

Name:
Matrikel-Nr.:

Computational Logic, WS 2025/2026,
Exercise sheet 6,
due date: **30 November 2025, 23:59 via Moodle**

Problem 26 (30 Points)

Translate the following sentences into first-order formulas. Then bring them into the prenex normal form.

- a) There is exactly one black cat on our street.
- b) Only dad likes black cats.
- c) If Rex likes everybody who likes Molly and Rex likes Charlie then Molly does not like Charlie.
- d) At most two cats on our street behave friendly with our dog.
- e) If there are at least two black cats on our street there will be a party on Friday the 13th.

Problem 27 (20 Points)

Given the following facts: “*Some cats like all kinds of Whiskas food.*” and “*No cat likes any vegetarian food.*” Using Gilmore’s algorithm show that “*No Whiskas food is vegetarian.*”

Problem 28 (20 Points)

Consider the following five statements:

- a) Molly is a cat.
- b) Cats are carnivora.
- c) All carnivora eat meat.
- d) No meat-eater eats grass.
- e) Molly does not eat grass.

Using Vampire, show that the conjunction of the first four implies the fifth one. You need to provide both the encoding and the answer produced by Vampire.

Problem 29 (30 Points)

On the island of knights and knaves, knights always tell the truth, while knaves always lie. You are approached by three people: Jim, Jon, and Joe.

Jim says: *Joe is a knave or I am a knight.*

Jon says: *Jim could claim that I am a knave.*

Joe says: *Neither Jim nor Jon are knights.*

With the help of Vampire decide what they actually are. You need to provide an encoding of the whole proof problem in Vampire and the answer produced by Vampire.