

3.X. Truth Tree Problems: Logical Equivalence

A. For each pair of sentences, **translate** both into formal language; then build two **truth trees** to show that the two sentences are **logically equivalent**.

1a. Trixie didn't pass the exam unless she did so without studying for it.

1b. If Trixie passed the exam, she did so without studying for it.

2a. If Trixie passed the exam, she didn't do so without studying for it.¹

2b. Trixie passed the exam only if she studied for it.

3a. If Letitia went out, then unless she took her umbrella she got wet.

3b. Assuming Letitia went out without taking her umbrella, she got wet.

4a. We'll have truffles if we have grog; otherwise we'll have aspic.

4b. Either we'll have truffles and grog, or we'll have aspic without (having) grog.

5a. Assuming the tablet's still in the cavern and hasn't been found by profiteers, either Barbie or Jack will find it.

5b. If the tablet's still in the cavern then, provided it hasn't been found by profiteers, Barbie will find it if Jack doesn't.

¹ On the negation of a "without" sentence, see 2.10 §3.