## MAU11602 second quiz, week 4, Wed 16/2/22due on Blackboard, 12 noon, Wed 2/3/22

## Rules and procedures.

1. Attempt 3 questions. Only *your first three answers* will be marked. 2. Each question carries 20 marks, so the maximum quiz mark is 60. 3. If a particular method of solution is stipulated, you get no marks if you don't use it. 4. *Show all work.* No marks will be given for answers which do not show the calculations. 5. Your answers should be scanned and submitted to Blackboard.

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W	X	Y	Z	
0	0	0	0	1
0	0	0	1	1
0	0	1	0	1
0	0	1	1	0
0	1	0	0	1
0	1	0	1	1
0	1	1	0	0
0	1	1	1	1

Question 1. Give a CNF with the following truth-table.

Question 2. Show using resolution that the following CNF is inconsistent

**Question 3.** Let A and B be formulae of SC with the property that every interpretation (truth assignment) which satisfies A also satisfies B. Prove

$$A \vdash_{\mathrm{SC}} B$$

**Question 4.** Prove  $A \wedge (B \wedge C) \implies (A \wedge B) \wedge C$ . You may use the notes up to Lemma 10.17 (vi), but nothing after that. (Hint: you needn't look too far back.) **Question 5.** Prove

$$\vdash_{\mathrm{SC}} (A \lor (B \land C)) \implies ((A \lor B) \land (A \lor C)) \quad (\text{part of (viii)}).$$

(Hint:  $(\neg A) \implies (B \land C) \ldots$ )