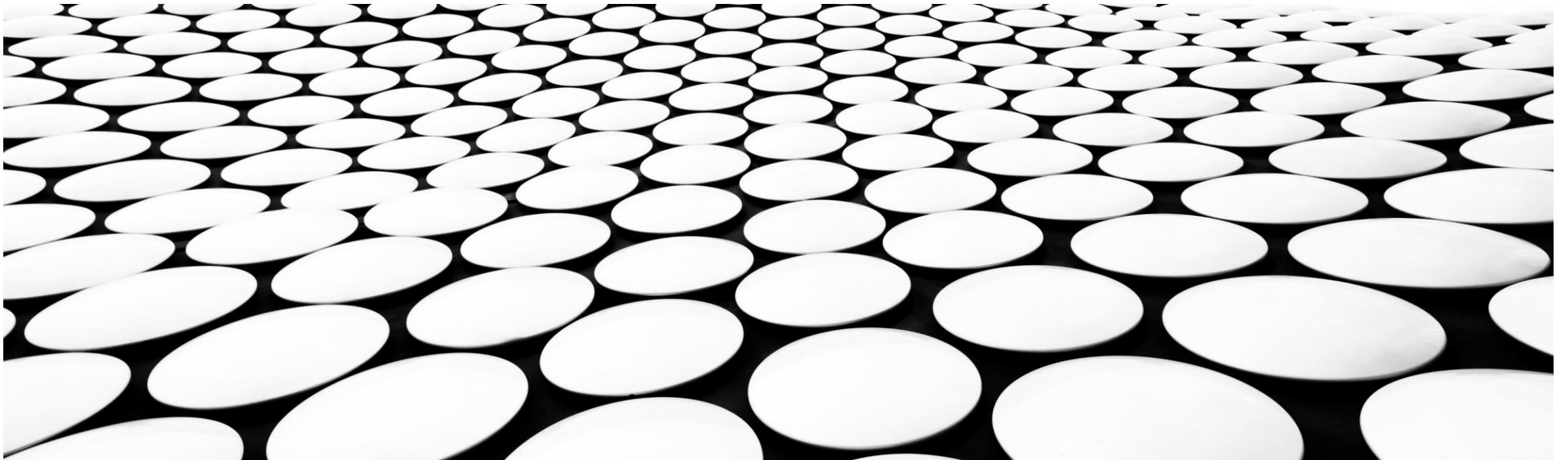# MATH CIRCLE AT FAU

10/19/2024
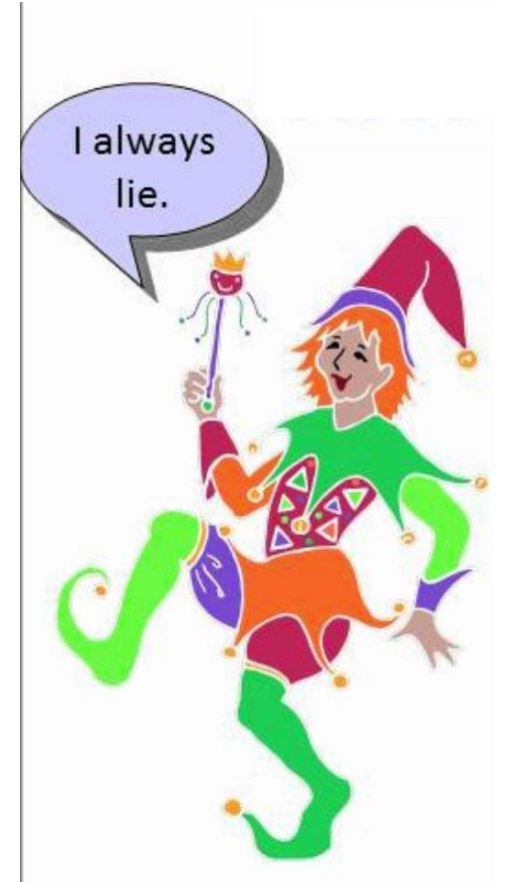
THE ISLAND OF KNIGHTS AND KNAVES

Here we are on the island of knights and knaves; The knights who can only tell the truth, the knaves who always lie.

You visit the island and meet two people, Alice and Bob.

Alice tells you: "At least one of us is a Knave."

What are Alice and Bob?

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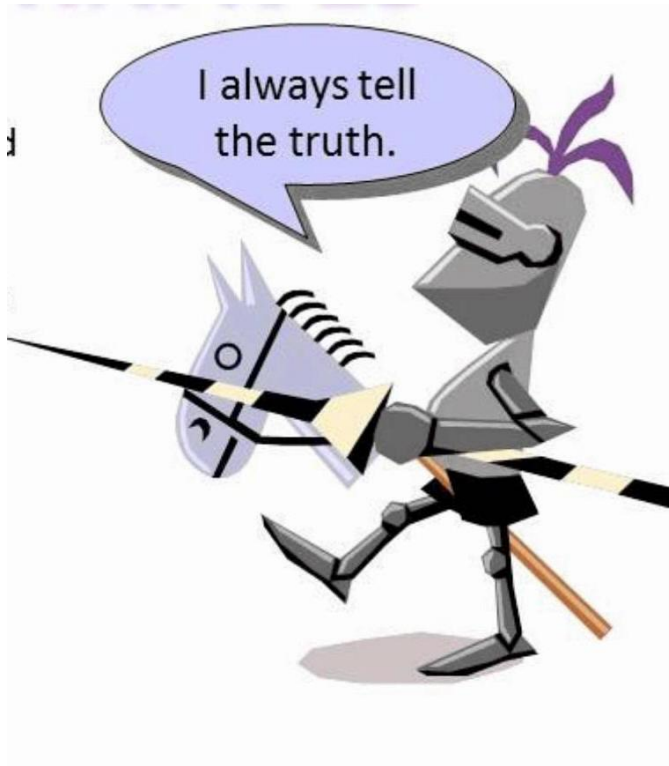
You visit the island and meet two people, Alice and Bob.

Alice tells you: "At least one of us is a Knave."

What are Alice and Bob?

The solution: Alice is a Knight and Bob is a Knave.
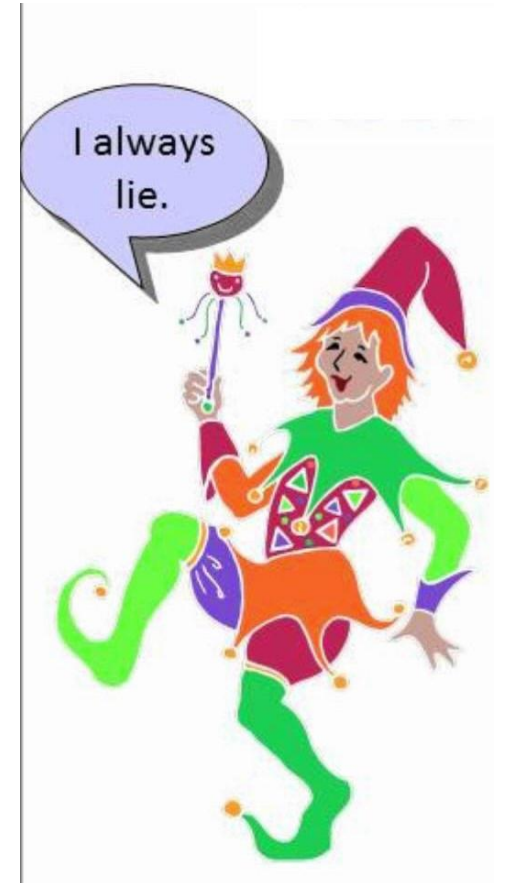
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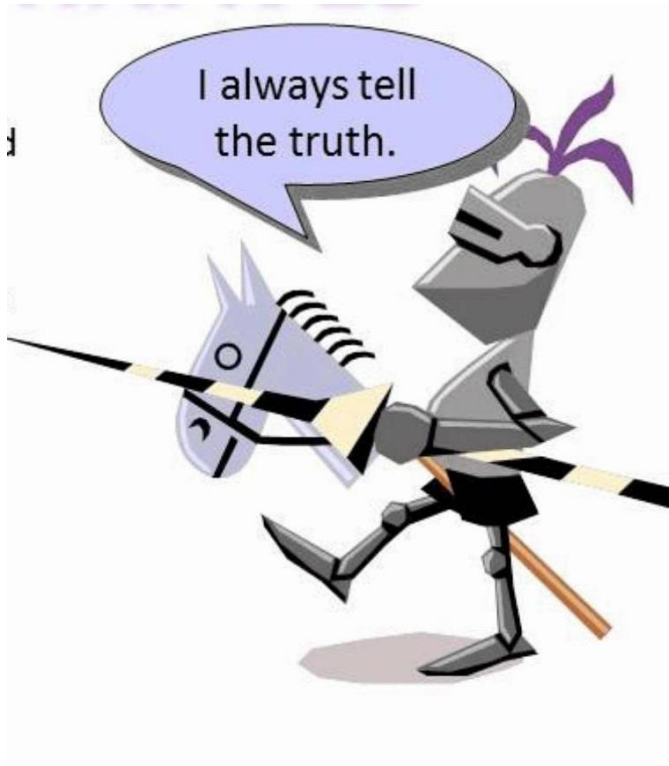You visit the island and meet two people, Alice and Bob.

Alice tells you: "At least one of us is a Knave."

What are Alice and Bob?

The solution: Alice is a Knight and Bob is a Knave.

1. Did you get it?
2. Can you explain the logic for us?

THE ISLAND OF KNIGHTS AND KNAVES

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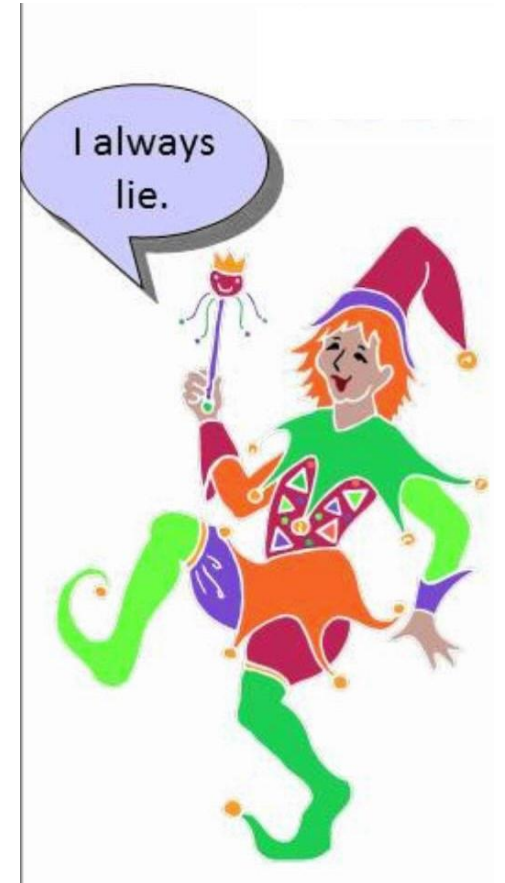
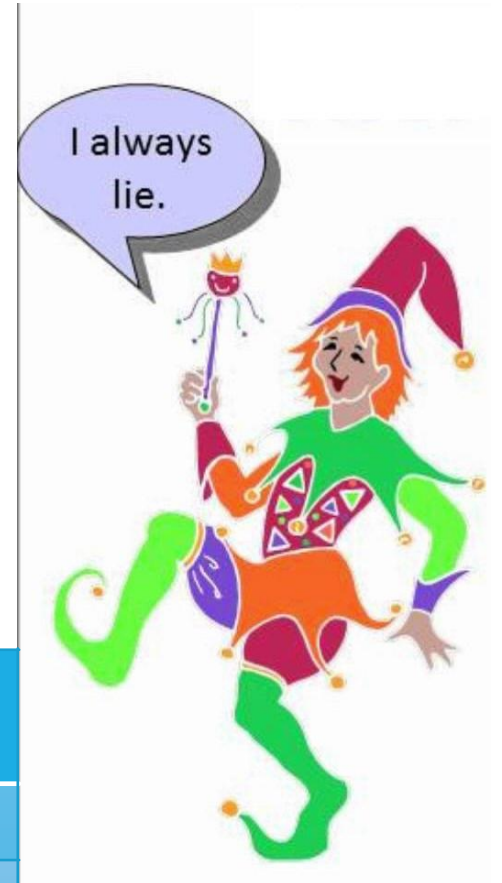You visit the island and meet two people, Alice and Bob.

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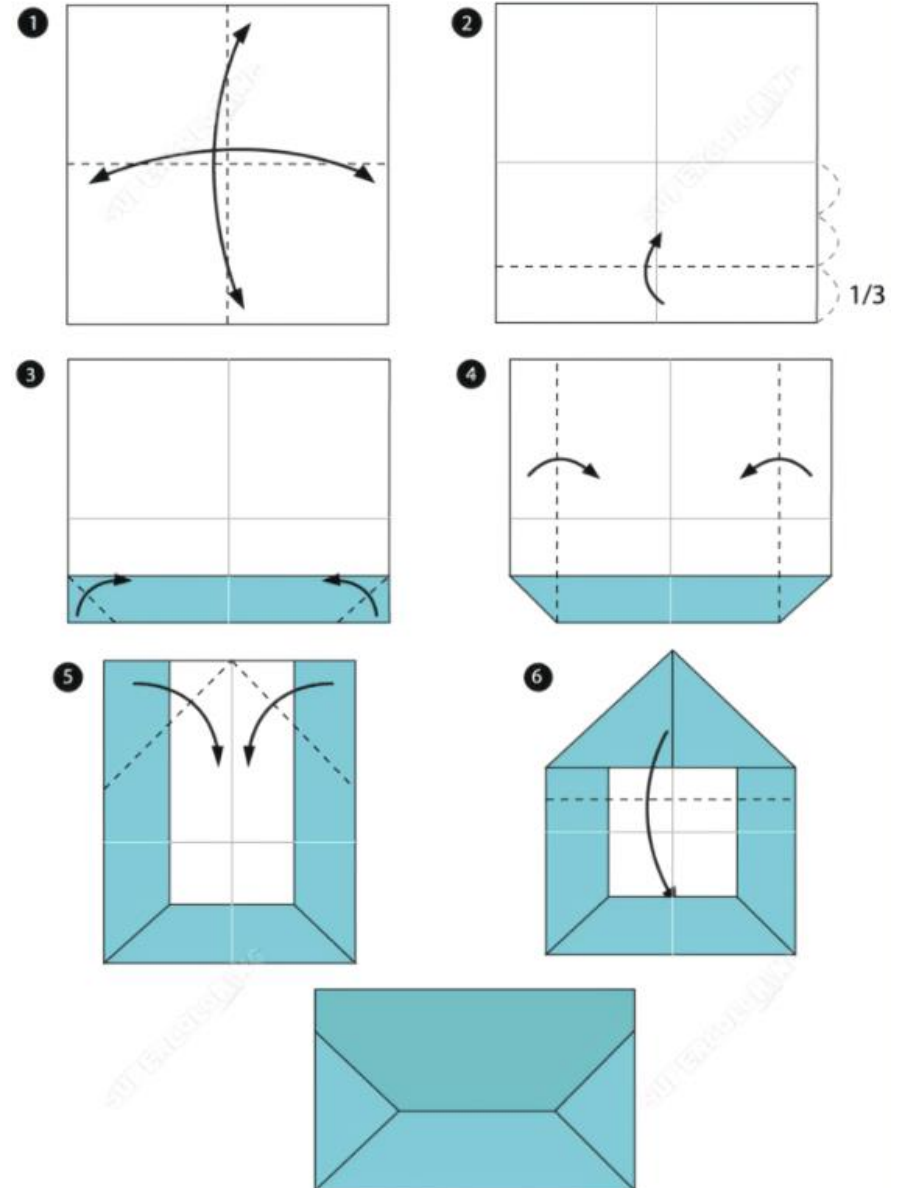The solution: Alice is a Knight and Bob is a Knave.
Truth table

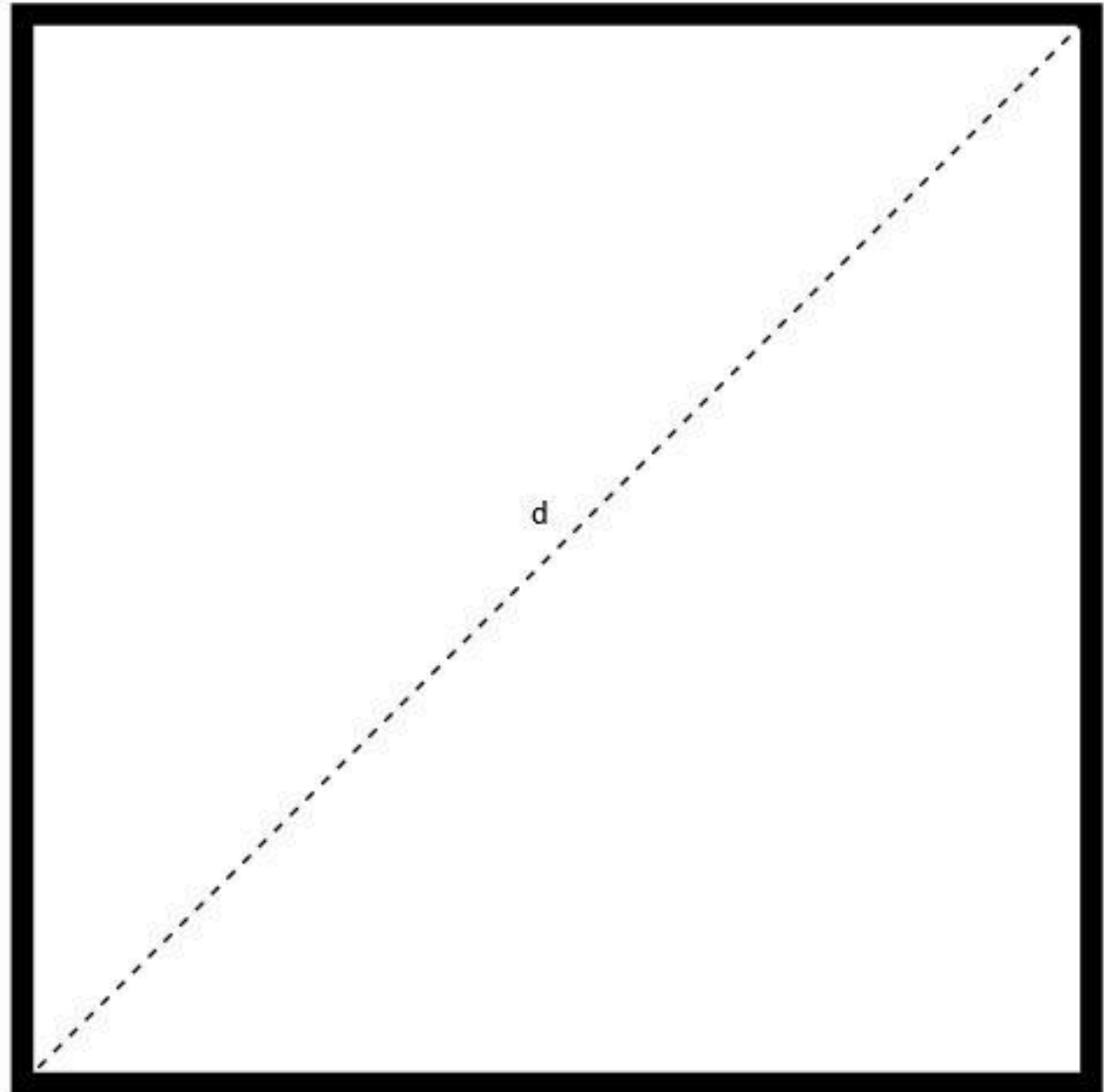| Alice	Bob	Alice's Statement
True	True	False
True	False	True
False	True	True
False	False	True

ACTIVITY: FOLDING AN ENVELOPE

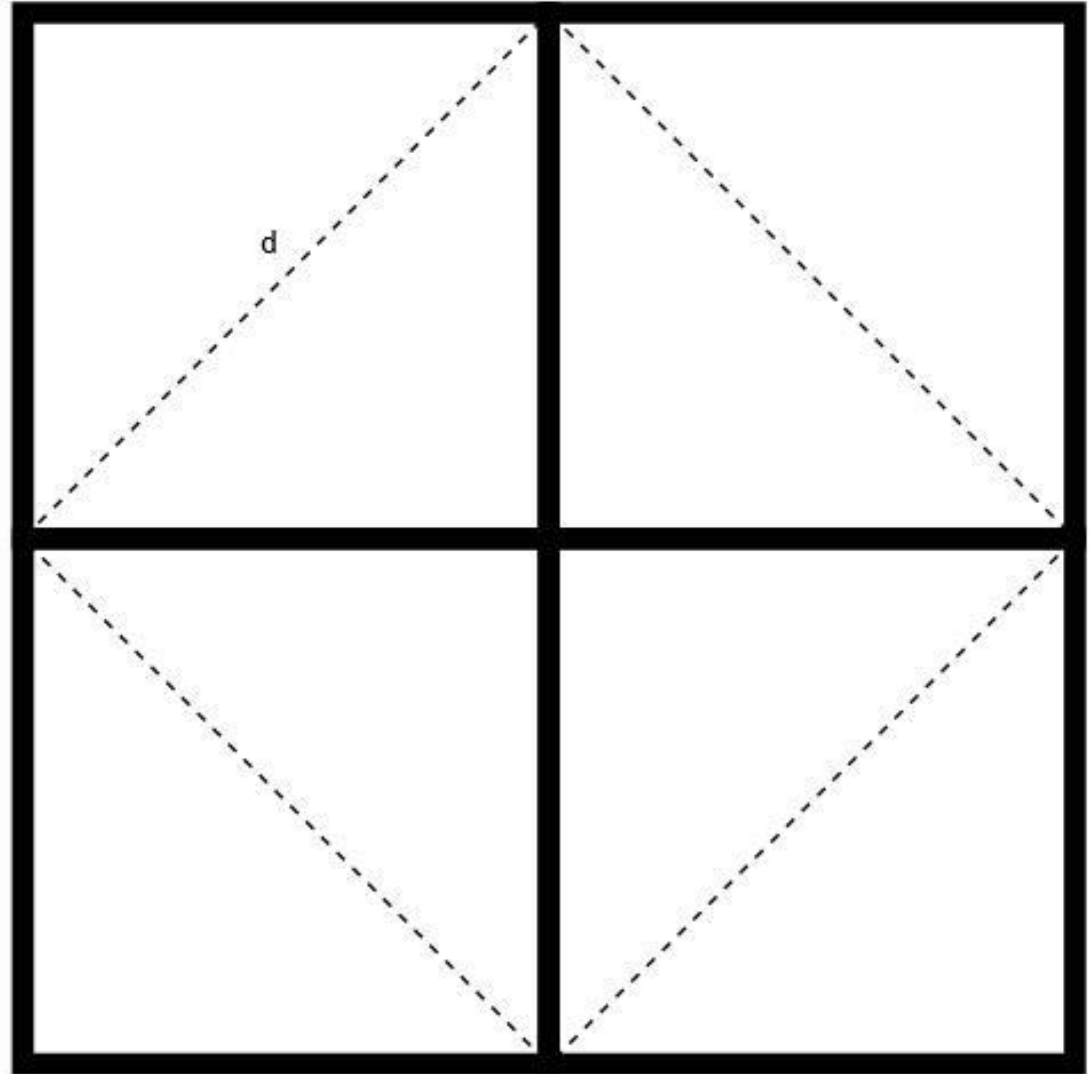Folding an envelope

from an A4 size paper

FIND THE SQUARE AREA

Given the diagonal of a square to be d=4 cm. Please find the area A of the square.

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Given the diagonal of a square to be d=4 cm. Please find the area A of the square.
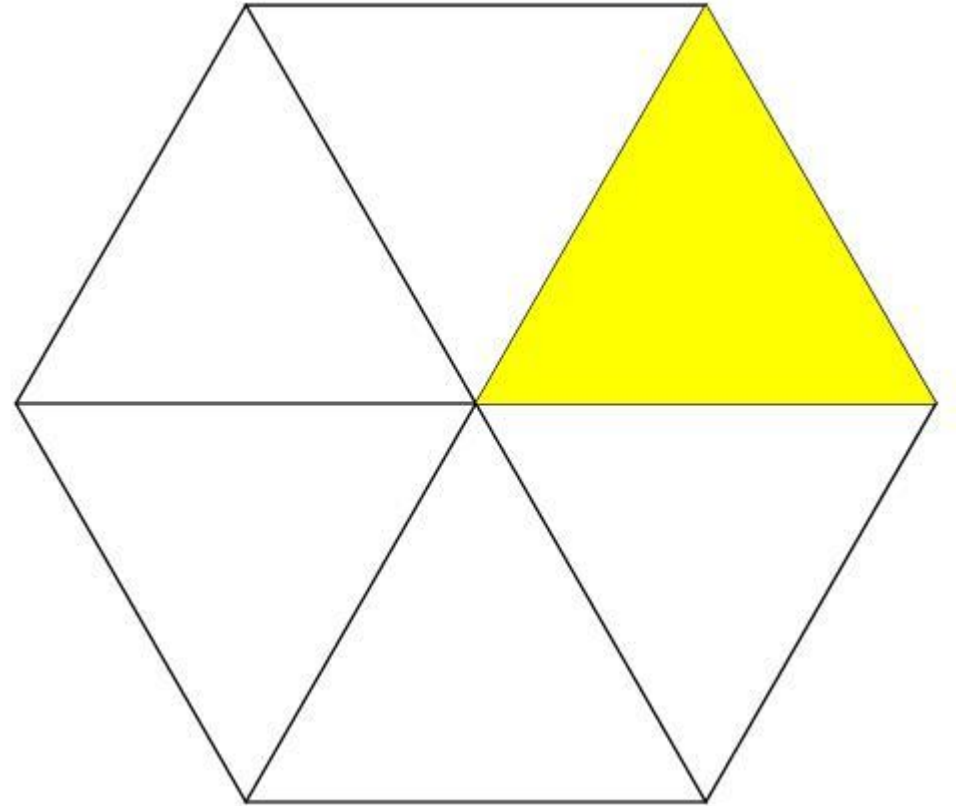
The solution: A=8

QUICK COUNTING

- Given condition: 3 kids will drink 2 gallons of milk in 4 days.

- Ask: How many gallons of milk will 8 kids drink in 9 days?

QUICK COUNTING

- Given condition: 3 kids will drink 2 gallons of milk in 4 days.

- Ask: How many gallons of milk will 8 kids drink in 9 days?

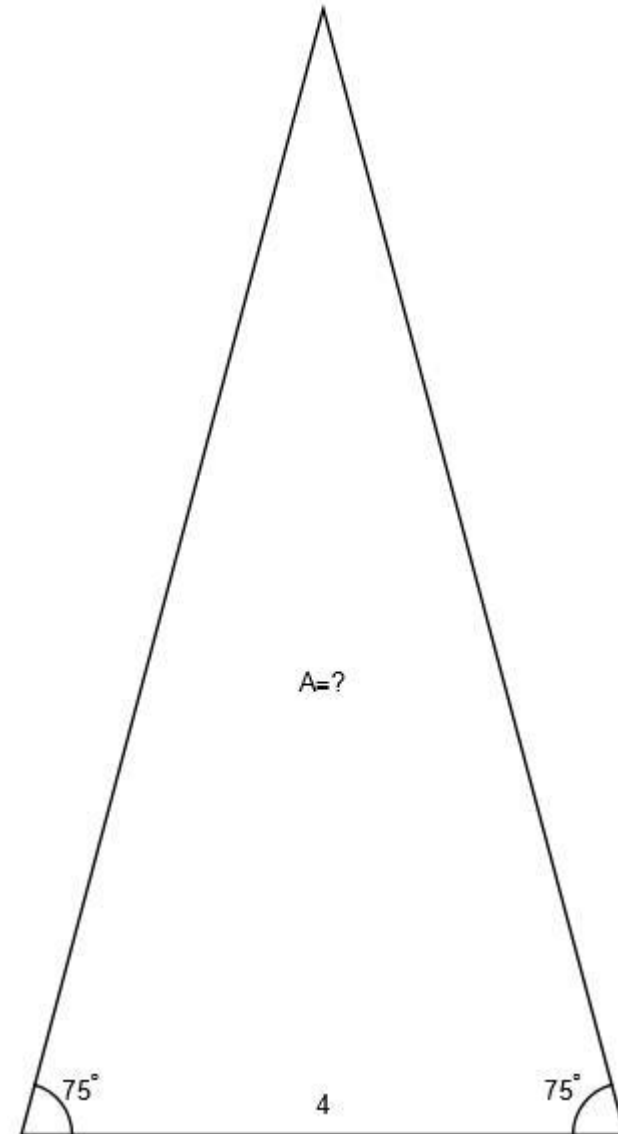- Solution: 12 gallons of milk

FILL THE BLANK

- 5 + ☐ = 19 - ☐

FILL THE BLANK

- 5 + [7] = 19 - [7]

FIND THE TRIANGLE AREA

- An Isosceles triangle with the base side 4

- The two base angles are both 75˚

- Please find the triangle area.

- Restriction: Do not use trigonometric functions

A=?

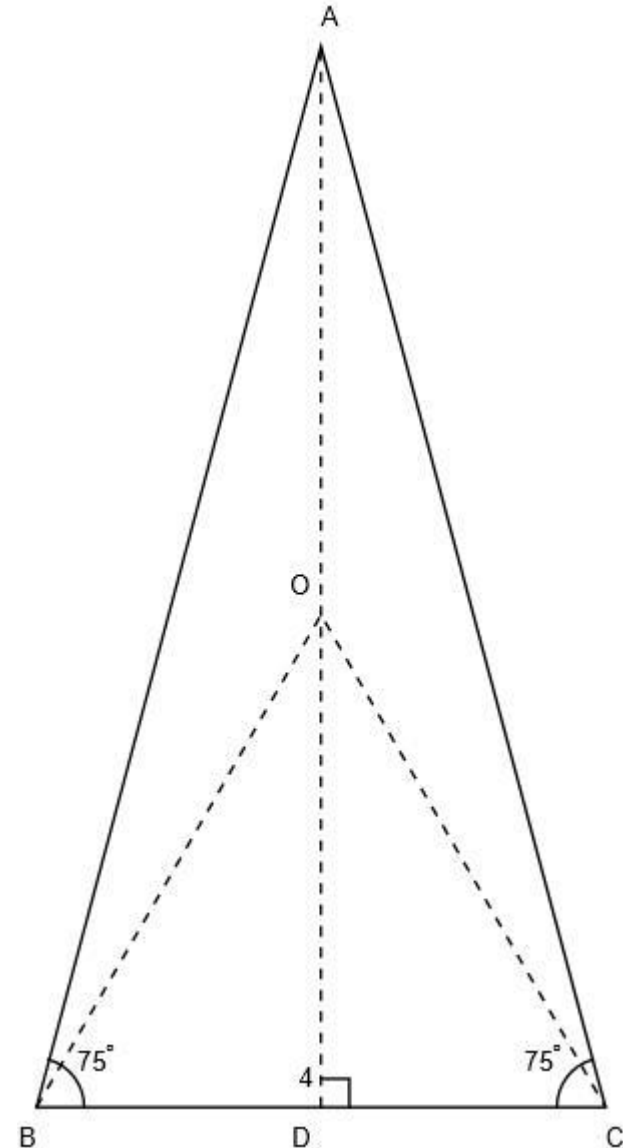75˚   4   75˚

FIND THE TRIANGLE AREA

- An Isosceles triangle with the base side 4

- The two base angles are both 75˚

- Please find the triangle area.

- Restriction: Do not use trigonometric functions

- Answer: $8 + 4\sqrt{3}$

FIND THE SHADED REGION AREA

- A quarter disc with radius R=12 in

- Remove a half disc from it first.

- Then remove another half disc.

- Please find the shaded region area.