

# M325K Practice Test 1

No Calculators, books, notes, etc.

1. Define what it means for an integer to be “prime”.

2. Prove or disprove: If  $n$  is odd, then  $(n^2 - 1)/2$  is even.

3. Negate the statement “Every even integer greater than 2 is the sum of 2 primes,” by first writing it in formal symbols.

4. Use a truth table to tell whether the argument form is valid:

$$\begin{array}{l} p \wedge \sim q \rightarrow r \\ r \vee q \\ q \rightarrow p \\ \therefore r \end{array}$$

5. Use valid argument forms to deduce  $\sim t$  from the premises:

$$\begin{array}{l} \sim p \rightarrow r \wedge \sim s \\ t \rightarrow s \\ u \rightarrow \sim p \\ \sim w \\ u \vee w \end{array}$$

6. Let  $I(x)$  be the statement “ $x$  has an internet connection”, and  $C(x, y)$  be the statement “ $x$  has chatted with  $y$ ”. Use quantifiers to express the statement “Someone in this class has an internet connection but has not chatted with anyone else in the class”.

7. Let  $L(x, y)$  be the statement “ $x$  loves  $y$ ”, with. Translate into a good English sentence:  
 $\exists x(\forall y L(y, x) \wedge \forall z((\forall w L(w, z)) \rightarrow z = x))$

8. State the converse, inverse and contrapositive of “You will be rich only if you work hard.”

9. Give an example of an argument which uses the Modus Tollens form.