

This assignment is due by 4pm on Thursday, 15 October. It should be posted in the glass-fronted collection boxes on the verandah of Carslaw Level 3. These boxes are at the end of the verandah closest to Eastern Avenue. (NOT the glass-fronted collection boxes near the pyramids on Carslaw Level 3, nor the open wooden pigeonholes.) Please do not post your assignment before 15 October, since the boxes are also used for the collection of assignments in other units. Your assignment must be stapled inside a manilla folder, on the front of which you should write the initial of your family name as a LARGE letter. A cover sheet must be signed and attached.

1. Apply the Karnaugh map method to find all simple Boolean expressions for the Boolean function $(w \vee x \vee y \vee z)(w' \vee x' \vee y' \vee z')$.

2. For each real number a consider the proposition $p(a)$ given by

$$\exists x \forall y (\sqrt{|x|} \geq a |y|) \Rightarrow (|x| \geq y^2),$$

where the universal set U is the set of real numbers.

- (i) Apply the negation rule to the quantifiers to write $\sim p(a)$ without using the implication sign \Rightarrow .
- (ii) Find all values of a for which $p(a)$ is true. Justify your answer.