

# CSC165, Summer 2005, Assignment 2

## marking scheme

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This was a particularly difficult assignment, so I have made a preliminary adjustment to the raw marks by assigning the following weights to the questions:

QUESTION 1: Weight: 30 (so multiply your mark by 30/28).

QUESTION 2: Weight: 30 (so multiply your mark by 30/25).

QUESTION 3: Weight: 10 (so multiply your mark by 10/44).

QUESTION 4: Weight: 30 (so multiply your mark by 30/7).

The net effect of the weights is to reduce the impact of question 3, which seems to have been the most difficult.

I may make further (upward) adjustments in the future.

In addition to the marking scheme below, please note that any attempt to prove something that is false true, or something that is true false, received no marks.

1. 7 marks for each subquestion, for a total of 28 marks for this question.

1 MARK: For correct statement of what is to be proved (that is whether the statement is true or false).

2 MARKS: For correct construction of a “let... assume” outer layer in a direct proof of an implication.

4 MARKS: For correct steps leading to the consequent.

2 MARKS: For correct construction of “let... then” layer for existentially quantified statement

4 MARKS: For correct steps leading to conclusion.

2. Part (a) is worth 12 marks

1 MARK: For correct statement of what is to be proved.

2 MARKS: For correct construction of “let... assume” layer for universally quantified implication

2 MARKS: Per case.

1 MARK: For concluding that the cases cover all possibilities.

Part (b) is worth 13 marks

1 MARK: For correct statement of what is to be proved.

2 MARKS: For correct construction of “let” statement for direct proof of implication.

1 MARK: For correct statement of conjoined assumption.

4 MARKS: For deriving first “half” of the inequality.

4 MARKS: For deriving second “half” of the inequality.

1 MARK: For deriving consequent.

3. Part (a) is worth 12 marks

1 MARK: For correct statement of what is to be proved

2 MARKS: For “let...” layer for universally quantified implication.

4 MARKS: Per case  $x = y$  and  $x \neq y$

1 MARK: For concluding that the cases cover all possibilities.

part (b) is worth 13 marks

1 MARK: For correctly stating what is to be proved.

3 MARKS: For “let...” layer for universally quantified implication.

2 MARKS: For the case where  $x^2 - y^2 = 0$

6 MARKS: For the case where  $x^2 - y^2 \neq 0$ .

1 MARK: For stating that the cases cover all possibilities.

4. Part (c) is worth 8 marks

1 MARK: For correctly stating what is to be proved.

1 MARK: For “let  $\epsilon...$ ”

1 MARK: For “let  $\delta...$ ”

1 MARK: For “let  $x, y...$ ”

4 MARKS: For steps leading to consequent.

Part (d) is worth 11 marks

1 MARK: For correctly stating what is to be proved.

4 MARKS: For “let...  $\epsilon, \delta, x, y...$ ”

5 MARKS: For steps leading to consequent.

1 MARK: For conclusion.

5. This question is worth 7 marks

1 MARK: For correctly stating what is to be proved

1 MARK: For assuming  $S1 \wedge S2$ .

1 MARK: For assuming  $g(f(x)) = g(f(y))$ .

3 MARKS: for deriving consequent.

1 MARK: For conclusion.