WELCOME TO THE OMEGA SPACE ACADEMY

sponsored by

HRT

hudson river trading

OMEGA

THE OMEGA SPACE ACADEMY

GREETINGS, CADET!

I see that you are just about ready to embark on your first mission into the cosmos! You just may be one of our math engineers on the next expedition. But before that moment, you must pass your final exams at the academy.

You will need to complete 5 tasks (puzzles) before you join your first expedition (metapuzzle)! You can solve any of the 5 tasks in the order of your choice. Each task has an answer that will be a phrase in English. You can check your answers at the site connected to the QR below.

Each task answer will then be used to help you complete your first expedition (metapuzzle). When you complete the 5 tasks, visit the “HUNT” headquarters to receive the metapuzzle.

We recommend you work with up to 3 other cadets.

If you are completing these tasks onsite at our Denver facility, you will have from 10am to 4pm to complete the full set of puzzles (5 tasks + 1 metapuzzle) to be eligible for a prize drawing. During that time you can visit the “HUNT” headquarters if you have any questions or need hints.

Good luck cadets!

https://hunt.omegausa.org

Puzzles by: Evan Chen, Michael Ma, Jen McTeague, Dave Shukan, and Wil Zambole.

TASK A: PLASIC+

For the academy we developed a new programming language called Plasic+. The first lesson is to get familiar with this primer about the symbols and grammar of the language.

PRIMER

If A = “stop”, then opp(A) = “go”
If A = “emit”, then <A>= “time”
If A = “acres” then $A = “scare”
If A = “count” then #A = 5
If A = “Alan”, B = “ask”, then A.3^B= “Alaskan”
If A = “star”, then A.2 = “t”
If A = “sun”, then def(A) = “star in the solar system”
If A= “Venus”, then A } planet
If A= “correct”, then syn(A,5) = “right”
If A = “s” + “top”, then A = “stop”
If A = “top” + “s”, then A = “tops”
If A = “four” - “o”, then A = “fur”

PROGRAM OUTPUT FROM TEST PROGRAM ON PAGE 2

```
3
GROUP OF STORES
R, G
3
YES!
YES!
6
9
FINAL ANSWER IS ?
```

TASK A: PLASIC+

Here is a test program written in the language to determine your team's ability work with the language.

: Def(x) = "a word meaning the entire quantity or amount"
: Display #x
: y = "T" + x
: x = "M" + x
: Display def(x)
: x = "S" + x
: If x = opp(y), then x = y
: x = syn(y,5)
: Display x.3, x.4
: x = <x>
: Let d = pint
: Let e = "C" + direction
: Display #e
: If d = 2e , then x = d.2 + d.3 + d.4 + x, else d = y
: If x } calculus, then Display "Yes!", else Display "No"
: x = $x
: If x } shape, then Display "Yes!", else Display "No"
: j = x.2 + x.3
: x = x – j
: If def(x) = "jumble or twist", then Display #x, else Display "No"
: j = <j>
: x.1 = "E"
: x.6 = "S"
: x = "M" + x
: x = x.6^j
: Display #x
: Display "Final Answer is", x

TASK B: EVEN KNIGHTS AND ODD KNAVES

During a space expedition, crew management is important. Keeping track of the crew, like the ones below, is always critical.

EACH PERSON IS THINKING OF AN INTEGER BETWEEN 1 AND 26 INCLUSIVE.

- Amy: My number is triple Ida's number. Basil's number is at least Clara's.
- Basil: My number is prime. It is a proper divisor of Amy's.
- Clara: My number is prime. It is not a proper divisor of Amy's.
- Desmond: My number is double Basil's. Someone else shares my number.
- Ernest: My number is 1 more than James'. Three people share the smallest number.
- Fanny: My number is 1 more than Kate's. James has the median number.
- George: My number is larger than Ernest's. Amy has the median number.
- Hector: My number is triple Fanny's. Nobody shares my number.
- Ida: My number is the square root of Ernest's. It is smaller than Basil's.
- James: My number is a factorial. There are exactly four knaves. Kate is one of them!
- Kate: My number is a factorial. There are exactly five knaves. James is one of them!

TASK C: OMEGA, WE HAVE A PROBLEM SET

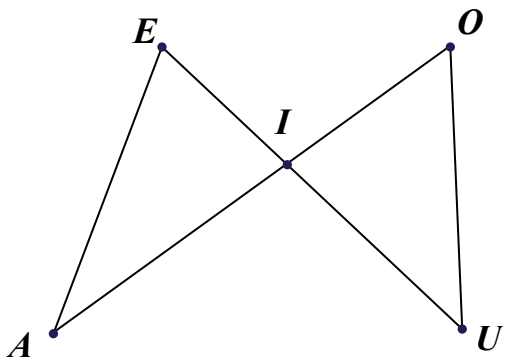
Expedition members needs to handle any problems that occur. We will first need to test your abilities with this problem simulation by finding x and y.

You may assume the following things while solving these problems:
If something looks like a straight line, then it is a straight line.
All named angles refer to the non-reflex angle with those points.
Values must be positive integers.

Problem 1: Connect the theorems

Given:

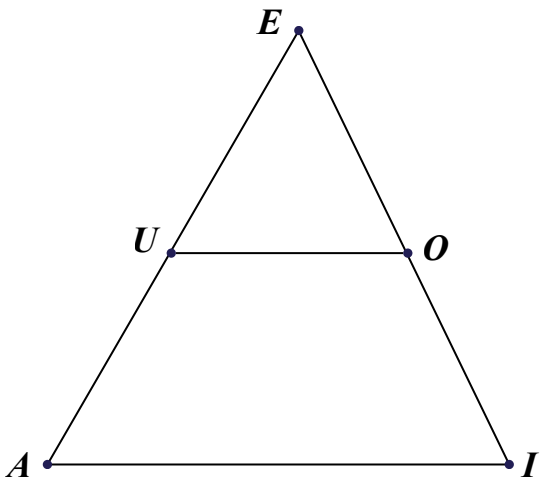
- $\angle A = 9x$
- $\angle E = 2x^2$
- $\angle AIE = 54$
- $\angle O = 7y - 1$
- $\angle U = (y - 1)^2$



Problem 2: Vowels, only please

Given:

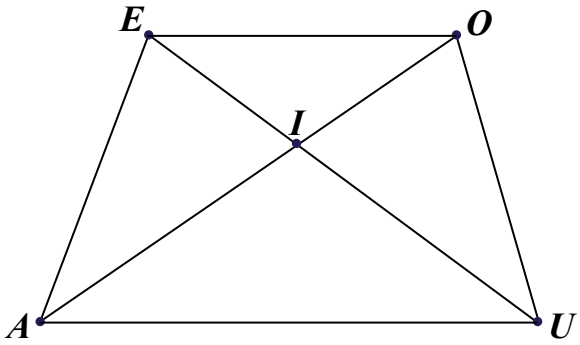
- $\angle A = 3x + 18$
- $\angle I = 3y + 19$
- $\angle EUO = 4x$
- $\angle UOE = 4y$
- $\overline{UO} \parallel \overline{AI}$



Problem 3: In an isosceles trapezoid ...

Given:

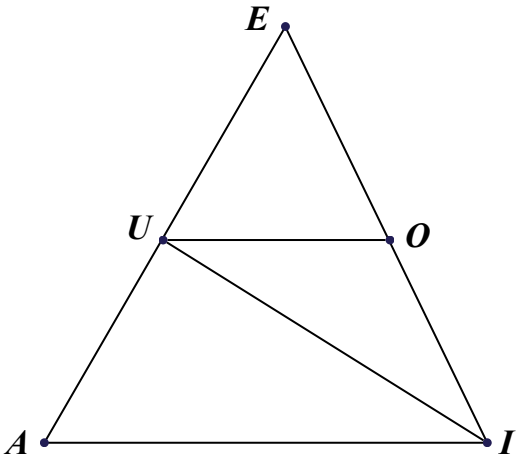
- $\overline{AU} \parallel \overline{EO}$
- $\overline{AE} \cong \overline{OU}$
- $\angle EAU = 4x - 15$
- $\angle AEO = 3y + 46$
- $\angle EOU = 5y$



Problem 4: Order of operations

Given:

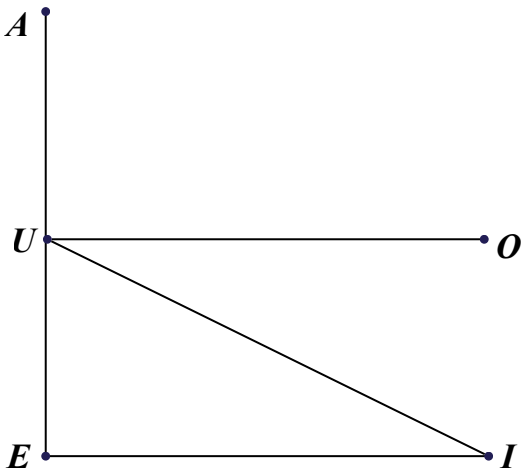
- $\overline{UE} \cong \overline{UI}$
- $\overline{EO} \cong \overline{OI}$
- $\angle EUO = 4x - 6$
- $\angle OUI = 3y$
- $\angle IUA = 4y$



Problem 5: Read, write, 'rithmetic

Given:

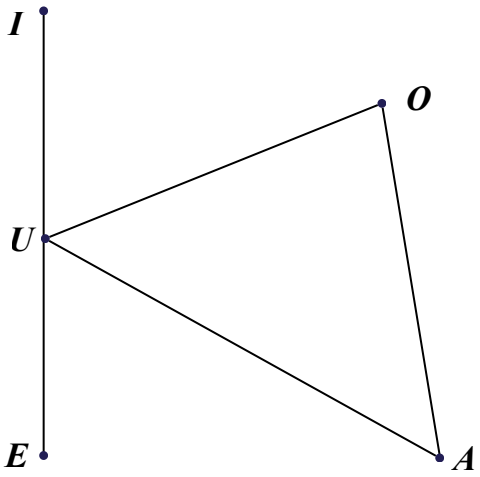
- $\overline{UO} \parallel \overline{EI}$
- $\angle OUI = 2y$
- $\angle IUE = 4x^2$
- $\angle E = 4y + 2$
- $\angle I = 10x - 2$



Problem 6: Letters and numbers!

Given:

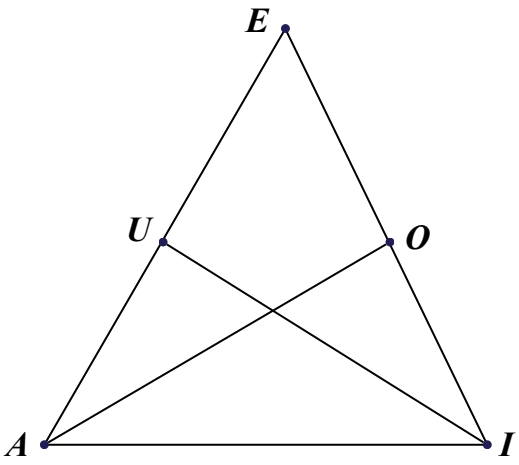
- $\angle IUO = 4x + y$
- $\angle OUA = 4x$
- $\angle AUE = 4x - y$
- $\angle O = 12y$
- $\angle A = 8y$



Problem 7: Formed anew

Given:

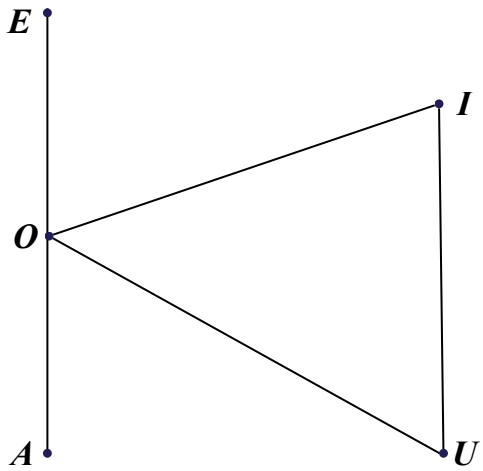
- $\angle EAO \cong \angle EIU$
- $\angle OAI \cong \angle UIA$
- $\angle E = x^2 + xy$
- $\angle EAO = 2x^2$
- $\angle UIA = x^2 y^2$



Problem 8: Thusly, the problem set closes

Given:

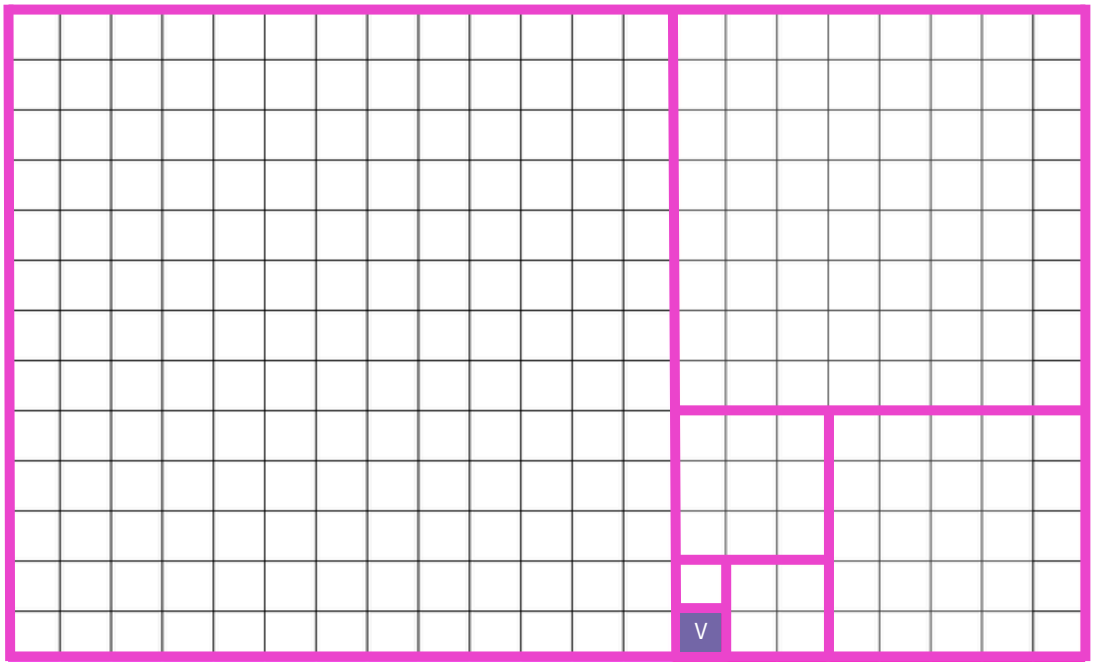
- $\overline{IU} \parallel \overline{AE}$
- $\angle EOI = 10y$
- $\angle IOU = 2xy$
- $\angle IUO = 2xy + 4$



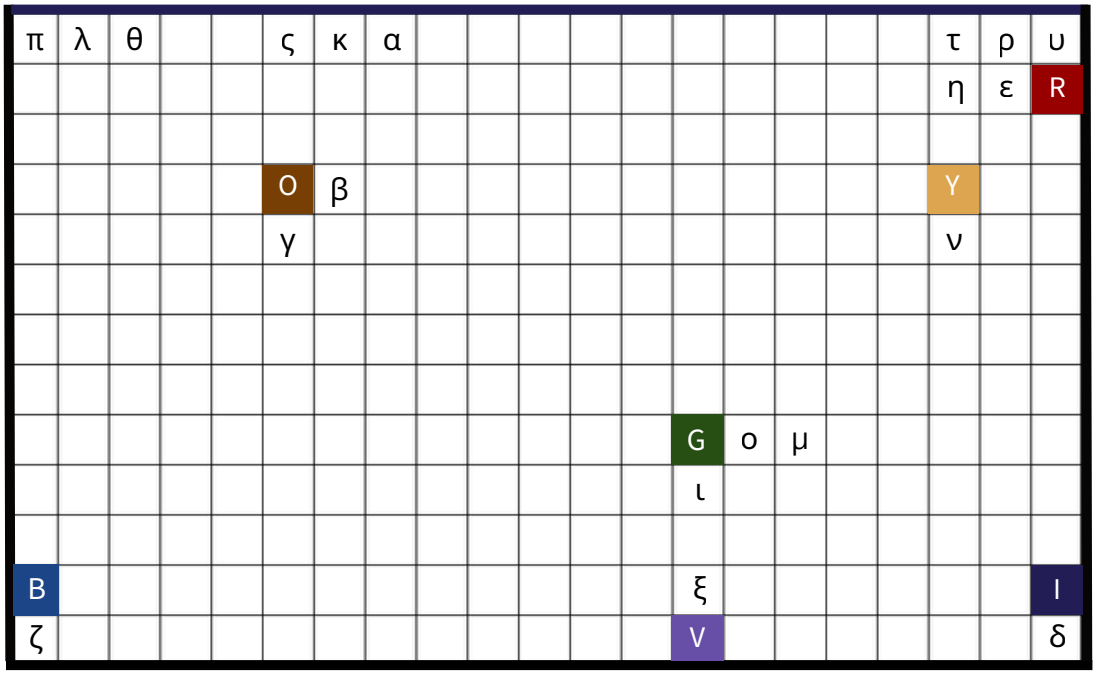
TASK D: FI-BASE-NACCI

While you examine the system sequencing, Commander Zeckendorf will monitor your work.

EXAMPLE LAYER



PUZZLE (7 LAYERS)



TASK D: FI-BASE-NACCI

α	R	+	O											
β	R	+	O											
γ			O		+			B						
δ			O	+		G		+		I				
ε	R	+	O											
ζ	R			+				B						
η	R													
θ			O											
ι						G								
κ			O											
λ								B						
μ						G		+		I				
ν				Y										
ξ			O				+			I	+	V		
ο			O	+		G		+		I				
π	R	+	O											
ρ	R	+	O											
ς	R	+	O											
τ	R	+	O											
υ	R		+	Y										

(6 5 9) → (4 5)

TASK E: HOMESTRETCH

Understanding the launch and landing algorithm is key to mission success.

Fill each row of unshaded squares with digits 0-9, once each. Identical single digits in squares cannot touch, not even diagonally. Digits may repeat within columns (as long as they do not touch). Columns of squares must sum to the corresponding 2-digit numbers in the shaded row.

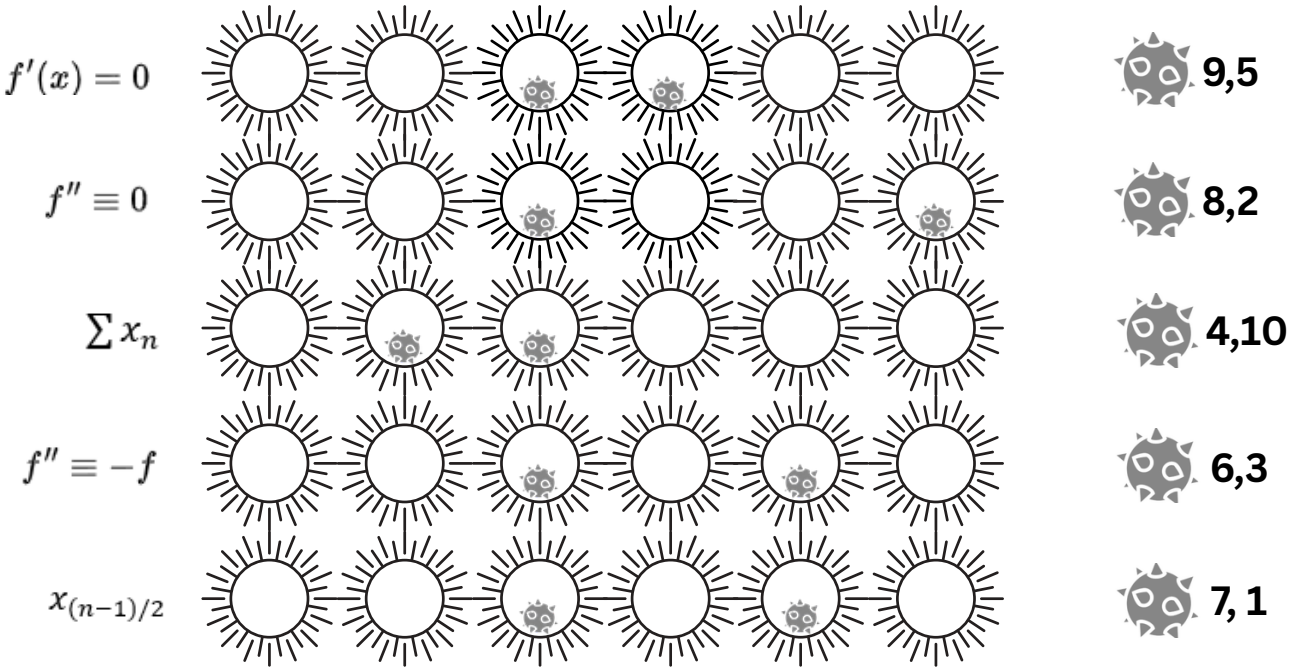
	0	1	2	3	4	5	6	7	8	9
0 1	1 A	L	ιι M	8 O	α S	ζζ T	η T	γγ H	6 E	β R
2 3	E	W	θθ I	6 T	3 H	λ I	2 N	μ R	ββ E	4 A
4 5	δδ C	4 H	κκ O	N	9 L	ε Y	8 A	ηη F	E	1 W
6 7	6 S	2 T	5 E	P	S	7 T	θ O	4 G	ι O	δ D
8 9	μμ O	αα N	γ T	S	εε T	6 O	ζ P	8 N	λλ O	κ W
	15	22	18	15	36	33	16	24	20	26

After completing the grid, you are close to the finish line:

Row α, Column αα
Row β, Column ββ
Row γ, Column γγ
Row δ, Column δδ
Row ε, Column εε
Row ζ, Column ζζ
Row η, Column ηη
Row θ, Column θθ
Row ι, Column ιι
Row κ, Column κκ
Row λ, Column λλ
Row μ, Column μμ

THE FIRST EXPEDITION (META PUZZLE)

Your team is now ready for *extended* time in space. Check your math as you navigate this star grid. But, do keep your eyes out for mines. If everything goes right, what will you be able to deploy for your long journey?



TASK LOG FOR REFERENCE