



The Subzero Cipher

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

Detective: _____ **Date:** _____

An elite rogue agent has infiltrated the Vanguard Academy's high-security mainframe. They bypassed the security grids to download the highly classified Omega Files, leaving the Chief Cryptographer locked in a digital holding cell. Your mission is to crack the clues, analyze the data, and unmask the saboteur before they slip off-grid.

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 cadet is _____

Possible suspects

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

NAME	SPECIALIST SPY SKILL	SPECIAL GADGET	DOMINANT WRITING HAND	HAIR DYE ACCENT	SECURITY VULNERABILITY
James Bond	Disguise Artistry	EMP Grenades	Left-handed writer	Spiky silver dye	Magnetic floor panels
Kim Possible	Drone Piloting	EMP Grenades	Right-handed writer	Neon blue streaks	Siren frequency jammer
Jason Bourne	Laser Hacking	Jetpack Boots	Left-handed writer	Copper orange buzz	Magnetic floor panels
Alex Rider	Laser Hacking	Sonar Visor	Left-handed writer	Neon blue streaks	Magnetic floor panels
Ethan Hunt	Parkour Mastery	Hologram Projector	Left-handed writer	Spiky silver dye	Magnetic floor panels
Artemis Fowl	Drone Piloting	Grappling Watch	Left-handed writer	Spiky silver dye	Sticky foam traps
Austin Powers	Cryptanalysis	Hologram Projector	Left-handed writer	Spiky silver dye	Magnetic floor panels
Frank Hardy	Parkour Mastery	Sonar Visor	Left-handed writer	Neon blue streaks	Siren frequency jammer
John Watson	Cryptanalysis	Hologram Projector	Right-handed writer	Spiky silver dye	Magnetic floor panels
Juni Cortez	Drone Piloting	Jetpack Boots	Right-handed writer	Copper orange buzz	Siren frequency jammer
Carmen Cortez	Drone Piloting	Hologram Projector	Right-handed writer	Spiky silver dye	Magnetic floor panels
Nancy Drew	Laser Hacking	Jetpack Boots	Left-handed writer	Spiky silver dye	Magnetic floor panels
Sherlock Holmes	Disguise Artistry	Hologram Projector	Left-handed writer	Copper orange buzz	Magnetic floor panels
Bruce Wayne	Laser Hacking	Sonar Visor	Right-handed writer	Copper orange buzz	Siren frequency jammer
Peter Parker	Parkour Mastery	Grappling Watch	Left-handed writer	Copper orange buzz	Magnetic floor panels
Katniss Everdeen	Laser Hacking	Grappling Watch	Left-handed writer	Spiky silver dye	Magnetic floor panels
Sydney Bristow	Disguise Artistry	Grappling Watch	Right-handed writer	Spiky silver dye	Siren frequency jammer
Joe Hardy	Cryptanalysis	Jetpack Boots	Left-handed writer	Spiky silver dye	Siren frequency jammer
Cody Banks	Parkour Mastery	EMP Grenades	Right-handed writer	Neon blue streaks	Siren frequency jammer
Natasha Romanoff	Disguise Artistry	EMP Grenades	Right-handed writer	Spiky silver dye	Siren frequency jammer
Perry Platypus	Cryptanalysis	Grappling Watch	Left-handed writer	Copper orange buzz	Siren frequency jammer

CLUE 1 Integers

The rogue cadet took the express elevator deep underground. By tracking the sequence of elevator trips across subterranean levels, we can calculate the final sub-level where they breached the firewall.

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

T			T											T			
20	28	15	20	28	14	15	18	29	17	15	16	27	17	20	17	21	27

		T								T	
12	15	20	22	23	13	4	25	17	17	20	16

$(-5) + 25 = \square \rightarrow \boxed{\text{T}}$	$7 - (-7) = \square \rightarrow \boxed{\text{I}}$	$(-15) + 19 = \square \rightarrow \boxed{\text{K}}$
$(-14) + 32 = \square \rightarrow \boxed{\text{F}}$	$23 - (-5) = \square \rightarrow \boxed{\text{H}}$	$(-7) + 34 = \square \rightarrow \boxed{\text{N}}$
$(-8) + 24 = \square \rightarrow \boxed{\text{S}}$	$11 - (-12) = \square \rightarrow \boxed{\text{A}}$	$(-3) + 25 = \square \rightarrow \boxed{\text{P}}$
$5 - (-10) = \square \rightarrow \boxed{\text{E}}$	$(-13) + 26 = \square \rightarrow \boxed{\text{C}}$	$(-7) + 36 = \square \rightarrow \boxed{\text{D}}$
$(-8) + 25 = \square \rightarrow \boxed{\text{O}}$	$(-9) + 21 = \square \rightarrow \boxed{\text{J}}$	$(-4) + 29 = \square \rightarrow \boxed{\text{B}}$
$(-1) + 22 = \square \rightarrow \boxed{\text{W}}$		

Scratch space:

CLUE 2 Percentages

We analyzed the stolen data packets left on the terminal screen. Finding the percentage of the remaining decryption buffer gives us the exact hardware signature of the thief's decryptor.

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

T					T										
29	21	10	45	30	29	10	52	58	47	24	10	45	45	10	9
		T		T					T						
52	35	29	21	29	21	10	50	10	27	29	21	58	45	9	

$25\% \text{ of } 116 = \square \rightarrow \boxed{\text{T}}$

$25\% \text{ of } 200 = \square \rightarrow \boxed{\text{L}}$

$5\% \text{ of } 940 = \square \rightarrow \boxed{\text{S}}$

$5\% \text{ of } 700 = \square \rightarrow \boxed{\text{I}}$

$50\% \text{ of } 104 = \square \rightarrow \boxed{\text{W}}$

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

$5\% \text{ of } 540 = \square \rightarrow \boxed{\text{F}}$

$5\% \text{ of } 480 = \square \rightarrow \boxed{\text{P}}$

$5\% \text{ of } 420 = \square \rightarrow \boxed{\text{H}}$

$50\% \text{ of } 116 = \square \rightarrow \boxed{\text{A}}$

$50\% \text{ of } 20 = \square \rightarrow \boxed{\text{E}}$

$25\% \text{ of } 36 = \square \rightarrow \boxed{\text{D}}$

$20\% \text{ of } 225 = \square \rightarrow \boxed{\text{N}}$

Scratch space:

CLUE 3
Order of operations

To bypass the high-energy security barrier, the culprit had to input a specific mathematical sequence. Solving the complex expression in the correct order reveals the sequence they used.

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

T								T	T										T		
74	50	28	114	57	28	105	74	74	31	17	57	57	28	31	28	120	74	50	28		
36	114	57	105	28	74	27															

$46 + 4 \times 7 = \square \rightarrow \text{T}$	$18 + 2 \times 9 = \square \rightarrow \text{M}$	$16 + 3 \times 4 = \square \rightarrow \text{E}$
$25 + 2 \times 3 = \square \rightarrow \text{R}$	$6 \times 9 - 4 = \square \rightarrow \text{H}$	$84 + 4 \times 9 = \square \rightarrow \text{D}$
$3 + 9 \times 6 = \square \rightarrow \text{G}$	$96 + 6 \times 3 = \square \rightarrow \text{A}$	$95 + 5 \times 2 = \square \rightarrow \text{N}$
$7 + 2 \times 5 = \square \rightarrow \text{I}$	$4 \times 8 - 5 = \square \rightarrow \text{S}$	

Scratch space:

CLUE 4

The escape pod's tracking beacon sends an exponentially multiplying signal to hide its trail. Calculating the signal strength at the target power level points directly to the flight path.

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

81 361 343 32 25 144 243 16 361 144 324 16 81 343 25 400 8 16 8

8 243 25 4 121 100 81 121 343 25

$$3^4 = \boxed{} \rightarrow \boxed{\mathbf{S}}$$

$$18^2 = \boxed{} \rightarrow \boxed{\mathbf{W}}$$

$$4^2 = \boxed{} \rightarrow \boxed{\mathbf{A}}$$

$$2^2 = \boxed{} \rightarrow \boxed{\text{C}}$$

$$20^2 = \boxed{} \rightarrow \boxed{\text{F}}$$

$7^3 = \boxed{} \rightarrow \boxed{\text{L}}$

$$5^2 = \boxed{} \rightarrow \boxed{\text{E}}$$

$12^2 = \boxed{} \rightarrow \boxed{\text{R}}$

$$19^2 = \boxed{} \rightarrow \boxed{1}$$

$3^5 = \boxed{} \rightarrow \boxed{\text{H}}$

$$2^5 = \boxed{} \rightarrow \boxed{\mathbf{v}}$$

$$2^3 = \boxed{} \rightarrow \boxed{\text{T}}$$

$$11^2 = \boxed{} \rightarrow \boxed{0}$$

$10^2 = \boxed{} \rightarrow \boxed{N}$

Scratch space:

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

The getaway vehicle's weight limit had to be perfectly balanced with stolen gear. Solve for the unknown gadget payload variable to find the culprit's exact equipment weight.

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:

$3x + 12 = 27, x = \boxed{}$

$3x + 10 = 40, x = \boxed{}$

$3x + 12 = 21, x = \boxed{}$

$6x + 10 = 46, x = \boxed{}$

$6x + 11 = 53, x = \boxed{}$

$3x + 2 = 26, x = \boxed{}$

$6x + 3 = 15, x = \boxed{}$

$6x + 3 = 9, x = \boxed{}$

$6x + 7 = 73, x = \boxed{}$

$4x + 1 = 17, x = \boxed{}$

$4x + 4 = 52, x = \boxed{}$

Step 2 - cross out the sentence with each answer:

1. The villain scaled the outer ventilation shaft, then escaped using a grappling watch.
2. The villain bypassed the security lasers, then distracted the backup team with a hologram.
3. The villain cracked the encrypted mainframe, then distracted the backup team with a hologram.
4. The villain bypassed the security lasers, then disabled the cameras with EMP grenades.
5. The villain bypassed the security lasers, then escaped using a grappling watch.
6. The villain bypassed the security lasers, then mapped out the dark tunnels with a sonar visor.
7. The villain scaled the outer ventilation shaft, then mapped out the dark tunnels with a sonar visor.
8. The villain cracked the encrypted mainframe, then disabled the cameras with EMP grenades.
9. The villain scaled the outer ventilation shaft, then distracted the backup team with a hologram.
10. The villain fooled the guards with a mask, then disabled the cameras with EMP grenades.
11. The villain guided a mini-uav through the vents, then blasted away using jetpack boots.
12. The villain guided a mini-uav through the vents, then escaped using a grappling watch.

Answer Key

The Subzero Cipher

Culprit: Ethan Hunt

Parkour Mastery · Hologram Projector · Left-handed writer · Spiky silver dye · Magnetic floor panels

Trail: Start 21 → Clue 1 17 → Clue 2 10 → Clue 3 7 → Clue 4 4 → Clue 5 1

Clue 1 (Integers): "THE THIEF DOES NOT OWN JETPACK BOOTS"

$(-5) + 25 = 20$ (T) · $7 - (-7) = 14$ (I) · $(-15) + 19 = 4$ (K) · $(-14) + 32 = 18$ (F) · $23 - (-5) = 28$ (H) · $(-7) + 34 = 27$ (N) · $(-8) + 24 = 16$ (S) · $11 - (-12) = 23$ (A) · $(-3) + 25 = 22$ (P) · $5 - (-10) = 15$ (E) · $(-13) + 26 = 13$ (C) · $(-7) + 36 = 29$ (D) · $(-8) + 25 = 17$ (O) · $(-9) + 21 = 12$ (J) · $(-4) + 29 = 25$ (B) · $(-1) + 22 = 21$ (W)

Clue 2 (Percentages): "THE NOTE WAS PENNED WITH THE LEFT HAND"

25% of 116 = 29 (T) · 25% of 200 = 50 (L) · 5% of 940 = 47 (S) · 5% of 700 = 35 (I) · 50% of 104 = 52 (W) · 60% of 50 = 30 (O) · 5% of 540 = 27 (F) · 5% of 480 = 24 (P) · 5% of 420 = 21 (H) · 50% of 116 = 58 (A) · 50% of 20 = 10 (E) · 25% of 36 = 9 (D) · 20% of 225 = 45 (N)

Clue 3 (Order of operations): "THE AGENT TRIGGERED THE MAGNETS"

$46 + 4 \times 7 = 74$ (T) · $18 + 2 \times 9 = 36$ (M) · $16 + 3 \times 4 = 28$ (E) · $25 + 2 \times 3 = 31$ (R) · $6 \times 9 - 4 = 50$ (H) · $84 + 4 \times 9 = 120$ (D) · $3 + 9 \times 6 = 57$ (G) · $96 + 6 \times 3 = 114$ (A) · $95 + 5 \times 2 = 105$ (N) · $7 + 2 \times 5 = 17$ (I) · $4 \times 8 - 5 = 27$ (S)

Clue 4 (Exponents): "SILVER HAIR WAS LEFT AT THE CONSOLE"

$3^4 = 81$ (S) · $18^2 = 324$ (W) · $4^2 = 16$ (A) · $2^2 = 4$ (C) · $20^2 = 400$ (F) · $7^3 = 343$ (L) · $5^2 = 25$ (E) · $12^2 = 144$ (R) · $19^2 = 361$ (I) · $3^5 = 243$ (H) · $2^5 = 32$ (V) · $2^3 = 8$ (T) · $11^2 = 121$ (O) · $10^2 = 100$ (N)

Clue 5 (Two-step equations): surviving statement is box 9 → Ethan Hunt

$3x + 12 = 27, x = 5$ · $3x + 10 = 40, x = 10$ · $3x + 12 = 21, x = 3$ · $6x + 10 = 46, x = 6$ · $6x + 11 = 53, x = 7$ · $3x + 2 = 26, x = 8$ · $6x + 3 = 15, x = 2$ · $6x + 3 = 9, x = 1$ · $6x + 7 = 73, x = 11$ · $4x + 1 = 17, x = 4$ · $4x + 4 = 52, x = 12$