

2.24.1. Truth Tree Validity Problems

A. Translate each of the following arguments into formal language, then use **truth trees** to decide whether the argument is **valid**.

1. Neither Kitty nor Dr. Slim have either a law degree or a medical license.
∴ Neither Kitty nor Dr. Slim have both a law degree and a medical license.

2. The senate will pass the bill without holding a special hearing.
The governor will sign the bill unless the senate holds a special hearing.
∴ The senate will pass the bill, and the governor will sign it.

(What would the truth tree for this argument look like if we broke down the first premise last?)

3. Shao Lin Logic was filmed in either Hong Kong or Beijing.
Shao Lin Logic featured fight scenes, but didn't use stunt men.
∴ Unless Shao Lin Logic used stunt men, it was filmed in Hong Kong.

4. Dick will have either a martini or an Old Fashioned, and so will Dora.
∴ Either Dick and Dora will both have a martini, or they'll both have an Old Fashioned.

5. Either Timbuktu Tech will win the game without going into overtime, or Bleak Prairies University will win the game without advancing to the finals.
Timbuktu Tech will neither go into overtime nor win the game.
∴ Bleak Prairies University won't advance to the finals.

6. Unless both Neko and Jack are going to Logicpalooza, Barbie isn't going.
Neko isn't going to Logicpalooza, but either Jack or Barbie is. ∴ Jack's going to Logicpalooza.

7. We're having truffles, but neither grog nor grappa. ∴ We're either having truffles but not grog, or truffles but not grappa.

8. Lucretia's a goth who likes absinthe. Lucretia's not a goth who likes grappa. ∴ Lucretia's a goth who likes absinthe but not grappa.

(See 2.10 § 3 on translating the negation of a sentence with a relative clause.)

9. Neither Rex nor Jack can fly. \therefore Neither Rex nor Jack is a cat that can fly.

(See 2.10 § 3 on translating the negation of a sentence with a relative clause.)

10. Kangaroos are indigenous to either Europe or Australia. Kangaroos are indigenous to either Australia or South America. Kangaroos aren't indigenous to Europe. \therefore Kangaroos are indigenous to South America.

11. Unless Suki passed the final in Business Logic without studying for it, she didn't get an A in the course. Suki didn't study for both the final in Business Logic and the one in Quantum Cosmetology. Though Suki isn't always responsible, she did study for the final in Quantum Cosmetology. \therefore Suki didn't get an A in Business Logic.

12. Descartes can't doubt that he is thinking unless he's thinking. Either Descartes can doubt that he is thinking, or he's thinking. Descartes isn't thinking unless he exists. \therefore Descartes exists.

(Adapted from Kalish, Montague, and Mar 1980: p. 35, #34)

13. Neither Trixie nor Elvis will serve on the committee unless Dr. Slim wins the vote. Elvis will serve on the committee without Trixie doing so. The new rules will pass without Dr. Slim winning the vote, unless either Deacon or Tangelo challenges them. \therefore Tangelo will challenge the new rules.

B. The following argument is clearly **invalid** (since the actual world serves as a validity counterexample).

INVALID

1. Kangaroos are indigenous to either Europe,
or South America, or Australia

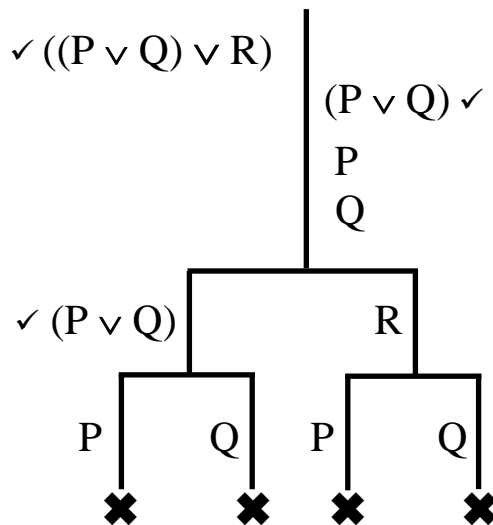
1. $(P \vee Q) \vee R$

\therefore Kangaroos are indigenous to either Europe
or South America.

$\therefore (P \vee Q)$

But in the following tree for the argument every path closes – thereby (wrongly) judging the argument to be **valid**.

💀 A Flawed Tree 💀



Explain what mistake has been made in this truth tree.