Ideas of mathematical proof. Checks for past paper 2021-22

'Final answers' are provided where it makes sense; these are not complete solutions.

1(a). $(-\infty, 1) \cup [4, \infty)$

1(b). $[(0,0)] = \{(0,0)\}$ and $[(-3,4)] =$ circle of radius 5 centred at $(0,0)$

2(a). (i) tautology;   (ii) tautology

3(b). $A \cap B$

3(c). (i) not inj., not surj.

   (ii) is inj., is surj.

   (iii) is not inj., is not surj.

4(c). E.g., (1,1), (2,1), (1,2), (2,2), (1,3), (2,3), ...