

These problems do count towards the core

1. Knights always tell the truth and Knaves always lie.

U says : None of us is a knight.

V says : At least three of us are knights.

W says : At most three of us are knights.

X says : Exactly five of us are knights.

Y says : Exactly two of us are knights.

Z says : Exactly one of us is a knight.

Which are knights and which are knaves?

2. In the back of an old cupboard you discover a note signed by a pirate famous for her bizarre sense of humor. In the note she wrote that she had hidden treasure somewhere on the property. She listed five true statements and challenged the reader to use them to figure out the location of the treasure.

- If this house is next to a lake, then the treasure is not in the kitchen.
- If the tree in the front yard is an elm, then the treasure is in the kitchen.
- This house is next to a lake.
- The tree in the front yard is an elm or the treasure is buried under the flagpole.
- If the tree in the back yard is an oak, then the treasure is in the garage

Where is the treasure hidden?

3.  **Paradox Alert** 

That the flying arrow is at rest, which result follows from the assumption that time is composed of moments ... he says that if everything when it occupies an equal space is at rest, and if that which is in locomotion is always in a now, the flying arrow is therefore motionless.

- Aristotle

Prove that you can move from one side of the room to the other

4. • Create your own alphabet
- Write a sentence using your alphabet
- Write a poem using your alphabet
5. • Learn someone's favorite color
- Learn **why** it's their favorite color

6. Determine the phrase and cipher for the following:
tend ets hpteznbh hhsbthb hkzy hzkbh

Given:

$$\begin{aligned}\mathbf{h} &\rightarrow c|r|s \\ \mathbf{e} &\rightarrow a|p \\ \mathbf{t} &\rightarrow n|m|f\end{aligned}$$

7. Integrate

$$\iint 3x^2 + 2z + 5xz \, dzdx$$

using your non-dominant hand.