



Crisis at Kepler Outpost

Grade 7 math · Integers, Percentages, Order of operations, Exponents, Two-step equations · Reading level grades 7-9

Detective: _____ Date: _____

A rogue saboteur has locked down Kepler Outpost Prime, trapping the Chief Astrophysicist inside the fusion core. We must decrypt the station logs to identify the culprit before life support systems fail entirely.

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 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 SPECIALIZATION	AUXILIARY GADGET	OXYGEN MASK LOGO	HELMET VISOR TINT	SYSTEM VULNERABILITY
Carl Sagan	Plasma Welding	EMP Grenade	Right-Handed Patch	Cobalt Visor	Freeze Ray
Valentina Tereshkova	Gravity Manipulation	Plasma Torch	Right-Handed Patch	Amber Visor	Freeze Ray
Charles Bolden	Solar Shielding	Plasma Torch	Left-Handed Patch	Cobalt Visor	Freeze Ray
Peggy Whitson	Gravity Manipulation	Sonic Screwdriver	Left-Handed Patch	Cobalt Visor	Freeze Ray
Kalpana Chawla	Gravity Manipulation	EMP Grenade	Left-Handed Patch	Amber Visor	Magnet Trap
Henrietta Leavitt	Quantum Hacking	Gravity Boots	Right-Handed Patch	Amber Visor	Flash Bang
Judith Resnik	Plasma Welding	Gravity Boots	Left-Handed Patch	Amber Visor	Flash Bang
Franklin Chang Diaz	Gravity Manipulation	Plasma Torch	Right-Handed Patch	Amber Visor	Magnet Trap
Sunita Williams	Solar Shielding	Plasma Torch	Right-Handed Patch	Cobalt Visor	Magnet Trap
Edwin Hubble	Solar Shielding	Jetpack Unit	Left-Handed Patch	Cobalt Visor	Freeze Ray
Helen Sharman	Plasma Welding	Gravity Boots	Right-Handed Patch	Amber Visor	Flash Bang
Guion Bluford	Gravity Manipulation	Jetpack Unit	Right-Handed Patch	Amber Visor	Flash Bang
Sally Ride	Solar Shielding	EMP Grenade	Right-Handed Patch	Amber Visor	Flash Bang
Yuri Gagarin	Gravity Manipulation	EMP Grenade	Right-Handed Patch	Amber Visor	Flash Bang
Ellen Ochoa	Laser Splicing	Jetpack Unit	Right-Handed Patch	Emerald Visor	Freeze Ray
Michael Collins	Solar Shielding	EMP Grenade	Left-Handed Patch	Amber Visor	Flash Bang
Katherine Johnson	Plasma Welding	Plasma Torch	Right-Handed Patch	Emerald Visor	Magnet Trap
Neil Armstrong	Quantum Hacking	Jetpack Unit	Left-Handed Patch	Cobalt Visor	Freeze Ray
John Glenn	Plasma Welding	Sonic Screwdriver	Right-Handed Patch	Emerald Visor	Flash Bang
Alan Shepard	Plasma Welding	Plasma Torch	Left-Handed Patch	Cobalt Visor	Freeze Ray
Chris Hadfield	Laser Splicing	Plasma Torch	Right-Handed Patch	Emerald Visor	Flash Bang

CLUE 1 Integers

To find the suspects security access level we must track the outposts core temperature fluctuations where the thermal chamber dropped nineteen degrees below zero then surged twenty-four degrees

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

T									T								T
11	21	13	2	7	2	16	13	19	11	5	26	13	2	10	26	11	
								T								T	
21	30	25	13	30	17	13	11	16	30	19	22	7	10	15	11		

$(-10) + 21 = \square \rightarrow \text{T}$	$(-12) + 28 = \square \rightarrow \text{P}$	$(-5) + 22 = \square \rightarrow \text{J}$
$(-2) + 7 = \square \rightarrow \text{D}$	$19 - (-3) = \square \rightarrow \text{K}$	$12 - (-7) = \square \rightarrow \text{C}$
$(-15) + 25 = \square \rightarrow \text{N}$	$1 - (-6) = \square \rightarrow \text{U}$	$10 - (-11) = \square \rightarrow \text{H}$
$(-8) + 10 = \square \rightarrow \text{S}$	$21 - (-4) = \square \rightarrow \text{V}$	$(-4) + 19 = \square \rightarrow \text{I}$
$13 - (-13) = \square \rightarrow \text{O}$	$26 - (-4) = \square \rightarrow \text{A}$	$5 - (-8) = \square \rightarrow \text{E}$

Scratch space:

CLUE 2 Percentages

We can narrow down the suspects escape route by calculating the backup generators remaining life which requires solving the percentage of reserve power still left in the terminal battery grid

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

T																T
46	29	22	53	51	22	11	43	57	13	30	21	59	24	38	46	
										T						
6	22	11	24	53	11	24	38	52	29	46	29	11	51	25	22	25
		T														
59	11	46	13	29												

$40\% \text{ of } 115 = \boxed{} \rightarrow \boxed{\text{T}}$

$10\% \text{ of } 430 = \boxed{} \rightarrow \boxed{\text{K}}$

$20\% \text{ of } 110 = \boxed{} \rightarrow \boxed{\text{E}}$

$50\% \text{ of } 106 = \boxed{} \rightarrow \boxed{\text{S}}$

$60\% \text{ of } 95 = \boxed{} \rightarrow \boxed{\text{Y}}$

$50\% \text{ of } 58 = \boxed{} \rightarrow \boxed{\text{H}}$

$10\% \text{ of } 210 = \boxed{} \rightarrow \boxed{\text{L}}$

$5\% \text{ of } 260 = \boxed{} \rightarrow \boxed{\text{C}}$

$50\% \text{ of } 12 = \boxed{} \rightarrow \boxed{\text{W}}$

$50\% \text{ of } 48 = \boxed{} \rightarrow \boxed{\text{R}}$

$25\% \text{ of } 236 = \boxed{} \rightarrow \boxed{\text{P}}$

$10\% \text{ of } 510 = \boxed{} \rightarrow \boxed{\text{N}}$

$50\% \text{ of } 60 = \boxed{} \rightarrow \boxed{\text{U}}$

$40\% \text{ of } 95 = \boxed{} \rightarrow \boxed{\text{I}}$

$20\% \text{ of } 260 = \boxed{} \rightarrow \boxed{\text{G}}$

$20\% \text{ of } 125 = \boxed{} \rightarrow \boxed{\text{D}}$

$10\% \text{ of } 110 = \boxed{} \rightarrow \boxed{\text{A}}$

Scratch space:

CLUE 3
Order of operations

To decrypt the visual logs calculate the exact orbital alignment coordinates using this specific sequence of math operations

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

A		A					A						A				A				
96	47	96	99	18	88	63	96	18	14	79	75	29	96	26	120	72	96	47	27		
										A											
72	29	14	47	58	100	58	18	120	100	96	27	100	47	18							

$60 + 6 \times 6 = \square \rightarrow$ A	$11 \times 7 - 5 = \square \rightarrow$ B	$46 + 2 \times 6 = \square \rightarrow$ D
$51 + 3 \times 8 = \square \rightarrow$ F	$39 + 8 \times 3 = \square \rightarrow$ M	$4 + 7 \times 2 = \square \rightarrow$ T
$14 + 2 \times 6 = \square \rightarrow$ S	$12 \times 9 - 9 = \square \rightarrow$ U	$4 \times 9 - 9 = \square \rightarrow$ G
$17 + 3 \times 4 = \square \rightarrow$ L	$7 \times 12 - 5 = \square \rightarrow$ C	$2 + 3 \times 4 = \square \rightarrow$ I
$10 \times 11 - 22 = \square \rightarrow$ O	$6 \times 12 - 25 = \square \rightarrow$ N	$84 + 6 \times 6 = \square \rightarrow$ H
$10 \times 12 - 20 = \square \rightarrow$ E		

Scratch space:

CLUE 4 Exponents

The saboteur jammed our radio channels with an exponential signal and we must find the strength of the transmission by solving this exponential power equation

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

W																
16	4	289	4	81	4	128	81	4	289	144	64	225	289	100	4	144
125	256	27	64	343	400	343	64	361	4	256	121	169	144	27	256	

$4^2 = \square \rightarrow$ W	$7^3 = \square \rightarrow$ A	$19^2 = \square \rightarrow$ B	$2^7 = \square \rightarrow$ C
$17^2 = \square \rightarrow$ D	$9^2 = \square \rightarrow$ T	$10^2 = \square \rightarrow$ G	$5^3 = \square \rightarrow$ F
$2^2 = \square \rightarrow$ E	$16^2 = \square \rightarrow$ R	$12^2 = \square \rightarrow$ S	$8^2 = \square \rightarrow$ M
$20^2 = \square \rightarrow$ N	$15^2 = \square \rightarrow$ U	$13^2 = \square \rightarrow$ I	$3^3 = \square \rightarrow$ O
$11^2 = \square \rightarrow$ V			

Scratch space:

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

The automated repair drone is tracking the culprits boot prints so calculate the distance they covered using the rate of travel plus the head start distance

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:

$5x + 9 = 44, x = \boxed{}$

$5x + 5 = 30, x = \boxed{}$

$5x + 7 = 37, x = \boxed{}$

$5x + 9 = 19, x = \boxed{}$

$4x + 6 = 42, x = \boxed{}$

$2x + 9 = 33, x = \boxed{}$

$4x + 11 = 15, x = \boxed{}$

$4x + 7 = 19, x = \boxed{}$

$5x + 12 = 52, x = \boxed{}$

$5x + 5 = 60, x = \boxed{}$

$3x + 11 = 23, x = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain deflected the outer radiation flares, then walked along the metal ceiling to escape detection.
2. The villain bypassed the mainframe firewall, then melted the lock mechanism on the vault.
3. The villain deflected the outer radiation flares, then melted the lock mechanism on the vault.
4. The villain warped the gravity grid, then melted the lock mechanism on the vault.
5. The villain deflected the outer radiation flares, then disabled the local cameras with an electromagnetic pulse.
6. The villain warped the gravity grid, then disabled the local cameras with an electromagnetic pulse.
7. The villain bypassed the mainframe firewall, then walked along the metal ceiling to escape detection.
8. The villain fused the emergency exit hatches, then flew across the central chasm to the control deck.
9. The villain sliced through the security bulkheads, then melted the lock mechanism on the vault.
10. The villain fused the emergency exit hatches, then walked along the metal ceiling to escape detection.
11. The villain bypassed the mainframe firewall, then disabled the local cameras with an electromagnetic pulse.
12. The villain warped the gravity grid, then walked along the metal ceiling to escape detection.

Answer Key

Crisis at Kepler Outpost

Culprit: Helen Sharman

Plasma Welding · Gravity Boots · Right-Handed Patch · Amber Visor · Flash Bang

Trail: Start 21 → Clue 1 17 → Clue 2 11 → Clue 3 6 → Clue 4 4 → Clue 5 1

Clue 1 (Integers): "THE SUSPECT DOES NOT HAVE A JETPACK UNIT"

$(-10) + 21 = 11$ (T) · $(-12) + 28 = 16$ (P) · $(-5) + 22 = 17$ (J) · $(-2) + 7 = 5$ (D) · $19 - (-3) = 22$ (K) · $12 - (-7) = 19$ (C) · $(-15) + 25 = 10$ (N) · $1 - (-6) = 7$ (U) · $10 - (-11) = 21$ (H) · $(-8) + 10 = 2$ (S) · $21 - (-4) = 25$ (V) · $(-4) + 19 = 15$ (I) · $13 - (-13) = 26$ (O) · $26 - (-4) = 30$ (A) · $5 - (-8) = 13$ (E)

Clue 2 (Percentages): "THE SNEAKY CULPRIT WEARS A RIGHT HANDED PATCH"

40% of 115 = 46 (T) · 10% of 430 = 43 (K) · 20% of 110 = 22 (E) · 50% of 106 = 53 (S) · 60% of 95 = 57 (Y) · 50% of 58 = 29 (H) · 10% of 210 = 21 (L) · 5% of 260 = 13 (C) · 50% of 12 = 6 (W) · 50% of 48 = 24 (R) · 25% of 236 = 59 (P) · 10% of 510 = 51 (N) · 50% of 60 = 30 (U) · 40% of 95 = 38 (I) · 20% of 260 = 52 (G) · 20% of 125 = 25 (D) · 10% of 110 = 11 (A)

Clue 3 (Order of operations): "AN AUTOMATIC FLASH BANG BLINDED THE AGENT"

$60 + 6 \times 6 = 96$ (A) · $11 \times 7 - 5 = 72$ (B) · $46 + 2 \times 6 = 58$ (D) · $51 + 3 \times 8 = 75$ (F) · $39 + 8 \times 3 = 63$ (M) · $4 + 7 \times 2 = 18$ (T) · $14 + 2 \times 6 = 26$ (S) · $12 \times 9 - 9 = 99$ (U) · $4 \times 9 - 9 = 27$ (G) · $17 + 3 \times 4 = 29$ (L) · $7 \times 12 - 5 = 79$ (C) · $2 + 3 \times 4 = 14$ (I) · $10 \times 11 - 22 = 88$ (O) · $6 \times 12 - 25 = 47$ (N) · $84 + 6 \times 6 = 120$ (H) · $10 \times 12 - 20 = 100$ (E)

Clue 4 (Exponents): "WE DETECTED SMUDGES FROM AN AMBER VISOR"

$4^2 = 16$ (W) · $7^3 = 343$ (A) · $19^2 = 361$ (B) · $2^7 = 128$ (C) · $17^2 = 289$ (D) · $9^2 = 81$ (T) · $10^2 = 100$ (G) · $5^3 = 125$ (F) · $2^2 = 4$ (E) · $16^2 = 256$ (R) · $12^2 = 144$ (S) · $8^2 = 64$ (M) · $20^2 = 400$ (N) · $15^2 = 225$ (U) · $13^2 = 169$ (I) · $3^3 = 27$ (O) · $11^2 = 121$ (V)

Clue 5 (Two-step equations): surviving statement is box 10 → Helen Sharman

$5x + 9 = 44, x = 7$ · $5x + 5 = 30, x = 5$ · $5x + 7 = 37, x = 6$ · $5x + 9 = 19, x = 2$ · $4x + 6 = 42, x = 9$ · $2x + 9 = 33, x = 12$ · $4x + 11 = 15, x = 1$ · $4x + 7 = 19, x = 3$ · $5x + 12 = 52, x = 8$ · $5x + 5 = 60, x = 11$ · $3x + 11 = 23, x = 4$