The Sunken Citadel Sabotage

Grade 8 math · Fractions of a number, Rounding, Bar models, Exponents · Reading level grades 7-9

Detective: _____ **Date:** _____

During a midnight expedition inside the Sunken Citadel, a rogue saboteur disabled the vault defense system and stole the priceless Sun Orb. The Lead Expedition Director has secured the perimeter, but the thief is still hidden among the crew. Solve the math challenges to decipher the field notes and unmask the saboteur before they vanish into the jungle.

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 Saboteur is _____

Possible suspects

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

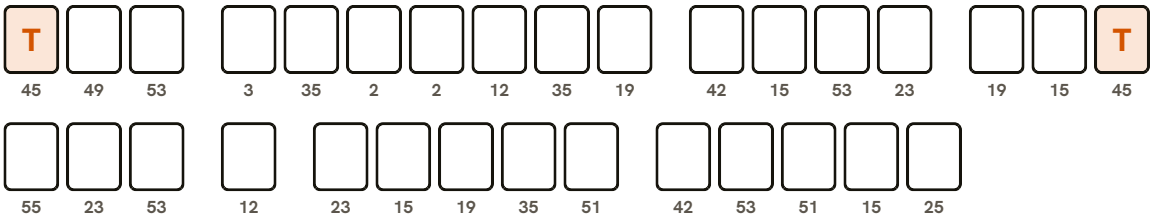
NAME	PRIMARY TOOL	GADGET	GRIP STYLE	EXPEDITION CAP	COUNTERMEASURE
Sergeant Kowalski	Laser Cutter	Glider Wings	Left Handed	Silver Helmet	EMP Blast
Technician Cruz	Laser Cutter	Hologram Emitter	Right Handed	Golden Bandana	EMP Blast
Pilot Connor	Plasma Torch	Smoke Pellets	Left Handed	Crimson Cap	EMP Blast
Ranger Blake	Laser Cutter	Signal Jammer	Left Handed	Golden Bandana	Acoustic Shield
Agent Foster	Laser Cutter	Hologram Emitter	Right Handed	Crimson Cap	EMP Blast
Agent Ramirez	Plasma Torch	Sonic Decoy	Left Handed	Silver Helmet	Acoustic Shield
Professor Sterling	Laser Cutter	Glider Wings	Left Handed	Crimson Cap	EMP Blast
Dr Aris Thorne	Laser Cutter	Hologram Emitter	Left Handed	Silver Helmet	Flashburst Flare
Navigator Ross	Thermal Torch	Hologram Emitter	Right Handed	Crimson Cap	EMP Blast
Operative Diaz	Plasma Torch	Smoke Pellets	Left Handed	Crimson Cap	Flashburst Flare
Analyst Kim	Plasma Torch	Signal Jammer	Left Handed	Golden Bandana	Acoustic Shield
Dr Maya Lin	Sonic Drill	Hologram Emitter	Right Handed	Silver Helmet	EMP Blast
Specialist Mercer	Laser Cutter	Smoke Pellets	Right Handed	Golden Bandana	Acoustic Shield
Scout Chen	Plasma Torch	Signal Jammer	Left Handed	Silver Helmet	Acoustic Shield
Scholar Bennett	Sonic Drill	Smoke Pellets	Left Handed	Silver Helmet	Acoustic Shield
Chief Rivera	Sonic Drill	Hologram Emitter	Left Handed	Silver Helmet	Acoustic Shield
Captain Marcus	Plasma Torch	Hologram Emitter	Right Handed	Golden Bandana	EMP Blast
Surveyor Young	Laser Cutter	Glider Wings	Left Handed	Silver Helmet	Acoustic Shield
Tracker Hayes	Sonic Drill	Smoke Pellets	Right Handed	Silver Helmet	Acoustic Shield
Archivist Patel	Thermal Torch	Smoke Pellets	Left Handed	Golden Bandana	EMP Blast
Officer Vance	Sonic Drill	Glider Wings	Right Handed	Crimson Cap	Flashburst Flare

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CLUE 1 Fractions of a number

> We analyzed the energy residue left on the ruined gate to determine how much fuel the intruder used during the breach.

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



3/8 of 120 = ☐ → T

2/10 of 95 = ☐ → N

2/4 of 30 = ☐ → O

1/3 of 126 = ☐ → D

4/8 of 24 = ☐ → A

5/8 of 88 = ☐ → U

4/8 of 4 = ☐ → L

1/4 of 100 = ☐ → Y

5/10 of 46 = ☐ → S

1/5 of 15 = ☐ → V

4/8 of 106 = ☐ → E

2/8 of 196 = ☐ → H

1/2 of 70 = ☐ → I

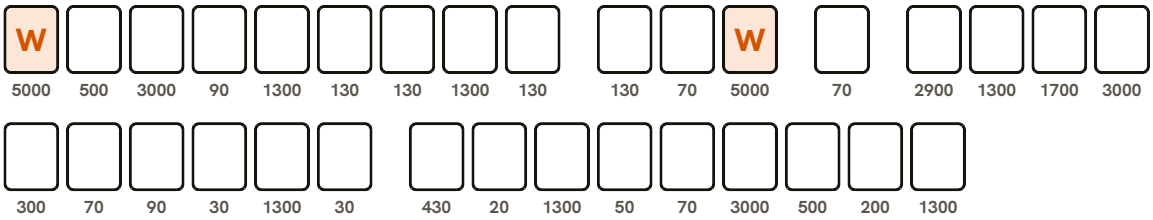
2/6 of 153 = ☐ → C

Scratch space:

CLUE 2 Rounding

> The vault sensors recorded a rough estimate of the intruder weight but the display only rounds to the nearest ten kilograms.

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



Round 4,509 to the nearest thousand ☐ → W

Round 20 to the nearest ten ☐ → P

Round 241 to the nearest hundred ☐ → V

Round 1,289 to the nearest hundred ☐ → E

Round 471 to the nearest hundred ☐ → I

Round 29 to the nearest ten ☐ → D

Round 3,436 to the nearest thousand ☐ → T

Round 93 to the nearest ten ☐ → N

Round 130 to the nearest ten ☐ → S

Round 2,916 to the nearest hundred ☐ → L

Round 434 to the nearest ten ☐ → O

Round 1,684 to the nearest hundred ☐ → F

Round 66 to the nearest ten ☐ → A

Round 49 to the nearest ten ☐ → R

Round 336 to the nearest hundred ☐ → H

Scratch space:

CLUE 3 Bar model word problems

> To compare the power output logs across the different security sectors our team sketched out comparative bar diagrams.

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

Someone scared the villain off with

A									H		E	L	D
20	112	21	62	83	11	72	112	83		72			

.

One group collected 13 relic and another group collected 7 relic. How many relic in all?

draw a bar model

Answer: ☐ → A

Expedition Quartermaster has 9 times as many relic as a teammate. The teammate has 8 relic. How many relic does Expedition Quartermaster have?

draw a bar model

Answer: ☐ → I

One group collected 6 solar battery and another group collected 5 solar battery. How many solar battery in all?

draw a bar model

Answer: ☐ → T

Expedition Quartermaster has 84 map cylinder, packed 4 to a bag. How many bags can be filled?

draw a bar model

Answer: ☐ → O

One group collected 40 scanner and another group collected 72 scanner. How many scanner in all?

draw a bar model

Answer: ☐ → C

The red team has 101 scanner and the blue team has 39 scanner. How many more scanner does the red team have?

draw a bar model

Answer: ☐ → U

There were 120 map cylinder in all. 37 map cylinder were used. How many map cylinder are left?

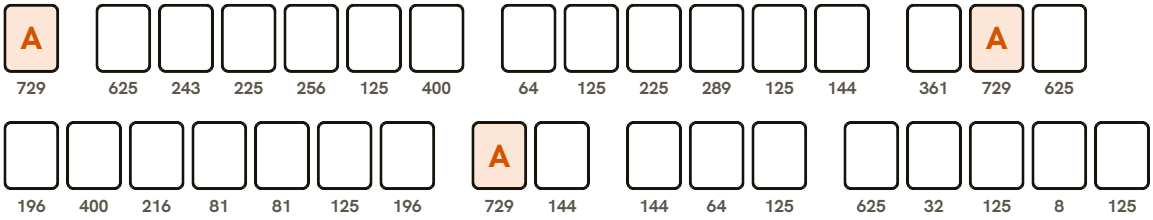
draw a bar model

Answer: ☐ → S

CLUE 4 Exponents

> The security mainframe logged the exponential growth rate of the corrupted code injected into the defense grid.

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



3^6 = ☐ → A	9^2 = ☐ → P	19^2 = ☐ → W	14^2 = ☐ → D
2^5 = ☐ → C	5^4 = ☐ → S	4^4 = ☐ → V	4^3 = ☐ → H
2^3 = ☐ → N	20^2 = ☐ → R	3^5 = ☐ → I	17^2 = ☐ → M
6^3 = ☐ → O	12^2 = ☐ → T	5^3 = ☐ → E	15^2 = ☐ → L

Scratch space:

CLUE 5 Fractions of a number - the last clue

> By calculating the exact fraction of encrypted data packets recovered from the comm tower we unlocked another clue.

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:

1/8 of 40 = ☐	1/2 of 22 = ☐	2/10 of 35 = ☐	4/8 of 12 = ☐
6/10 of 15 = ☐	3/6 of 4 = ☐	2/10 of 5 = ☐	6/8 of 4 = ☐
2/8 of 32 = ☐	1/8 of 80 = ☐	8/10 of 5 = ☐	

Step 2 - cross out the sentence with each answer:

1. The villain breached the outer wall using a grapple launcher, then soared over the canopy with glider wings.
2. The villain shattered the stone seal using a sonic drill, then soared over the canopy with glider wings.
3. The villain melted the security door using a thermal torch, then disrupted the guard comms with a signal jammer.
4. The villain disintegrated the locks using a plasma torch, then escaped under cover of smoke pellets.
5. The villain shattered the stone seal using a sonic drill, then escaped under cover of smoke pellets.
6. The villain breached the outer wall using a grapple launcher, then distracted the patrol with a sonic decoy.
7. The villain shattered the stone seal using a sonic drill, then confused the pursuers using a hologram emitter.
8. The villain breached the outer wall using a grapple launcher, then disrupted the guard comms with a signal jammer.
9. The villain melted the security door using a thermal torch, then escaped under cover of smoke pellets.
10. The villain breached the outer wall using a grapple launcher, then confused the pursuers using a hologram emitter.
11. The villain sliced through the reinforced vault using a laser cutter, then soared over the canopy with glider wings.
12. The villain disintegrated the locks using a plasma torch, then disrupted the guard comms with a signal jammer.

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TEACHER / PARENT

Answer Key

The Sunken Citadel Sabotage

Culprit: Scout Chen

Plasma Torch · Signal Jammer · Left Handed · Silver Helmet · Acoustic Shield

Trail: Start 21 → Clue 1 20 → Clue 2 12 → Clue 3 6 → Clue 4 4 → Clue 5 1

Clue 1 (Fractions of a number): "THE VILLAIN DOES NOT USE A SONIC DECOY"

3/8 of 120 = 45 (T) · 2/10 of 95 = 19 (N) · 2/4 of 30 = 15 (O) · 1/3 of 126 = 42 (D) · 4/8 of 24 = 12 (A) · 5/8 of 88 = 55 (U) · 4/8 of 4 = 2 (L) · 1/4 of 100 = 25 (Y) · 5/10 of 46 = 23 (S) · 1/5 of 15 = 3 (V) · 4/8 of 106 = 53 (E) · 2/8 of 196 = 49 (H) · 1/2 of 70 = 35 (I) · 2/6 of 153 = 51 (C)

Clue 2 (Rounding): "WITNESSES SAW A LEFT HANDED OPERATIVE"

Round 4,509 to the nearest thousand = 5000 (W) · Round 20 to the nearest ten = 20 (P) · Round 241 to the nearest hundred = 200 (V) · Round 1,289 to the nearest hundred = 1300 (E) · Round 471 to the nearest hundred = 500 (I) · Round 29 to the nearest ten = 30 (D) · Round 3,436 to the nearest thousand = 3000 (T) · Round 93 to the nearest ten = 90 (N) · Round 130 to the nearest ten = 130 (S) · Round 2,916 to the nearest hundred = 2900 (L) · Round 434 to the nearest ten = 430 (O) · Round 1,684 to the nearest hundred = 1700 (F) · Round 66 to the nearest ten = 70 (A) · Round 49 to the nearest ten = 50 (R) · Round 336 to the nearest hundred = 300 (H)

Clue 3 (Bar model word problems): "ACOUSTIC SHIELD"

One group collected 13 relic and another group collected 7 relic. How many relic in all? = 20 (A) · Expedition Quartermaster has 9 times as many relic as a teammate. The teammate has 8 relic. How many relic does Expedition Quartermaster have? = 72 (I) · One group collected 6 solar battery and another group collected 5 solar battery. How many solar battery in all? = 11 (T) · Expedition Quartermaster has 84 map cylinder, packed 4 to a bag. How many bags can be filled? = 21 (O) · One group collected 40 scanner and another group collected 72 scanner. How many scanner in all? = 112 (C) · The red team has 101 scanner and the blue team has 39 scanner. How many more scanner does the red team have? = 62 (U) · There were 120 map cylinder in all. 37 map cylinder were used. How many map cylinder are left? = 83 (S)

Clue 4 (Exponents): "A SILVER HELMET WAS DROPPED AT THE SCENE"

3^6 = 729 (A) · 9^2 = 81 (P) · 19^2 = 361 (W) · 14^2 = 196 (D) · 2^5 = 32 (C) · 5^4 = 625 (S) · 4^4 = 256 (V) · 4^3 = 64 (H) · 2^3 = 8 (N) · 20^2 = 400 (R) · 3^5 = 243 (I) · 17^2 = 289 (M) · 6^3 = 216 (O) · 12^2 = 144 (T) · 5^3 = 125 (E) · 15^2 = 225 (L)

Clue 5 (Fractions of a number): surviving statement is box 12 → Scout Chen

1/8 of 40 = 5 · 1/2 of 22 = 11 · 2/10 of 35 = 7 · 4/8 of 12 = 6 · 6/10 of 15 = 9 · 3/6 of 4 = 2 · 2/10 of 5 = 1 · 6/8 of 4 = 3 · 2/8 of 32 = 8 · 1/8 of 80 = 10 · 8/10 of 5 = 4