



Sabotage on Sector Nine

Grade 9 math · Two-step equations, Exponents, Square roots, Integers · Reading level grades 7-9

Detective: _____ **Date:** _____

The primary star-mapping array on Sector Nine has been targeted! Someone scrambled the coordinates, pointing our telescopes directly into a blinding cosmic storm. If we do not restore the array soon, we will miss the trajectory of an incoming asteroid. The Chief Astronomer has tracked the override commands to the station's main mainframe, but the culprit has locked the terminal. We need your mathematical skill to solve these encrypted logs and identify the Saboteur before the asteroid strikes.

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	TECH GEAR	HELMET VISOR	GLOVE GRIP	HELMET STRIPE	SENSOR GLITCH
Charles Duke	Laser Pointer	Infra Red	Left Handed	Cyber Green	Ice Crystals
Neil Armstrong	Plasma Cutter	Infra Red	Left Handed	Cyber Green	Ice Crystals
Edgar Mitchell	Hacker Deck	Neon Grid	Left Handed	Astro Blue	Ice Crystals
Buzz Aldrin	Plasma Cutter	Solar Glass	Left Handed	Neon Orange	Magnetic Fields
Michael Collins	Sonic Wrench	Neon Grid	Left Handed	Cyber Green	Magnetic Fields
Jack Swigert	Gravity Boots	Neon Grid	Left Handed	Cyber Green	Solar Flares
Chris Hadfield	Sonic Wrench	Neon Grid	Right Handed	Cyber Green	Magnetic Fields
Peggy Whitson	Gravity Boots	Infra Red	Right Handed	Cyber Green	Ice Crystals
David Scott	Gravity Boots	Neon Grid	Right Handed	Neon Orange	Solar Flares
Fred Haise	Sonic Wrench	Dark Shield	Left Handed	Neon Orange	Solar Flares
Guion Bluford	Plasma Cutter	Dark Shield	Left Handed	Neon Orange	Ice Crystals
Gene Cernan	Sonic Wrench	Gold Tint	Left Handed	Cyber Green	Ice Crystals
Pete Conrad	Sonic Wrench	Gold Tint	Left Handed	Neon Orange	Ice Crystals
Alan Shepard	Laser Pointer	Neon Grid	Left Handed	Astro Blue	Magnetic Fields
John Glenn	Sonic Wrench	Dark Shield	Right Handed	Neon Orange	Ice Crystals
John Young	Hacker Deck	Dark Shield	Right Handed	Neon Orange	Magnetic Fields
Harrison Schmitt	Plasma Cutter	Dark Shield	Right Handed	Neon Orange	Solar Flares
Yuri Gagarin	Gravity Boots	Dark Shield	Left Handed	Cyber Green	Ice Crystals
Valentina Tereshkova	Hacker Deck	Gold Tint	Right Handed	Astro Blue	Ice Crystals
Jim Lovell	Hacker Deck	Dark Shield	Right Handed	Astro Blue	Magnetic Fields
Mae Jemison	Laser Pointer	Gold Tint	Left Handed	Cyber Green	Ice Crystals

CLUE 1

Two-step equations

We found a locked console displaying two unknown fuel canister weights. To bypass the lockout, we must solve for the missing weight variable using the station's balance equation.

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

T								T											T
9	6	2	3	22	4	5	9	2	17	7	11	5	2	3	16	5	9		
20	2	22	7	22	11	22	7	8	3	6	13	2	15	11					

$6x + 2 = 56, x = \square \rightarrow \boxed{\text{T}}$

$2x + 6 = 40, x = \square \rightarrow \boxed{\text{U}}$

$5x + 9 = 49, x = \square \rightarrow \boxed{\text{K}}$

$3x + 2 = 47, x = \square \rightarrow \boxed{\text{L}}$

$8x + 7 = 47, x = \square \rightarrow \boxed{\text{O}}$

$4x + 12 = 28, x = \square \rightarrow \boxed{\text{B}}$

$3x + 2 = 8, x = \square \rightarrow \boxed{\text{E}}$

$8x + 10 = 138, x = \square \rightarrow \boxed{\text{N}}$

$3x + 11 = 44, x = \square \rightarrow \boxed{\text{D}}$

$4x + 7 = 35, x = \square \rightarrow \boxed{\text{R}}$

$6x + 6 = 138, x = \square \rightarrow \boxed{\text{A}}$

$3x + 11 = 50, x = \square \rightarrow \boxed{\text{I}}$

$3x + 3 = 63, x = \square \rightarrow \boxed{\text{W}}$

$8x + 9 = 33, x = \square \rightarrow \boxed{\text{S}}$

$7x + 10 = 52, x = \square \rightarrow \boxed{\text{H}}$

Scratch space:

CLUE 2

Exponents

A strange radiation flare is multiplying rapidly in the lower deck, doubling every ten seconds. By calculating the total flare output using exponents, we can recover the next data packet.

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

T						T													
400	4	100	441	100	225	400	4	8	243	81	100	81	125	441	289	169	100		

							T					T	T		
27	343	100	324	324	100	81	400	4	100	36	128	400	400	289	243

$20^2 = \square \rightarrow \text{**T**}$

$15^2 = \square \rightarrow \text{**F**}$

$2^2 = \square \rightarrow \text{**H**}$

$3^3 = \square \rightarrow \text{**P**}$

$6^2 = \square \rightarrow \text{**B**}$

$21^2 = \square \rightarrow \text{**L**}$

$7^3 = \square \rightarrow \text{**R**}$

$5^3 = \square \rightarrow \text{**G**}$

$17^2 = \square \rightarrow \text{**O**}$

$3^5 = \square \rightarrow \text{**N**}$

$2^7 = \square \rightarrow \text{**U**}$

$10^2 = \square \rightarrow \text{**E**}$

$18^2 = \square \rightarrow \text{**S**}$

$2^3 = \square \rightarrow \text{**A**}$

$3^4 = \square \rightarrow \text{**D**}$

$13^2 = \square \rightarrow \text{**V**}$

Scratch space:

CLUE 3 Square roots

The emergency solar grid has been partially isolated. The mainframe tells us the total area of the square solar field, but we must use square roots to find the length of the side cables.

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

I																		
23	20	6	20	18	10	16	21	22	14	16	16	3	5	18	21	5	2	21
			I			I					I							
21	3	6	23	18	20	23	18	20	2	23	21	16						

$\text{sqrt}(529) = \square \rightarrow \boxed{\text{I}}$	$\text{sqrt}(324) = \square \rightarrow \boxed{\text{R}}$	$\text{sqrt}(196) = \square \rightarrow \boxed{\text{L}}$
$\text{sqrt}(9) = \square \rightarrow \boxed{\text{H}}$	$\text{sqrt}(256) = \square \rightarrow \boxed{\text{S}}$	$\text{sqrt}(441) = \square \rightarrow \boxed{\text{T}}$
$\text{sqrt}(100) = \square \rightarrow \boxed{\text{Y}}$	$\text{sqrt}(484) = \square \rightarrow \boxed{\text{A}}$	$\text{sqrt}(36) = \square \rightarrow \boxed{\text{E}}$
$\text{sqrt}(400) = \square \rightarrow \boxed{\text{C}}$	$\text{sqrt}(4) = \square \rightarrow \boxed{\text{U}}$	$\text{sqrt}(25) = \square \rightarrow \boxed{\text{O}}$

Scratch space:

CLUE 4 Integers

The station's external temperature sensors are fluctuating wildly below zero as we pass behind the planet's shadow. We need to sum up these positive and negative temperature integers to reveal the next security code.

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

C																			
27	38	20	26	25	17	25	26	26	23	35	6	25	3	32	27	21	26	9	

16	26	25	26	4	24	37	23	11	23	26	6	25	20	38	

$20 - (-7) = \square \rightarrow \text{C}$

$(-2) + 23 = \square \rightarrow \text{L}$

$(-4) + 10 = \square \rightarrow \text{A}$

$(-2) + 13 = \square \rightarrow \text{D}$

$(-13) + 39 = \square \rightarrow \text{E}$

$(-1) + 18 = \square \rightarrow \text{G}$

$3 - (-1) = \square \rightarrow \text{F}$

$(-14) + 17 = \square \rightarrow \text{T}$

$9 - (-15) = \square \rightarrow \text{O}$

$25 - (-13) = \square \rightarrow \text{Y}$

$(-10) + 35 = \square \rightarrow \text{R}$

$28 - (-9) = \square \rightarrow \text{U}$

$6 - (-3) = \square \rightarrow \text{S}$

$17 - (-15) = \square \rightarrow \text{I}$

$15 - (-8) = \square \rightarrow \text{N}$

$(-14) + 34 = \square \rightarrow \text{B}$

$(-13) + 48 = \square \rightarrow \text{P}$

$9 - (-7) = \square \rightarrow \text{W}$

Scratch space:

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

The emergency backup battery is draining at a steady rate plus a constant system baseline. Solve this two-step rate equation to find exactly how much power remains in the security log.

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:

$8x + 12 = 60, x = \boxed{}$

$8x + 4 = 12, x = \boxed{}$

$9x + 9 = 36, x = \boxed{}$

$2x + 9 = 19, x = \boxed{}$

$3x + 4 = 10, x = \boxed{}$

$7x + 1 = 50, x = \boxed{}$

$3x + 10 = 43, x = \boxed{}$

$6x + 2 = 50, x = \boxed{}$

$3x + 9 = 21, x = \boxed{}$

$6x + 7 = 67, x = \boxed{}$

$3x + 2 = 38, x = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain overloaded the core reactor, then hid in the engine room.
2. The villain locked the airlock doors, then stole the star maps.
3. The villain locked the airlock doors, then escaped in a pod.
4. The villain disabled the oxygen valves, then hid in the engine room.
5. The villain scrambled the navigation logs, then hid in the engine room.
6. The villain jammed the radar dishes, then escaped in a pod.
7. The villain locked the airlock doors, then corrupted the hard drives.
8. The villain disabled the oxygen valves, then cut the communication wire.
9. The villain jammed the radar dishes, then hid in the engine room.
10. The villain jammed the radar dishes, then cut the communication wire.
11. The villain jammed the radar dishes, then corrupted the hard drives.
12. The villain scrambled the navigation logs, then cut the communication wire.

Answer Key

Sabotage on Sector Nine

Culprit: Charles Duke

Laser Pointer · Infra Red · Left Handed · Cyber Green · Ice Crystals

Trail: Start 21 → Clue 1 14 → Clue 2 10 → Clue 3 6 → Clue 4 4 → Clue 5 1

Clue 1 (Two-step equations): "THE SABOTEUR DOES NOT WEAR A DARK SHIELD"

$6x + 2 = 56, x = 9$ (T) · $2x + 6 = 40, x = 17$ (U) · $5x + 9 = 49, x = 8$ (K) · $3x + 2 = 47, x = 15$ (L) · $8x + 7 = 47, x = 5$ (O) · $4x + 12 = 28, x = 4$ (B) · $3x + 2 = 8, x = 2$ (E) · $8x + 10 = 138, x = 16$ (N) · $3x + 11 = 44, x = 11$ (D) · $4x + 7 = 35, x = 7$ (R) · $6x + 6 = 138, x = 22$ (A) · $3x + 11 = 50, x = 13$ (I) · $3x + 3 = 63, x = 20$ (W) · $8x + 9 = 33, x = 3$ (S) · $7x + 10 = 52, x = 6$ (H)

Clue 2 (Exponents): "THE LEFT HANDED GLOVE PRESSED THE BUTTON"

$20^2 = 400$ (T) · $15^2 = 225$ (F) · $2^2 = 4$ (H) · $3^3 = 27$ (P) · $6^2 = 36$ (B) · $21^2 = 441$ (L) · $7^3 = 343$ (R) · $5^3 = 125$ (G) · $17^2 = 289$ (O) · $3^5 = 243$ (N) · $2^7 = 128$ (U) · $10^2 = 100$ (E) · $18^2 = 324$ (S) · $2^3 = 8$ (A) · $3^4 = 81$ (D) · $13^2 = 169$ (V)

Clue 3 (Square roots): "ICE CRYSTALS SHORT OUT THEIR CIRCUITS"

$\sqrt{529} = 23$ (I) · $\sqrt{324} = 18$ (R) · $\sqrt{196} = 14$ (L) · $\sqrt{9} = 3$ (H) · $\sqrt{256} = 16$ (S) · $\sqrt{441} = 21$ (T) · $\sqrt{100} = 10$ (Y) · $\sqrt{484} = 22$ (A) · $\sqrt{36} = 6$ (E) · $\sqrt{400} = 20$ (C) · $\sqrt{4} = 2$ (U) · $\sqrt{25} = 5$ (O)

Clue 4 (Integers): "CYBER GREEN PARTICLES WERE FOUND NEARBY"

$20 - (-7) = 27$ (C) · $(-2) + 23 = 21$ (L) · $(-4) + 10 = 6$ (A) · $(-2) + 13 = 11$ (D) · $(-13) + 39 = 26$ (E) · $(-1) + 18 = 17$ (G) · $3 - (-1) = 4$ (F) · $(-14) + 17 = 3$ (T) · $9 - (-15) = 24$ (O) · $25 - (-13) = 38$ (Y) · $(-10) + 35 = 25$ (R) · $28 - (-9) = 37$ (U) · $6 - (-3) = 9$ (S) · $17 - (-15) = 32$ (I) · $15 - (-8) = 23$ (N) · $(-14) + 34 = 20$ (B) · $(-13) + 48 = 35$ (P) · $9 - (-7) = 16$ (W)

Clue 5 (Two-step equations): surviving statement is box 9 → Charles Duke

$8x + 12 = 60, x = 6$ · $8x + 4 = 12, x = 1$ · $9x + 9 = 36, x = 3$ · $2x + 9 = 19, x = 5$ · $3x + 4 = 10, x = 2$ · $7x + 1 = 50, x = 7$ · $3x + 10 = 43, x = 11$ · $6x + 2 = 50, x = 8$ · $3x + 9 = 21, x = 4$ · $6x + 7 = 67, x = 10$ · $3x + 2 = 38, x = 12$