

3.13.1 Knight-Knave Problems

Use either **truth tables** or a **truth tree** to solve each of the following Knight-Knave puzzles.¹

A. Knight-Knave puzzles with two people, P and Q.

1. You ask Q: “Are either of you knights?” He replies “No.” What are P and Q?

2. P says “I’m a knave, but Q isn’t.” What are P and Q?

3. Q says “We aren’t both knights.” What are P and Q?

4. P says “Q and I are of the same type.” What is Q?

(Simplifying hint: use a biconditional to translate what P said.)

5. You ask P, “Are you a knight or a knave?” She responds, but you don’t hear what she said; so you ask Q, “What did P say?” Q replies, “P said that she’s a knave.” What is Q?

(Note: this one is trickier.)

6. P says “Q is a knight”.

Q says “P and I are of the same type”.

What are P and Q?

7. P says “At least one of us is a knight”.

Q says “P and I are not of the same type”.

What are P and Q?

¹ Problems X and Y are from Smullyan XX: YY.

B. Knight-Knave puzzles with three people, P, Q, and R.

1. Q says "P and I aren't both knights."

R says "Neither P nor Q is a knight".

What are P, Q, and R?

2. P says "R and I aren't both knights".

P then adds "Q and I aren't of the same type".

What are P, Q, and R?

3. P says "If R is a knight, then I'm not one".

P then adds "Both Q and I are knights".

What are P, Q, and R?

4. P says "R's a knight, but I'm not".

R says "All three of us are knaves".

What are P, Q, and R?

5. R says "If P is a knight, then so is Q".

P says "R is a knight but Q isn't".

What are P, Q, and R?

6. Q says "Neither P nor R is a knight".

R says "P and Q aren't of the same type".

What are P, Q, and R?

7. P says "It's not the case that if R is knight then Q is a knight".

R says "P and Q are of the same type".

What are P, Q, and R?

8. R says "Either P's a knight, and Q's a knight if I'm one, or neither P nor I are knights".

What are P, Q, and R?

9. P says “Q and I aren’t of the same type”.

R says “Both P and Q are knights”.

What are Q and R?

10. P says “If I’m a knight, then so is R; otherwise Q is one.”

R says “If I’m a knight, then so is Q; otherwise P is one.”

What are P, Q, and R?