Discrete Mathematics - HW0

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Problem 1

1.1

$A = \{3, 4, 5, 6, 7\}$

1.2

$A = \{-3, -2, -1, 0, 1, 2, 3\}$

1.3

Members of $\{x \in I^+ \mid x^2 < 10\} \cup \{x \in I^+ \mid 2 < x < 8\}$

$\{1, 2, 3, 4, 5, 6, 7\}$

Problem 2

2.1

$\{\exists x \in M \mid P(x)\}$

2.2

$\{\exists x \in M \mid P(x)\} \rightarrow Q(x)$

2.3

$\{\exists x \in M \mid P(x)\} \rightarrow \neg Q(x)$

2.4

$\{\forall x \in M \mid P(x)\}$

2.5

$\{\forall x \in M \mid \neg P(x)\}$

2.6

$\{\forall x \in \mathbf{A}, Q(x)\}$

2.7

$\{\exists x \in M \mid Q(x)\} \rightarrow P(x)$

2.8

$\{\exists x \in \mathbf{A}\}, \{\exists y \in \mathbf{B}\} \rightarrow P(x, y)$

2.9

$\{\forall x \in \mathbf{(}B)\}, \{\exists y \in \mathbf{A}\} \rightarrow P(x, y)$

2.10

$\{\exists x \in \mathbf{A}\}, \{\forall y \in \mathbf{B}\} \rightarrow \neg P(x, y)$

Problem 3

3.1

$P \to (\neg Q \vee P)$

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

3.2

$P \to (P \wedge Q)$

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

3.3

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

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

Problem 4

4.1

True

4.2

a.)

If all boys, exists some girl(s) in class that are secretly liked, then some girl(s)secretly liked all boys in class. True. Who is it to say that a girl cant be liked by multiple boys at the same time. So the proposition is true.

b.)

If some girl(s) that secretly liked by all boys in class, then all boys secretly like some girl(s) in class. This is true, if atleast a girl is liked by all boys then all boys atleast like the same girl.