

### 2.25.1. Tautology, Contradiction, and Consistency: Truth Tree Problems

**A. Translate** each of the following sentences into formal language; then use a **truth tree** to decide whether that sentence is a **tautology**, a **contradiction**, or **neither**.

1. Dr. Slim is a weasel who isn't a weasel.
2. Jack either scales cliffs or doesn't.
3. Jack is a cat who either scales cliffs or doesn't.
4. Unless we're having both truffles and grog, we're not having truffles.
5. Unless we're not having truffles, we're having either truffles or grog.
6. Suki passed Business Logic without studying for the Business Logic exam, though she did study for the Business Logic exam.
7. Unless Rex's handwriting is illegible, it's either legible or beautiful.
8. Unless Rex's handwriting is illegible, it's both legible and beautiful.
9. Although Rex's handwriting is illegible, it's both legible and beautiful.
10. Unless Dr. Slim is a physician, he's not a physician who performs surgery.<sup>1</sup>
11. Unless Dr. Slim is a physician who performs surgery, he's not a physician.
12. Dick and Dora both ordered a Sloe Gin Fizz, unless neither of them did.

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<sup>1</sup> On the negation of a sentence containing a relative clause, see 2.10 §3.

13. Either Dick ordered a Sloe Gin Fizz or Dora ordered one – unless neither of them did.

**B.** Following a break-in at the Neptuna Seafood Lounge, various people testify about whether Neko or Jack were in the neighborhood of the crime scene. Use **truth trees** to decide for each person **whether they gave consistent testimony** on Neko and Jack’s whereabouts. (Use the **same translation key** for everyone’s testimony; leave out words in parentheses.) *(Tip: since several people may use the same sentence, write out a list of sentences as you go along.)*

1. **Neko**: “Me and Jack weren’t *both* in the neighborhood. (In particular,) I wasn’t in the neighborhood.”

2. **Jack**: “Neither of us were in the neighborhood.”

3. **Jake**: “Neko wasn’t in the neighborhood unless Jack was. (Now, as a matter of fact) Neko was in the neighborhood, but Jack wasn’t.”

4. **Barbie**: “Neko and Jack weren’t *both* in the neighborhood. (But) Neko wasn’t in the neighborhood unless Jack was.”

5. **Trixie**: “Neko and Jack weren’t *both* in the neighborhood. (But) Neko wasn’t in the neighborhood unless Jack was. (In fact,) Jack was in the neighborhood.”

6. **Elvis**: “Neko and Jack weren’t *both* in the neighborhood. (But) Neko wasn’t in the neighborhood unless Jack was. (In fact,) Neko was in the neighborhood.”

7. **Rex**: “Either Neko and Jack were both in the neighborhood or neither of them were.”

8. **Suki**: “Either Neko and Jack were both in the neighborhood or neither of them were. (In fact,) Neko was in the neighborhood.”

9: **Dr. Slim**: “Either Neko and Jack were both in the neighborhood or neither of them were. (Now in fact,) Neko was in the neighborhood, but Jack wasn’t.”

10. **Jezebel**: “Either Neko and Jack were both in the neighborhood or neither of them were. (Moreover,) either Neko was in the neighborhood or she wasn’t. (Now in fact,) Neko was in the neighborhood, but Jack wasn’t.”

**C.** Use **truth trees** and the testimony from **(E)** to **answer** the following questions.

1. Is **Neko’s** testimony **consistent** with **Jack’s**?
2. Is **Trixie’s** testimony **consistent** with **Suki’s**?
3. Is **Trixie’s** testimony **consistent** with **Neko’s**?
4. Is **Barbie’s** testimony **consistent** with **Nekos**?
5. Is **Barbie’s** testimony **consistent** with **Trixie’s**?
6. Is **Barbie’s** testimony **consistent** with **Elvis’s**?
7. Is **Barbie’s** testimony **consistent** with **Jack’s**?
8. Is **Trixie’s** testimony **consistent** with **Jack’s**?
9. Are **Barbie’s**, **Neko’s** and **Jack’s** testimony all **consistent** together?
10. Are **Barbie’s**, **Neko’s**, and **Trixie’s** testimony all **consistent** together?