Translating English into Predicate Logic – A summary. Oct 15

Every ... / All ... / Each ... / Any x ... / $(\forall x \ \ldots)$

Some ... / At least one ... / There exists a ... / There is a ... / $(\exists x \ \ldots)$

None ... / No x ... / $(\neg(\exists x \ \ldots))$

Not every ... / Not all ... $(\neg(\forall x \ \ldots))$

Every x with property P ....
Every P-ish x .... $(\forall x (P(x) \rightarrow \ldots))$

Some x with property P ....
Some P-ish x .... $(\exists x (P(x) \wedge \ldots))$

one x with property P ....
At least one P-ish x $(\exists x \ P(x))$

one x with property P ....
At most one P-ish x

If there are two P-ish things, they are the same.
$(\forall x (\forall y \ ((P(x) \wedge P(y)) \rightarrow (x = y))))$

There does not exist two different P-ish things.
$(\neg(\exists x (\exists y \ ((P(x) \wedge P(y)) \wedge x \neq y))))$

Exactly one P-ish x = (at least one) $\wedge$ (at most one)

different
At least two P-ish things
$(\exists x (\exists y \ ((P(x) \wedge P(y)) \wedge x \neq y)))$

At most two (different) P-ish things
$\forall x \ \forall y \ \forall z \ ((P(x) \wedge P(y) \wedge P(z)) \rightarrow ((x=y) \vee (y=z) \vee (z=x))$
$\neg(\exists x \ \exists y \ \exists z \ \ P(x) \wedge P(y) \wedge P(z) \wedge (x \neq y) \wedge (y \neq z) \wedge (z \neq x))$