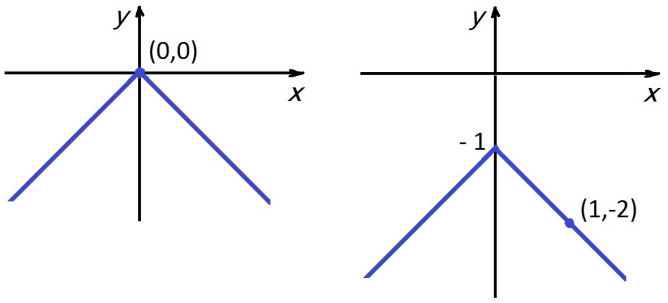
Ideas of mathematical proof. Checks for past paper 2020-21

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

1(a). $(-5,-3) \cup (2,5)$

1(b). $[(0,0)]$ is the graph of $y = -|x|$;
$[(1,-2)]$ is the graph of $y = -|x| - 1$;



2(a). (i) tautology; (ii) neither

3(b). $A \cup \overline{B}$

3(c). (i) is inj., not surj.
(ii) is inj., is surj.
(iii) is not inj., is not surj.

4(b). (ii)