

Math105 2005 Test 2

October 06, 2005

Answer all questions and give complete reasons and checks for your answers. The parts of the questions are weighted as shown and can be answered in any order. On your answer sheet please write and sign a declaration that what you are handing in is your own work. Anyone who plagiarises or lets someone else copy their work will receive zero and be reported to their Dean.

1. (a) Write a sentence translating these logic expressions into English: [2]

$$\sim (\forall x; p(x) \vee q(x)) \qquad \exists x; (p(x) \wedge q(x))$$

- (b) If $p(x)$ is " $x < 0$ " and $q(x)$ is " $x^2 \geq 4$ " find two values of x ; one for which each of the two statements above are false. [2]
2. (a) Work out the truth table of this expression, explaining the links between your columns to show how the table was generated. [4]

$$(p \rightarrow q) \underline{\vee} p$$

- (b) Using the rules of logic one step at a time and naming them as they are used, simplify the statement in 2.(a) to one involving just one \vee or \wedge . [12]