The Kepler Prime Sabotage

Grade 8 math · Exponents, Square roots, Pythagorean theorem, Order of operations, Two-step equations · Reading level grades 7-9

Detective: _____ **Date:** _____

A rogue pilot has disabled the primary shield generator at Kepler Prime! With an asteroid shower closing in, we must analyze local telemetry and identify the saboteur before our life support systems fail.

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 stellar saboteur is _____

Possible suspects

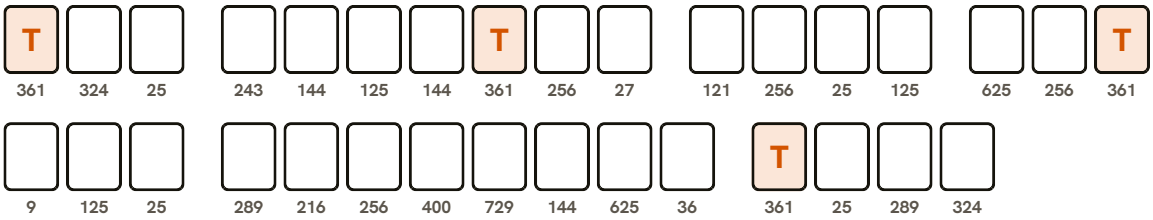
Cross off a row as each clue rules it out. The one left at the end is the culprit.

NAME	PRIMARY THRUSTER	AUXILIARY GEAR	FLIGHT DECK HABIT	VISOR TINT	SENSOR VULNERABILITY
Mae Jemison	fusion impulse drive	gravity anchor beam	left handed joystick grip	deep cobalt sheen	magnetic pulse disruption
Scott Kelly	antimatter plasma	gravity anchor beam	right handed joystick grip	deep cobalt sheen	subzero thermal shock
Buzz Aldrin	fusion impulse drive	cloaking light bender	left handed joystick grip	emerald green glare	subzero thermal shock
Kalpana Chawla	solar sail rig	gravity anchor beam	left handed joystick grip	deep cobalt sheen	magnetic pulse disruption
Valentina Tereshkova	antimatter plasma	nanotech repair swarm	left handed joystick grip	emerald green glare	magnetic pulse disruption
Sally Ride	fusion impulse drive	gravity anchor beam	right handed joystick grip	amber gold reflection	magnetic pulse disruption
Sunita Williams	dark energy booster	plasma cutter torch	left handed joystick grip	emerald green glare	magnetic pulse disruption
Katherine Johnson	dark energy booster	stasis field emitter	left handed joystick grip	amber gold reflection	magnetic pulse disruption
Ellen Ochoa	dark energy booster	nanotech repair swarm	right handed joystick grip	emerald green glare	subzero thermal shock
Franklin Chang Diaz	fusion impulse drive	stasis field emitter	left handed joystick grip	emerald green glare	subzero thermal shock
Michael Collins	dark energy booster	nanotech repair swarm	left handed joystick grip	deep cobalt sheen	subzero thermal shock
Margaret Hamilton	fusion impulse drive	stasis field emitter	left handed joystick grip	emerald green glare	magnetic pulse disruption
Roberta Bondar	solar sail rig	nanotech repair swarm	left handed joystick grip	emerald green glare	magnetic pulse disruption
Guion Bluford	solar sail rig	gravity anchor beam	left handed joystick grip	amber gold reflection	subzero thermal shock
Charles Bolden	fusion impulse drive	stasis field emitter	left handed joystick grip	deep cobalt sheen	cosmic microwave static
Bernard Harris	fusion impulse drive	stasis field emitter	right handed joystick grip	deep cobalt sheen	magnetic pulse disruption
John Glenn	fusion impulse drive	cloaking light bender	left handed joystick grip	emerald green glare	magnetic pulse disruption
Neil Armstrong	dark energy booster	gravity anchor beam	right handed joystick grip	amber gold reflection	magnetic pulse disruption
Alan Shepard	antimatter plasma	gravity anchor beam	right handed joystick grip	emerald green glare	cosmic microwave static
Joan Higginbotham	solar sail rig	stasis field emitter	right handed joystick grip	emerald green glare	magnetic pulse disruption
Peggy Whitson	dark energy booster	gravity anchor beam	left handed joystick grip	emerald green glare	subzero thermal shock

CLUE 1 Exponents

> Our subspace sensors logged an energy reading that grows exponentially. Calculate the base power value to unlock the first terminal log.

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



19^2 = ☐ → T

3^5 = ☐ → V

3^3 = ☐ → R

4^4 = ☐ → O

6^3 = ☐ → L

9^3 = ☐ → K

5^3 = ☐ → S

5^4 = ☐ → N

5^2 = ☐ → E

11^2 = ☐ → D

3^2 = ☐ → U

6^2 = ☐ → G

18^2 = ☐ → H

17^2 = ☐ → C

20^2 = ☐ → A

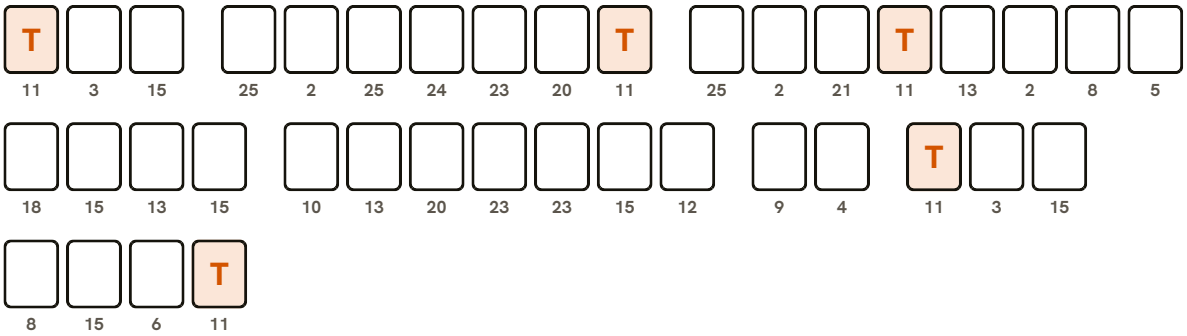
12^2 = ☐ → I

Scratch space:

CLUE 2 Square roots

> The runaway vessel carved a square-shaped ion path through our grid. Find the square root of the total area to determine their flight speed.

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



sqrt(121) = ☐ → T

sqrt(529) = ☐ → P

sqrt(16) = ☐ → Y

sqrt(441) = ☐ → N

sqrt(169) = ☐ → R

sqrt(81) = ☐ → B

sqrt(4) = ☐ → O

sqrt(144) = ☐ → D

sqrt(225) = ☐ → E

sqrt(625) = ☐ → C

sqrt(100) = ☐ → G

sqrt(400) = ☐ → I

sqrt(64) = ☐ → L

sqrt(324) = ☐ → W

sqrt(576) = ☐ → K

sqrt(25) = ☐ → S

sqrt(9) = ☐ → H

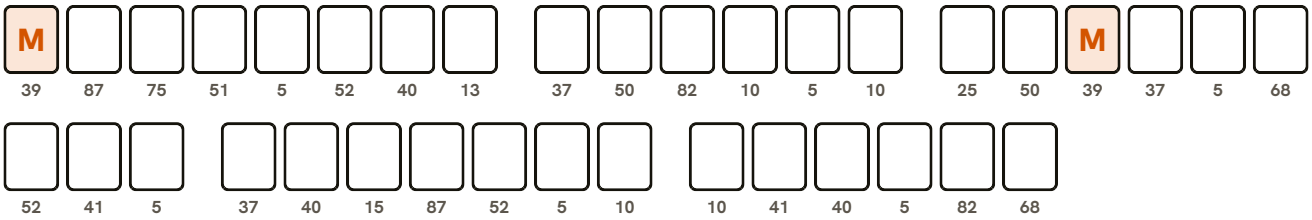
sqrt(36) = ☐ → F

Scratch space:

CLUE 3 Pythagorean theorem

> We need to plot an intercept vector. Calculate the diagonal path of their escape using the Pythagorean theorem with our station coordinates.

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



legs 15 and 36, hypotenuse = ☐ → M

legs 5 and 12, hypotenuse = ☐ → C

legs 3 and 4, hypotenuse = ☐ → E

legs 12 and 35, hypotenuse = ☐ → P

legs 18 and 80, hypotenuse = ☐ → L

legs 30 and 40, hypotenuse = ☐ → U

legs 15 and 20, hypotenuse = ☐ → J

legs 9 and 12, hypotenuse = ☐ → R

legs 9 and 40, hypotenuse = ☐ → H

legs 6 and 8, hypotenuse = ☐ → S

legs 60 and 63, hypotenuse = ☐ → A

legs 21 and 72, hypotenuse = ☐ → G

legs 20 and 48, hypotenuse = ☐ → T

legs 24 and 32, hypotenuse = ☐ → I

legs 24 and 45, hypotenuse = ☐ → N

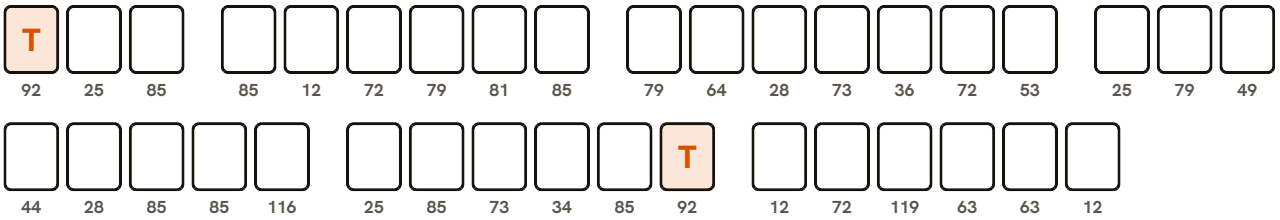
legs 32 and 60, hypotenuse = ☐ → D

Scratch space:

CLUE 4 Order of operations

> The saboteur left a scrambled override code. Solve this arithmetic sequence using the proper order of operations to reveal their ship's registry.

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



47 + 9 × 5 = ☐ → T	12 × 7 - 12 = ☐ → C	63 + 2 × 5 = ☐ → L
22 + 3 × 9 = ☐ → D	11 × 6 - 2 = ☐ → I	1 + 5 × 7 = ☐ → O
11 × 8 - 9 = ☐ → A	26 + 9 × 2 = ☐ → G	11 + 2 × 7 = ☐ → H
58 + 9 × 3 = ☐ → E	11 × 8 - 7 = ☐ → P	13 + 5 × 8 = ☐ → K
71 + 8 × 6 = ☐ → U	55 + 2 × 4 = ☐ → F	2 + 5 × 2 = ☐ → S
12 × 11 - 16 = ☐ → N	4 × 10 - 6 = ☐ → M	7 × 6 - 14 = ☐ → R

Scratch space:

CLUE 5 Two-step equations - the last clue

> A damaged fuel capsule is losing pressure at a constant rate. Solve this two-step equation to find the exact minute the saboteur launched.

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 = 30, x = ☐	2x + 11 = 31, x = ☐	6x + 2 = 68, x = ☐	6x + 9 = 39, x = ☐
2x + 9 = 33, x = ☐	2x + 3 = 11, x = ☐	3x + 4 = 28, x = ☐	3x + 9 = 27, x = ☐
2x + 9 = 27, x = ☐	5x + 4 = 9, x = ☐	2x + 4 = 10, x = ☐	

Step 2 - cross out the sentence with each answer:

1. The villain scrambled the lunar mapping beacon, then slipped into the dark nebula.
2. The villain overloaded the station hyperdrive, then escaped through the asteroid field.
3. The villain hacked the orbital defense grid, then hid behind the Martian moons.
4. The villain drained the solar power array, then fled toward the Jupiter outpost.
5. The villain overloaded the station hyperdrive, then hid behind the Martian moons.
6. The villain overloaded the station hyperdrive, then warped into the outer system.
7. The villain drained the solar power array, then slipped into the dark nebula.
8. The villain drained the solar power array, then hid behind the Martian moons.
9. The villain scrambled the lunar mapping beacon, then escaped through the asteroid field.
10. The villain scrambled the lunar mapping beacon, then warped into the outer system.
11. The villain vented the oxygen reserve tanks, then warped into the outer system.
12. The villain hacked the orbital defense grid, then escaped through the asteroid field.

TEACHER / PARENT

Answer Key

The Kepler Prime Sabotage

Culprit: Margaret Hamilton

fusion impulse drive · stasis field emitter · left handed joystick grip · emerald green glare · magnetic pulse disruption

Trail: Start 21 → Clue 1 19 → Clue 2 12 → Clue 3 7 → Clue 4 4 → Clue 5 1

Clue 1 (Exponents): "THE VISITOR DOES NOT USE CLOAKING TECH"

19^2 = 361 (T) · 3^5 = 243 (V) · 3^3 = 27 (R) · 4^4 = 256 (O) · 6^3 = 216 (L) · 9^3 = 729 (K) · 5^3 = 125 (S) · 5^4 = 625 (N) · 5^2 = 25 (E) · 11^2 = 121 (D) · 3^2 = 9 (U) · 6^2 = 36 (G) · 18^2 = 324 (H) · 17^2 = 289 (C) · 20^2 = 400 (A) · 12^2 = 144 (I)

Clue 2 (Square roots): "THE COCKPIT CONTROLS WERE GRIPPED BY THE LEFT"

sqrt(121) = 11 (T) · sqrt(529) = 23 (P) · sqrt(16) = 4 (Y) · sqrt(441) = 21 (N) · sqrt(169) = 13 (R) · sqrt(81) = 9 (B) · sqrt(4) = 2 (O) · sqrt(144) = 12 (D) · sqrt(225) = 15 (E) · sqrt(625) = 25 (C) · sqrt(100) = 10 (G) · sqrt(400) = 20 (I) · sqrt(64) = 8 (L) · sqrt(324) = 18 (W) · sqrt(576) = 24 (K) · sqrt(25) = 5 (S) · sqrt(9) = 3 (H) · sqrt(36) = 6 (F)

Clue 3 (Pythagorean theorem): "MAGNETIC PULSES JUMPED THE PIRATES SHIELD"

legs 15 and 36, hypotenuse = 39 (M) · legs 5 and 12, hypotenuse = 13 (C) · legs 3 and 4, hypotenuse = 5 (E) · legs 12 and 35, hypotenuse = 37 (P) · legs 18 and 80, hypotenuse = 82 (L) · legs 30 and 40, hypotenuse = 50 (U) · legs 15 and 20, hypotenuse = 25 (J) · legs 9 and 12, hypotenuse = 15 (R) · legs 9 and 40, hypotenuse = 41 (H) · legs 6 and 8, hypotenuse = 10 (S) · legs 60 and 63, hypotenuse = 87 (A) · legs 21 and 72, hypotenuse = 75 (G) · legs 20 and 48, hypotenuse = 52 (T) · legs 24 and 32, hypotenuse = 40 (I) · legs 24 and 45, hypotenuse = 51 (N) · legs 32 and 60, hypotenuse = 68 (D)

Clue 4 (Order of operations): "THE ESCAPE AIRLOCK HAD GREEN HELMET SCUFFS"

47 + 9 × 5 = 92 (T) · 12 × 7 - 12 = 72 (C) · 63 + 2 × 5 = 73 (L) · 22 + 3 × 9 = 49 (D) · 11 × 6 - 2 = 64 (I) · 1 + 5 × 7 = 36 (O) · 11 × 8 - 9 = 79 (A) · 26 + 9 × 2 = 44 (G) · 11 + 2 × 7 = 25 (H) · 58 + 9 × 3 = 85 (E) · 11 × 8 - 7 = 81 (P) · 13 + 5 × 8 = 53 (K) · 71 + 8 × 6 = 119 (U) · 55 + 2 × 4 = 63 (F) · 2 + 5 × 2 = 12 (S) · 12 × 11 - 16 = 116 (N) · 4 × 10 - 6 = 34 (M) · 7 × 6 - 14 = 28 (R)

Clue 5 (Two-step equations): surviving statement is box 2 → Margaret Hamilton

3x + 9 = 30, x = 7 · 2x + 11 = 31, x = 10 · 6x + 2 = 68, x = 11 · 6x + 9 = 39, x = 5 · 2x + 9 = 33, x = 12 · 2x + 3 = 11, x = 4 · 3x + 4 = 28, x = 8 · 3x + 9 = 27, x = 6 · 2x + 9 = 27, x = 9 · 5x + 4 = 9, x = 1 · 2x + 4 = 10, x = 3