



The Great Mewropolitan Museum Heist

Grade 10 math · Pythagorean theorem, Square roots, Exponents, Order of operations · Reading level grades 7-9

Detective: _____ Date: _____

The legendary Golden Ball of Yarn has been swiped from its glass display case! The security system was bypassed, leaving only a trail of pawprints and a mysterious mathematical cipher. Agent Whiskers needs your help to crack the codes, track the clues, and collar the feline fiend before they escape the city.

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 cat burglar is _____

Possible suspects

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

NAME	SIGNATURE MOVE	SPECIAL TOOL	COLLAR STYLE	FUR PATTERN	MAJOR DISTRACTION
Simba	shadow blending	grappling yarn	wears gold collar	ginger tabby fur	smelly tuna treats
Hobbes	high leaping	laser pointer	wears silver collar	calico patch pattern	feather wand toys
Meowth	high leaping	laser pointer	wears gold collar	tuxedo style coat	crinkly tin foil
Duchess	laser dodging	cardboard shield	wears silver collar	tuxedo style coat	feather wand toys
Rum Tum Tugger	stealth pouncing	grappling yarn	wears silver collar	ginger tabby fur	crinkly tin foil
Macavity	shadow blending	laser pointer	wears gold collar	ginger tabby fur	feather wand toys
Bustopher Jones	high leaping	grappling yarn	wears silver collar	ginger tabby fur	smelly tuna treats
Sir Pounce	shadow blending	laser pointer	wears gold collar	calico patch pattern	feather wand toys
Felix the Cat	high leaping	grappling yarn	wears silver collar	tuxedo style coat	crinkly tin foil
Figaro	high leaping	catnip smoke	wears silver collar	tuxedo style coat	smelly tuna treats
Grizabella	high leaping	cardboard shield	wears gold collar	tuxedo style coat	crinkly tin foil
Milo	stealth pouncing	catnip smoke	wears gold collar	tuxedo style coat	feather wand toys
Mittens	shadow blending	grappling yarn	wears gold collar	tuxedo style coat	crinkly tin foil
Oliver	laser dodging	cardboard shield	wears gold collar	tuxedo style coat	feather wand toys
Salem	shadow blending	grappling yarn	wears silver collar	tuxedo style coat	crinkly tin foil
Cheshire	stealth pouncing	grappling yarn	wears gold collar	tuxedo style coat	smelly tuna treats
Mr Bigglesworth	shadow blending	cardboard shield	wears gold collar	tuxedo style coat	crinkly tin foil
Nala	high leaping	cardboard shield	wears gold collar	ginger tabby fur	smelly tuna treats
Garfield	stealth pouncing	grappling yarn	wears silver collar	calico patch pattern	feather wand toys
Crookshanks	high leaping	laser pointer	wears gold collar	calico patch pattern	crinkly tin foil
Luna	high leaping	squeaky decoy	wears gold collar	tuxedo style coat	crinkly tin foil

CLUE 1

Pythagorean theorem

A motion sensor caught the thief running diagonally across the rectangular courtyard. To calculate the direct distance of the path they took, you must find the hypotenuse using the Pythagorean theorem.

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

T							T									T
51	41	58	68	10	68	116	58	82	51	15	20	58	68	111	20	51
10	68	58	68	5	10	58	25	13	74	15	58	82	20	74	68	

legs 24 and 45, hypotenuse = → **T**

legs 32 and 60, hypotenuse = → **S**

legs 6 and 8, hypotenuse = → **U**

legs 24 and 70, hypotenuse = → **Y**

legs 7 and 24, hypotenuse = → **A**

legs 12 and 16, hypotenuse = → **O**

legs 18 and 80, hypotenuse = → **C**

legs 3 and 4, hypotenuse = → **Q**

legs 9 and 40, hypotenuse = → **H**

legs 40 and 42, hypotenuse = → **E**

legs 36 and 105, hypotenuse = → **N**

legs 9 and 12, hypotenuse = → **D**

legs 5 and 12, hypotenuse = → **K**

legs 80 and 84, hypotenuse = → **P**

Scratch space:

CLUE 2

The suspect fled through a square-shaped garden with a known total area. Find the square root of the area to determine the exact length of the single gate they leaped over.

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

[illegible]

sqrt(196) = → **T**

sqrt(144) = → **G**

sqrt(324) = → **A**

sqrt(4) = → **H**

sqrt(9) = → **S**

sqrt(361) = → **D**

sqrt(49) = → **W**

sqrt(16) = → **R**

sqrt(225) = → **L**

sqrt(289) = →

sqrt(576) = → **C**

sqrt(441) = → **E**

Scratch space:

CLUE 3

The museum's backup siren increases its volume exponentially over time. Calculate the final value of this exponent equation to find out which radio frequency the burglar used to jam the signal.

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

Diagram illustrating the multiplication of 169 by 49, showing the partial products and their alignment.

Top row (Partial products):

- 169 (shaded orange)
- 343
- 49
- 225
- 9
- 49
- 8
- 16
- 243
- 4
- 400
- 484
- 49
- 27
- 400
- 49
- 225
- 9
- 16
- 49

Bottom row (Partial products):

- 8
- 16
- 256
- 144
- 32
- 484
- 25
- 169 (shaded orange)
- 256
- 144
- 225
- 9
- 256
- 484

$$13^2 = \boxed{} \rightarrow \boxed{\text{T}}$$

$$12^2 = \boxed{} \rightarrow \boxed{\text{N}}$$

$$3^3 = \boxed{} \rightarrow \boxed{\mathbf{S}}$$

$$2^2 = \boxed{} \rightarrow \boxed{\mathbf{M}}$$

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

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

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

$$16^2 = \boxed{} \rightarrow \boxed{\text{I}}$$

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

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

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

$$22^2 = \boxed{} \rightarrow \boxed{\text{L}}$$

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

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

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

$$3^2 = \boxed{} \rightarrow \boxed{0}$$

Scratch space:

CLUE 4 Order of operations

To open the heavy metal lockbox dropped by the suspect during their escape, you must evaluate this expression by strictly following the order of operations.

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

T					T										
116	71	93	27	53	116	21	34	9	93	21	94	71	93	9	103

T							T							T
116	34	90	93	9	77	94	116	81	56	93	65	77	103	116

$12 \times 12 - 28 = \square \rightarrow$ T	$7 \times 8 - 22 = \square \rightarrow$ U	$9 + 2 \times 6 = \square \rightarrow$ R
$12 \times 10 - 30 = \square \rightarrow$ X	$10 \times 10 - 6 = \square \rightarrow$ S	$9 + 3 \times 6 = \square \rightarrow$ I
$10 \times 8 - 3 = \square \rightarrow$ O	$9 \times 10 - 19 = \square \rightarrow$ H	$12 \times 10 - 27 = \square \rightarrow$ E
$10 \times 9 - 25 = \square \rightarrow$ C	$25 + 7 \times 8 = \square \rightarrow$ Y	$3 + 2 \times 3 = \square \rightarrow$ D
$10 \times 11 - 7 = \square \rightarrow$ A	$7 \times 9 - 7 = \square \rightarrow$ L	$8 \times 7 - 3 = \square \rightarrow$ N

Scratch space:

CLUE 5**Square roots - the last clue**

The burglar left a dusty pawprint on a square canvas painting. By finding the square root of the canvas area, you will determine the width of the frame and get a clear look at the clue underneath.

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:

$\text{sqrt}(25) = \boxed{}$

$\text{sqrt}(144) = \boxed{}$

$\text{sqrt}(36) = \boxed{}$

$\text{sqrt}(4) = \boxed{}$

$\text{sqrt}(121) = \boxed{}$

$\text{sqrt}(16) = \boxed{}$

$\text{sqrt}(49) = \boxed{}$

$\text{sqrt}(81) = \boxed{}$

$\text{sqrt}(9) = \boxed{}$

$\text{sqrt}(64) = \boxed{}$

$\text{sqrt}(100) = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain slips under the vault door, then unrolls the ancient mummy bandages.
2. The villain sneaks through the skylight, then unrolls the ancient mummy bandages.
3. The villain scrambles up the tapestries, then swipes the golden ball of yarn.
4. The villain darts past the sleeping guard dog, then swipes the golden ball of yarn.
5. The villain leaps over the laser grid, then steals the royal catnip stash.
6. The villain slips under the vault door, then swipes the golden ball of yarn.
7. The villain scrambles up the tapestries, then messes up all the scratching posts.
8. The villain darts past the sleeping guard dog, then messes up all the scratching posts.
9. The villain leaps over the laser grid, then messes up all the scratching posts.
10. The villain darts past the sleeping guard dog, then knocks over the expensive glass vases.
11. The villain slips under the vault door, then messes up all the scratching posts.
12. The villain leaps over the laser grid, then unrolls the ancient mummy bandages.

Answer Key

The Great Mewropolitan Museum Heist

Culprit: Mr Bigglesworth

shadow blending · cardboard shield · wears gold collar · tuxedo style coat · crinkly tin foil

Trail: Start 21 → Clue 1 20 → Clue 2 12 → Clue 3 5 → Clue 4 4 → Clue 5 1

Clue 1 (Pythagorean theorem): "THE SUSPECT DOES NOT USE SQUEAKY DECOYS"

legs 24 and 45, hypotenuse = 51 (T) · legs 32 and 60, hypotenuse = 68 (S) · legs 6 and 8, hypotenuse = 10 (U) · legs 24 and 70, hypotenuse = 74 (Y) · legs 7 and 24, hypotenuse = 25 (A) · legs 12 and 16, hypotenuse = 20 (O) · legs 18 and 80, hypotenuse = 82 (C) · legs 3 and 4, hypotenuse = 5 (Q) · legs 9 and 40, hypotenuse = 41 (H) · legs 40 and 42, hypotenuse = 58 (E) · legs 36 and 105, hypotenuse = 111 (N) · legs 9 and 12, hypotenuse = 15 (D) · legs 5 and 12, hypotenuse = 13 (K) · legs 80 and 84, hypotenuse = 116 (P)

Clue 2 (Square roots): "THE TARGET WEARS A GOLD COLLAR"

$\sqrt{196} = 14$ (T) · $\sqrt{144} = 12$ (G) · $\sqrt{324} = 18$ (A) · $\sqrt{4} = 2$ (H) · $\sqrt{9} = 3$ (S) · $\sqrt{361} = 19$ (D) · $\sqrt{49} = 7$ (W) · $\sqrt{16} = 4$ (R) · $\sqrt{225} = 15$ (L) · $\sqrt{289} = 17$ (O) · $\sqrt{576} = 24$ (C) · $\sqrt{441} = 21$ (E)

Clue 3 (Exponents): "THE FOE CRUMBLES BEFORE CRINKLY TIN FOIL"

$13^2 = 169$ (T) · $12^2 = 144$ (N) · $3^3 = 27$ (S) · $2^2 = 4$ (M) · $7^2 = 49$ (E) · $5^2 = 25$ (Y) · $3^5 = 243$ (U) · $16^2 = 256$ (I) · $2^5 = 32$ (K) · $2^4 = 16$ (R) · $15^2 = 225$ (F) · $22^2 = 484$ (L) · $2^3 = 8$ (C) · $7^3 = 343$ (H) · $20^2 = 400$ (B) · $3^2 = 9$ (O)

Clue 4 (Order of operations): "THE INTRUDER SHED A TUXEDO STYLE COAT"

$12 \times 12 - 28 = 116$ (T) · $7 \times 8 - 22 = 34$ (U) · $9 + 2 \times 6 = 21$ (R) · $12 \times 10 - 30 = 90$ (X) · $10 \times 10 - 6 = 94$ (S) · $9 + 3 \times 6 = 27$ (I) · $10 \times 8 - 3 = 77$ (O) · $9 \times 10 - 19 = 71$ (H) · $12 \times 10 - 27 = 93$ (E) · $10 \times 9 - 25 = 65$ (C) · $25 + 7 \times 8 = 81$ (Y) · $3 + 2 \times 3 = 9$ (D) · $10 \times 11 - 7 = 103$ (A) · $7 \times 9 - 7 = 56$ (L) · $8 \times 7 - 3 = 53$ (N)

Clue 5 (Square roots): surviving statement is box 1 → Mr Bigglesworth

$\sqrt{25} = 5$ · $\sqrt{144} = 12$ · $\sqrt{36} = 6$ · $\sqrt{4} = 2$ · $\sqrt{121} = 11$ · $\sqrt{16} = 4$ · $\sqrt{49} = 7$ · $\sqrt{81} = 9$ · $\sqrt{9} = 3$ · $\sqrt{64} = 8$ · $\sqrt{100} = 10$