The Biodome Heist on Ares-V

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

Detective: _____ **Date:** _____

A crisis has struck the Ares-V Research Outpost. The rare Martian spore sample has been stolen from the pressurized biodome! A rogue cosmonaut has bypassed security. You must analyze the telemetry data and find the thief before they board the escape shuttle.

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 cosmonaut is _____

Possible suspects

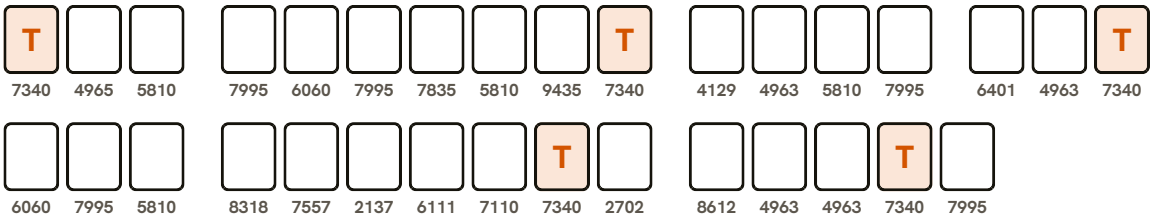
Cross off a row as each clue rules it out. The one left at the end is the culprit.

NAME	PRIMARY GEAR	SECONDARY TOOL	VISOR TYPE	HAIR COLOR	SYSTEM HAZARD
Caroline Herschel	cloaking field	solar sail	silver reflective visor	silver white hair	magnetic interference
Mae Jemison	gravity disruptor	emp blaster	gold reflective visor	bright orange hair	bright solar flare
Carl Sagan	gravity disruptor	solar sail	gold reflective visor	neon blue hair	bright solar flare
Arthur Clarke	cloaking field	gravity boots	gold reflective visor	bright orange hair	bright solar flare
Guion Bluford	holographic decoy	magnetic grapple	gold reflective visor	silver white hair	bright solar flare
Chris Hadfield	cloaking field	plasma torch	gold reflective visor	silver white hair	extreme cold
Annie Cannon	cloaking field	emp blaster	gold reflective visor	bright orange hair	magnetic interference
Neil Armstrong	holographic decoy	magnetic grapple	gold reflective visor	bright orange hair	bright solar flare
Vera Rubin	jetpack booster	emp blaster	gold reflective visor	bright orange hair	magnetic interference
Edwin Hubble	gravity disruptor	solar sail	silver reflective visor	bright orange hair	magnetic interference
Peggy Whitson	cloaking field	emp blaster	gold reflective visor	neon blue hair	magnetic interference
Stephen Hawking	gravity disruptor	solar sail	gold reflective visor	silver white hair	bright solar flare
Yuri Gagarin	jetpack booster	emp blaster	gold reflective visor	bright orange hair	bright solar flare
John Glenn	jetpack booster	plasma torch	gold reflective visor	neon blue hair	extreme cold
Kalpana Chawla	jetpack booster	magnetic grapple	gold reflective visor	bright orange hair	magnetic interference
Sally Ride	laser cutter	solar sail	gold reflective visor	bright orange hair	bright solar flare
Jocelyn Bell	jetpack booster	magnetic grapple	silver reflective visor	bright orange hair	magnetic interference
Maria Mitchell	laser cutter	emp blaster	gold reflective visor	bright orange hair	extreme cold
Michael Collins	jetpack booster	solar sail	gold reflective visor	neon blue hair	bright solar flare
Valentina Tereshkova	holographic decoy	magnetic grapple	silver reflective visor	bright orange hair	bright solar flare
Grote Reber	gravity disruptor	emp blaster	silver reflective visor	neon blue hair	magnetic interference

CLUE 1 Addition

To access the initial security camera footage, the crew must add up the total energy reserves across the secondary batteries. Solving this sum unlocks the first encrypted file.

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



4178 + 3162 = ☐ → T

1745 + 3218 = ☐ → O

3669 + 3441 = ☐ → I

1383 + 754 = ☐ → A

2182 + 4219 = ☐ → N

1594 + 2535 = ☐ → D

2823 + 3237 = ☐ → U

2448 + 3362 = ☐ → E

1301 + 1401 = ☐ → Y

5452 + 3983 = ☐ → C

5939 + 2673 = ☐ → B

3974 + 2137 = ☐ → V

4742 + 3093 = ☐ → P

4729 + 3266 = ☐ → S

2929 + 4628 = ☐ → R

2033 + 2932 = ☐ → H

2616 + 5702 = ☐ → G

Scratch space:

CLUE 2 Two-step equations

> The terminal requires solving for the unknown docking pressure. The system subtracts the leak rate and divides by the seal factor to isolate the pressure variable.

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

T						T			T										
14	16	18	8	18	11	8	18	14	11	20	14	7	11	5	7	11	18	20	
19	7	4	9	11	18	12	4	18	6	14	3	2	18	2	3	13	7	11	

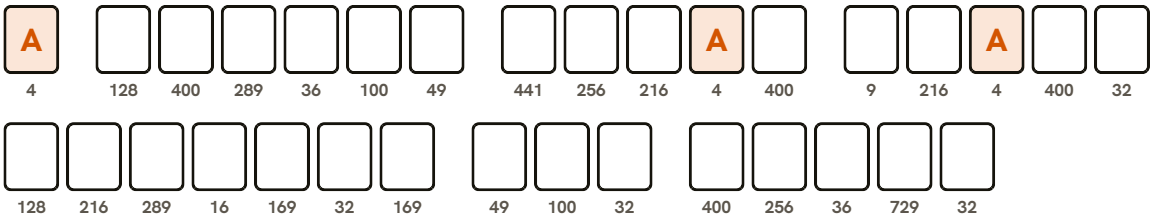
8x + 5 = 117, x = ☐ → T	8x + 10 = 58, x = ☐ → C	4x + 8 = 56, x = ☐ → F
6x + 6 = 54, x = ☐ → P	2x + 2 = 24, x = ☐ → R	4x + 5 = 25, x = ☐ → W
2x + 7 = 45, x = ☐ → G	8x + 8 = 40, x = ☐ → L	6x + 12 = 120, x = ☐ → E
5x + 7 = 72, x = ☐ → S	9x + 10 = 154, x = ☐ → H	9x + 12 = 192, x = ☐ → A
4x + 6 = 34, x = ☐ → O	2x + 11 = 17, x = ☐ → I	8x + 2 = 18, x = ☐ → V
2x + 12 = 30, x = ☐ → D		

Scratch space:

CLUE 3 Exponents

> The comms array is failing. You must calculate the exponential growth of the signal noise to tune the dish back to the outpost's central computer.

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



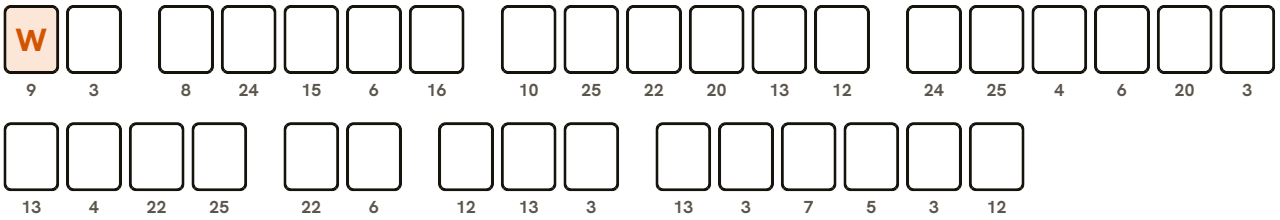
2^2 = ☐ → A	3^2 = ☐ → F	20^2 = ☐ → R	9^3 = ☐ → U
2^5 = ☐ → E	6^3 = ☐ → L	6^2 = ☐ → G	13^2 = ☐ → D
21^2 = ☐ → S	2^7 = ☐ → B	2^4 = ☐ → N	17^2 = ☐ → I
10^2 = ☐ → H	2^8 = ☐ → O	7^2 = ☐ → T	

Scratch space:

CLUE 4 Square roots

> To scan the biodome, you need the radius of the circular sensor field. The scanner displays the total area, meaning you must solve the square root to find the distance.

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



sqrt(81) = ☐ → W

sqrt(100) = ☐ → B

sqrt(484) = ☐ → I

sqrt(625) = ☐ → R

sqrt(36) = ☐ → N

sqrt(400) = ☐ → G

sqrt(9) = ☐ → E

sqrt(169) = ☐ → H

sqrt(256) = ☐ → D

sqrt(576) = ☐ → O

sqrt(225) = ☐ → U

sqrt(144) = ☐ → T

sqrt(49) = ☐ → L

sqrt(64) = ☐ → F

sqrt(25) = ☐ → M

sqrt(16) = ☐ → A

Scratch space:

CLUE 5 Two-step equations - the last clue

> The backup generator will shut down in a few minutes. Solve for the time variable by factoring in the starting fuel units minus the steady consumption rate.

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:

3x + 9 = 15, x = ☐	4x + 11 = 31, x = ☐	8x + 7 = 15, x = ☐	5x + 8 = 23, x = ☐
6x + 11 = 83, x = ☐	3x + 1 = 31, x = ☐	4x + 2 = 30, x = ☐	5x + 8 = 53, x = ☐
9x + 4 = 58, x = ☐	9x + 8 = 107, x = ☐	6x + 9 = 57, x = ☐	

Step 2 - cross out the sentence with each answer:

1. The villain bypassed the thermal shields, then fled in a stolen mining pod.
2. The villain sabotaged the life support computer, then locked down the laboratory sector.
3. The villain breached the secure vault door, then scrambled the outpost radar arrays.
4. The villain hacked the airlock override, then scrambled the outpost radar arrays.
5. The villain disabled the exterior power grid, then fled in a stolen mining pod.
6. The villain sabotaged the life support computer, then fled in a stolen mining pod.
7. The villain bypassed the thermal shields, then locked down the laboratory sector.
8. The villain breached the secure vault door, then beamed the stolen data to a pirate ship.
9. The villain breached the secure vault door, then fled in a stolen mining pod.
10. The villain breached the secure vault door, then vented the waste tanks to escape.
11. The villain hacked the airlock override, then locked down the laboratory sector.
12. The villain disabled the exterior power grid, then vented the waste tanks to escape.

TEACHER / PARENT

Answer Key

The Biodome Heist on Ares-V

Culprit: Sally Ride

laser cutter · solar sail · gold reflective visor · bright orange hair · bright solar flare

Trail: Start 21 → Clue 1 20 → Clue 2 15 → Clue 3 8 → Clue 4 4 → Clue 5 1

Clue 1 (Addition): "THE SUSPECT DOES NOT USE GRAVITY BOOTS"

4178 + 3162 = 7340 (T) · 1745 + 3218 = 4963 (O) · 3669 + 3441 = 7110 (I) · 1383 + 754 = 2137 (A) · 2182 + 4219 = 6401 (N) · 1594 + 2535 = 4129 (D) · 2823 + 3237 = 6060 (U) · 2448 + 3362 = 5810 (E) · 1301 + 1401 = 2702 (Y) · 5452 + 3983 = 9435 (C) · 5939 + 2673 = 8612 (B) · 3974 + 2137 = 6111 (V) · 4742 + 3093 = 7835 (P) · 4729 + 3266 = 7995 (S) · 2929 + 4628 = 7557 (R) · 2033 + 2932 = 4965 (H) · 2616 + 5702 = 8318 (G)

Clue 2 (Two-step equations): "THE PERPETRATOR WORE A GOLD REFLECTIVE VISOR"

8x + 5 = 117, x = 14 (T) · 8x + 10 = 58, x = 6 (C) · 4x + 8 = 56, x = 12 (F) · 6x + 6 = 54, x = 8 (P) · 2x + 2 = 24, x = 11 (R) · 4x + 5 = 25, x = 5 (W) · 2x + 7 = 45, x = 19 (G) · 8x + 8 = 40, x = 4 (L) · 6x + 12 = 120, x = 18 (E) · 5x + 7 = 72, x = 13 (S) · 9x + 10 = 154, x = 16 (H) · 9x + 12 = 192, x = 20 (A) · 4x + 6 = 34, x = 7 (O) · 2x + 11 = 17, x = 3 (I) · 8x + 2 = 18, x = 2 (V) · 2x + 12 = 30, x = 9 (D)

Clue 3 (Exponents): "A BRIGHT SOLAR FLARE BLINDED THE ROGUE"

2^2 = 4 (A) · 3^2 = 9 (F) · 20^2 = 400 (R) · 9^3 = 729 (U) · 2^5 = 32 (E) · 6^3 = 216 (L) · 6^2 = 36 (G) · 13^2 = 169 (D) · 21^2 = 441 (S) · 2^7 = 128 (B) · 2^4 = 16 (N) · 17^2 = 289 (I) · 10^2 = 100 (H) · 2^8 = 256 (O) · 7^2 = 49 (T)

Clue 4 (Square roots): "WE FOUND BRIGHT ORANGE HAIR IN THE HELMET"

sqrt(81) = 9 (W) · sqrt(100) = 10 (B) · sqrt(484) = 22 (I) · sqrt(625) = 25 (R) · sqrt(36) = 6 (N) · sqrt(400) = 20 (G) · sqrt(9) = 3 (E) · sqrt(169) = 13 (H) · sqrt(256) = 16 (D) · sqrt(576) = 24 (O) · sqrt(225) = 15 (U) · sqrt(144) = 12 (T) · sqrt(49) = 7 (L) · sqrt(64) = 8 (F) · sqrt(25) = 5 (M) · sqrt(16) = 4 (A)

Clue 5 (Two-step equations): surviving statement is box 4 → Sally Ride

3x + 9 = 15, x = 2 · 4x + 11 = 31, x = 5 · 8x + 7 = 15, x = 1 · 5x + 8 = 23, x = 3 · 6x + 11 = 83, x = 12 · 3x + 1 = 31, x = 10 · 4x + 2 = 30, x = 7 · 5x + 8 = 53, x = 9 · 9x + 4 = 58, x = 6 · 9x + 8 = 107, x = 11 · 6x + 9 = 57, x = 8