Solutions (taken from some students)

Problem 2

2.1) (3, 4, 5, 6, 7)

2.2) (-3, -2, -1, 0, 1, 2, 3)

2.3) (1, 2, 3, 4, 5, 6, 7)

2.4) (3)

Problem 3

3.1) $\exists x \, \varepsilon \, M,\ \textit{such that}\ P(x)$

3.2) $\exists x \, \varepsilon \, M,\ \textit{such that}\ P(x) \wedge Q(x)$

3.3) $\exists x \, \varepsilon \, M,\ \textit{such that}\ P(x) \wedge \neg Q(x)$

3.4) $\forall x \, \varepsilon \, M,\ \textit{such that}\ P(x)$

3.5) $\forall x \, \varepsilon \, M,\ \textit{such that}\ \neg Q(x)$

3.6) $\forall x \, \varepsilon \, A,\ Q(x)$

3.7) $\exists x \, \varepsilon \, B,\ \textit{such that}\ \neg P(x)$

3.8) $\exists x \, \varepsilon \, A, \forall y \, \varepsilon \, B,\ \textit{such that}\ F(x, y)$

3.9) $\forall x \, \varepsilon \, B,\ \exists y \, \varepsilon \, A\ ,\ \textit{such that}\ F(x, y)$

3.10) $\exists x \, \varepsilon \, A,\ \forall y \, \varepsilon \, B, \textit{such that}\ \neg F(x, y)$

Problem 4

4.1)

P	**Q**	**¬Q**	**¬Q∨P**	**P ⇒(¬Q∨P)**
T	T	F	T	T
T	F	T	T	T
F	T	F	F	T
F	F	T	T	T

4.2)

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

4.3)

P	Q	R	$P \wedge R$	$Q \wedge R$	$(P \wedge R) \vee (P \wedge R)$
T	T	T	T	T	T
T	T	F	F	F	F
F	T	T	F	T	T
F	T	F	F	F	F
F	F	F	F	F	F
F	F	T	F	F	F
T	F	T	T	F	T
T	F	F	F	F	F

5.1

The two proposition are not equivalent. The first is true and the second is false.

5.2 A

This proposition means that, if for every boy there is a girl that is secretly liked implies that there exist a girl that is secretly liked by all boys.This proposition is not true, to prove it we take a class with the same numbers of girls and boys. Each boy likes one girl such that a girl has a unique lover then the proposition is False.

5.2 B

This proposition means that, if there exists a girl that is secretly liked by all boys it implies that for every boys there exist a girl that is secretly liked. The second proposition is true.

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The resulting card will be the fourth of clover.