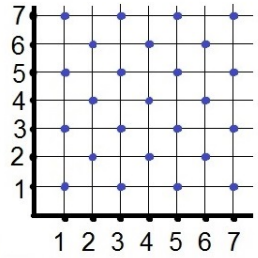
Ideas of mathematical proof. Checks for past paper 2022-23

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

1(b). $(-2, 0] \cup [2, 3)$

1(c). (ii)



1(c). (iii) $[3] = \{1, 3, 5, 7\}$.

2(b). (i)

P	Q	$P \vee Q$	$\neg Q$	$P \wedge \neg Q$	$(P \vee Q) \Rightarrow (P \wedge \neg Q)$
T	T	T	F	F	F
T	F	T	T	T	T
F	T	T	F	F	F
F	F	F	T	F	T

neither tautology, nor contradiction.

(ii)

P	Q	$\neg Q$	$\neg Q \Rightarrow P$	$\neg P$	$\neg P \vee Q$	$(\neg Q \Rightarrow P) \vee (\neg P \vee Q)$
T	T	F	T	F	T	T
T	F	T	T	F	F	T
F	T	F	T	T	T	T
F	F	T	F	T	T	T

is a tautology.

3(b).

(i) Is inj.; is not surj.

(ii) Not inj.; is surj.

(iii) Is inj.; not surj.

4(a). $\bar{A} \cup \bar{B}$.

4(b). (1) False.

(2) True.

(3) True.