

Login:		Surname:			Name:	
Task	1	2	3	4	5	Σ
Points						

1. Prove that the following argument is valid using:

- a) semantic indirect proof, b) truth table method, c) resolution method

If the program does not halt then it is not correct.

The program is correct or I made a mistake.

If I did not make a mistake then the program halts.

2. Find *all models* of the following formula of propositional logic. *Decide*, what kind of formula it is (tautology, contradiction, satisfiable).

$$(p \supset \neg q) \wedge (q \vee r)$$

3. Prove the validity of the following argument. Use any method you know.

Everybody who admires the US president and votes for democracy, does not like Russia.

Some do like Russia though they vote for democracy.

Some vote for democracy but do not admire the US president.

4. Negate the following sentences:

- (a) All prime numbers are odd.
- (b) Charles likes only winners.
- (c) No rational number is transcendental.
- (d) Some numbers are smaller than their square.

Formalize the sentences (a) – (d) in the first-order predicate logic. Negate the resulting formulas using de Morgan laws and check whether your negations were correct.

5. Prove that the following formula is logically valid.

$$[\forall x P(x) \vee \forall x Q(x)] \supset \forall x [P(x) \vee Q(x)]$$