Truth-Tellers and Liars
Truth-tellers and Liars Logic Puzzles

✦ Most Common Setup:
✧ You're on an island where each inhabitant is a truth-teller (knight) or a liar (knave).
✧ We use knights and knaves since they are one syllabus
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❖ Knights always tell the truth
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✧ You need to determine whether each person is a knight or a knave.
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✧ You're given some information about some people
✧ You need to determine whether each person is a knight or a knave.
✧ In some cases, it may be impossible to determine what everyone is, or the situation may be impossible.
✶ In some problems, you will also have normals/randoms
✧ These are people that can tell both truths and lies
Puzzle #1

- Alice and Bob are residents of the island of knaves and knights
- Bob says: “We are both knaves”
- Who is a knave and who is a knight?
Alice and Bob are residents of the island of knaves and knights
Bob says: “We are both knaves”
Who is a knave and who is a knight?
Ans: Alice is a knight
Bob is a knave
Puzzle #1

- Alice and Bob are residents of the island of knaves and knights
- Bob says: “We are both knaves”
- Who is a knave and who is a knight?
- Ans: Alice is a knight
  - Bob is a knave
  - Bob’s statement cannot be true
  - A knave admitting to being a knave would be the same as a liar telling the truth that "I am a liar"
- This is known as the liar paradox
Puzzle #2

- Charlie and Dean are residents of the island of knaves and knights
- Charlie says: “We are of different kinds”
- Dean says: “We are the same kind”
- Who is a knave and who is a knight?
Puzzle #2

- Charlie and Dean are residents of the island of knaves and knights
- Charlie says: “We are of different kinds”
- Dean says: “We are the same kind”
- Who is a knave and who is a knight?
  Ans: Charlie is a knight
  Dean is a knave
Puzzle #2

✧ Charlie and Dean are residents of the island of knaves and knights.
✧ Charlie says: “We are of different kinds”
✧ Dean says: “We are the same kind”
✧ Who is a knave and who is a knight?
✧ Ans: Charlie is a knight
    Dean is a knave
✧ The two statements are contradictory
✧ One has to be a knight and the other a knave
✧ Since that is exactly what Charlie said, Charlie must be the knight
Puzzle #3

- You meet a single person named Ethan
- You want to know if they are a knave or a knight
- You may ask them a single question
- What question do you ask them?
Puzzle #3

- You meet a single person named Ethan
- You want to know if they are a knave or a knight
- You may ask them a single question
- What question do you ask them?
  - Ans: “Are you a teapot?”
  - If they respond yes: They are a knave
  - If they respond no: They are a knight
Puzzle #4- Most Famous Rendition

- Freya and Gabby are standing at a fork in the road
- Freya is standing in front of the left road
- Gabby is standing in front of the right road
Puzzle #4- Most Famous Rendition

- Freya and Gabby are standing at a fork in the road
- Freya is standing in front of the left road
- Gabby is standing in front of the right road
- One of them is a **knight** and the other a **knave**, but you don't know which.
- You also know that one road leads to Death, and the other leads to Freedom.
- By asking one yes/no question, can you determine the road to Freedom?
Puzzle #4- Most Famous Rendition

- Freya and Gabby are standing at a fork in the road
- Freya is standing in front of the left road
- Gabby is standing in front of the right road
- One of them is a knight and the other a knave, but you don't know which.
- You also know that one road leads to Death, and the other leads to Freedom.
- By asking one yes/no question, can you determine the road to Freedom?
  ✷ Ans: Ask one: “If I asked you if your bridge would lead me to my death, what would you say?”
Puzzle #4- Most Famous Rendition

Freya and Gabby are standing at a fork in the road
Freya is standing in front of the left road
Gabby is standing in front of the right road
One of them is a knight and the other a knave, but you don't know which.
You also know that one road leads to Death, and the other leads to Freedom.
By asking one yes/no question, can you determine the road to Freedom?

Ans: Ask each: “If I asked you if your bridge would lead me to my death, what would you say?”
The knave will be forced to lie about the lie they would tell and would then answer with a double negative
Both knight and knave will give the correct answer.
Freya and Gabby are standing at a fork in the road
Freya is standing in front of the left road
Gabby is standing in front of the right road
One of them is a knight and the other a knave, but you don't know which.
You also know that one road leads to Death, and the other leads to Freedom.
By asking one yes/no question, can you determine the road to Freedom?

Ans: Ask each: “Would *the other person* tell me that *your* door leads to Freedom?”
Puzzle #4- Most Famous Rendition

✧ Freya and Gabby are standing at a fork in the road
✧ Freya is standing in front of the left road
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✧ Ans: Ask each: “Would *the other person* tell me that *your* door leads to Freedom?”
✧ The knave will be forced to lie about the lie they would tell and would then answer with a double negative
✧ Both knight and knave will give the correct answer.
Puzzle #5: Goodman’s 1931 Variant

- Three inhabitants Hugo, Iris, James meet some day
- Hugo says either “I am a knight” or “I am a knave”, we don't which
- Iris says “Hugo said, ‘I am a knave’”
- Iris says “James is a knave”
- James says “Hugo is knight”
- Who is a knave and who is a knight?
Puzzle #5: Goodman’s 1931 Variant

- Three inhabitants Hugo, Iris, James meet some day
- Hugo says either “I am a knight” or “I am a knave”, we don't which
- Iris says “Hugo said, ‘I am a knave’”
- Iris says “James is a knave”
- James says “Hugo is knight”
- Who is a knave and who is a knight?
  - Ans: Hugo is a knight
  - Iris is a knave
  - James is a knight
Three inhabitants Hugo, Iris, James meet some day

Hugo says either “I am a knight” or “I am a knave”, we don't which

Iris says “Hugo said, ‘I am a knave’”

Iris says “James is a knave”

James says “Hugo is knight”

Who is a knave and who is a knight?

Ans: Hugo is a knight
    Iris is a knave
    James is a knight

Since a knave always lies, they cannot admit their own identity, so Hugo could not have admitted to being a knave

This means that Iris must be a knave

Iris’s allegation directed at James must be false, so Hugo and James must be knights
Puzzle #6

- You meet Kenny, Lily, and Max who are all different classes
- Kenny, Lily, and Max are either a knight, a knave, or a normal (Remember: normals can tell lies or truths)
- Kenny, Lily, and Max know who each of the other two people are
Puzzle #6

- You meet Kenny, Lily, and Max who are all different classes
- Kenny, Lily, and Max are either a knight, a knave, or a normal (Remember: normals can tell lies or truths)
- Kenny, Lily, and Max know who each of the other two people are
- Kenny says “I am the knight,”
- Lily says “I am the knave,”
- Max says “Lily is the knight.”
- Who is the knight, the knave, and the normal?
Puzzle #6

- You meet Kenny, Lily, and Max who are all different classes
- Kenny, Lily, and Max are either a knight, a knave, or a normal (Remember: normals can tell lies or truths)
- Kenny, Lily, and Max know who each of the other two people are
- Kenny says “I am the knight,”
- Lily says “I am the knave,”
- Max says “Lily is the knight.”
- Who is the knight, the knave, and the normal?
- Ans: Kenny is a knight
  Lily is the normal
  Max is the knave
Puzzle #7

- Kenny says “I am the knight,”
- Lily says “Kenny is telling the truth,”
- Max says “I am the normal”
- Who is the knight, the knave, and the normal?
Puzzle #7

- Kenny says “I am the knight,”
- Lily says “Kenny is telling the truth,”
- Max says “I am the normal”
- Who is the knight, the knave, and the normal?
- Ans: Kenny is a knight
  
  Lily is the normal
  Max is the knave
Puzzle #8

- Kenny says “I am the knight,”
- Lily says “I am the knight,”
- Max says “I am the knight”
- Who is the knight, the knave, and the normal?
Puzzle #8

- Kenny says “I am the knight,”
- Lily says “I am the knight,”
- Max says “I am the knight”
- Who is the knight, the knave, and the normal?
- Ans: Any of the three can be the knight, knave, and normal
Puzzle #8

- Kenny says “I am not the normal,”
- Lily says “I am not the normal,”
- Max says “I am not the normal”
- Who is the knight, the knave, and the normal?
Kenny says “I am not the normal,“
Lily says “I am not the normal,”
Max says “I am not the normal”
Who is the knight, the knave, and the normal?
Ans: No solutions
The Hardest Logic Puzzle Ever

Three gods Athena, Apollo, and Hermes are called, in no particular order, True, False, and Random.

True always speaks truly, False always speaks falsely, but whether Random speaks truly or falsely is a completely random matter.

Your task is to determine the identities of Athena, Apollo, and Hermes by asking three yes–no questions; each question must be put to exactly one god.

The gods understand English, but will answer all questions in their own language, in which the words for yes and no are da and ja, in some order.

You do not know which word means which.