clue 3 (Square roots): "THE BANDIT IS SCARED OF SQUEAKY TOYS"

sqrt(400) = 20 (T) · sqrt(361) = 19 (E) · sqrt(36) = 6 (O) · sqrt(25) = 5 (H) · sqrt(225) = 15 (K) · sqrt(484) = 22 (Y) · sqrt(121) = 11 (U) · sqrt(576) = 24 (C) · sqrt(49) = 7 (A) · sqrt(4) = 2 (Q) · sqrt(324) = 18 (R) · sqrt(144) = 12 (I) · sqrt(256) = 16 (D) · sqrt(196) = 14 (S) · sqrt(100) = 10 (B) · sqrt(16) = 4 (N) · sqrt(625) = 25 (F)

Clue 4 (Exponents): "WE FOUND BLACK FUR CLUES AT THE SCENE"

3^2 = 9 (W) · 2^2 = 4 (T) · 7^2 = 49 (U) · 18^2 = 324 (C) · 5^4 = 625 (H) · 14^2 = 196 (L) · 4^2 = 16 (A) · 5^2 = 25 (E) · 12^2 = 144 (K) · 3^5 = 243 (B) · 22^2 = 484 (D) · 8^2 = 64 (N) · 11^2 = 121 (F) · 2^3 = 8 (R) · 2^8 = 256 (S) · 7^3 = 343 (O)

Clue 5 (Square roots): surviving statement is box 7 → Ziggy

sqrt(4) = 2 · sqrt(36) = 6 · sqrt(64) = 8 · sqrt(16) = 4 · sqrt(81) = 9 · sqrt(1) = 1 · sqrt(144) = 12 · sqrt(121) = 11 · sqrt(25) = 5 · sqrt(100) = 10 · sqrt(9) = 3