

Philosophy 500 — June 14: Quantifier logic

(1) Some A's aren't B's	(1) $\exists x(Ax \ \& \ \neg Bx)$
(2) Not all A's are B's	(2) $\neg \forall x(Ax \rightarrow Bx)$
(3) All A's are B's	(3) $\forall x(Ax \rightarrow Bx)$
(3 $\frac{1}{2}$) a is the only B	(3 $\frac{1}{2}$) $\forall x(Bx \leftrightarrow x = a)$
(4) Some A's are B's	(4) $\exists x(Ax \ \& \ Bx)$
(5) No A's are B's	(5) $\neg \exists x(Ax \ \& \ Bx)$
(6) Every A isn't a B	(6) $\forall x(Ax \rightarrow \neg Bx)$

(1) and (2) are logically equivalent to each other, and are the negation of (3).

(5) and (6) are logically equivalent to each other, and are the negation of (4).

Translate each of the following, into several logically equivalent sentences if you see how.

UD: all dogs	Px: x is a pomeranian.	Lxyz: x likes y better than z.
f: Fido	Cx: x is a cockapoo.	Bxy: x has bitten y.
e: Eric	Fx: x can fetch.	Oxy: x is older than y.
k: Kara	Hx: x is hairy.	Sxy: x smells worse than y.

1. Eric has bitten the only pomeranian.

2. Not every cockapoo is older than every dog Eric likes.

3. Every dog has bitten some dog who's bitten a cockapoo.

4. Kara likes any dog which can fetch better than any dog which can't.

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5. Some cockapoo smells worse than every pomeranian which can't fetch.

6. Eric smells worse than every dog other than Kara, unless he's bitten them.

7. Any dog other than Fido which has bitten a cockapoo is hairy.

8. No pomeranian older than Eric likes Kara better than every cockapoo.

9. Some hairy dog likes Eric better than any pomeranian which isn't older than Kara.

10. There's only one hairy cockapoo, and it smells worse than any pomeranian.