ASSIGNMENT 1

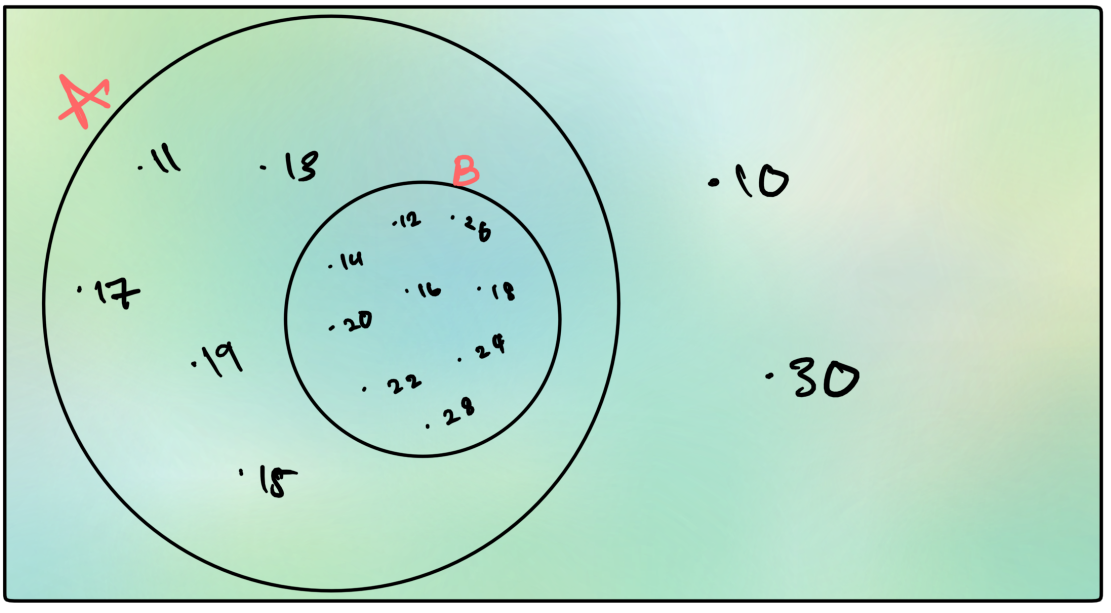
1a) $C = \{11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29\}$

$|C| = 19$

1b) $B = \{12, 14, 16, 18, 20, 22, 24, 26, 28\}$

$|B| = 9$

1c)



1d) $B \oplus C = \{10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30\}$

$|B \oplus C| = 11$

Given $A = \{s, u, b\}$

$B = \{s, e, t\}$

$C = \{n, e, t\}$

2a) $|P(A)| = 2^3$

$= 8$

2b) $A \cup B \cap C = \{s, u, b, e, t\} \cap \{n, e, t\}$

$= \{e, t\}$

2c) $A \cap B \cup C = \{s\} \cup \{n, e, t\}$

$= \{n, e, t, s\}$

2d) $A - B = \{+, e, b, u\}$

2e) $B \times C = \{(s, n), (s, e), (s, t), (e, n), (e, e), (e, t), (t, n), (t, e), (t, t), (n, s), (n, e), (n, t), (e, s), (t, s)\}$

3a) true 3b) true 3c) false

4a)

p	q	(x) $p \to q$	(y) $\neg p \leftrightarrow \neg q$	$x \wedge y$
t	t	t	t	t
t	f	f	f	f
f	t	t	f	f
f	f	t	t	t

4b)

p	q	(x) $p \leftrightarrow q$	(y) $\neg p \to \neg q$	$x \vee y$
t	t	t	t	t
t	f	f	t	t
f	t	f	f	f
f	f	t	t	t

5) let $(\neg q \vee \neg r) = x$ $p \vee y$

let $(q \wedge r) = y$

p	q	r	x	y	A	B
t	t	t	f	t	f	t
t	t	f	t	f	f	t
t	f	t	t	f	f	t
t	f	f	t	f	f	t
f	t	t	f	t	f	t
f	t	f	t	f	t	f
f	f	t	t	f	t	f
f	f	f	t	f	t	f

$\therefore A \not\equiv B$

6) let $(p \vee q) = x$

let $(p \wedge q) = y$

p	q	x	y	A	B
t	t	t	t	t	t
t	f	t	f	t	t
f	t	t	f	f	t
f	f	f	f	f	f

$\therefore A \equiv B$