

Knights and Knaves Problems To Teach Logic

Here are some Knights and Knaves puzzles that might be good for teaching concepts in logic

1. While walking through a fictional forest, you encounter three trolls guarding a bridge. Each is either a *knight*, who always tells the truth, or a *knave*, who always lies. The trolls will not let you pass until you correctly identify each as either a knight or a knave. Each troll makes a single statement:

Troll 1: Only one of us is a knave.

Troll 2: No, only one of us is a knight.

Troll 3: We are all knaves.

Which troll is which?

2. You stumble upon two trolls playing Stratego[®]. They tell you:

Troll 1: If we are cousins, then we are both knaves.

Troll 2: We are cousins or we are both knaves.

Could both trolls be knights?

3. You come across four trolls playing bridge. They declare:

Troll 1: All trolls here see at least one knave.

Troll 2: I see at least one troll that sees only knaves.

Troll 3: Some trolls are scared of goats.

Troll 4: All trolls are scared of goats.

Are there any trolls that are not scared of goats?

4. You encounter three more trolls:

Troll 1: If I am a knave then there are exactly two knights here.

Troll 2: Troll 1 is lying.

Troll 3: Either we are all knaves or at least one of us is a knight.

Which troll is which?

5. You find yourself face-to-face with 13 trolls. Luckily for you, each troll makes a statement. The trolls make almost identical statements:

By the time I'm finished speaking, you will have heard x of us lie to you

where x is some number. However, no two trolls use the same number for x . Additionally, the first 12 trolls pick numbers for x such that it is impossible to deduce whether the troll who just spoke is a knight or a knave. After hearing the statement of the 13th troll, you can deduce the status of all 13 trolls.

Which trolls are knights and which are knaves?