

Henceforth, when asked to *symbolically write* a statement, unless otherwise stated, follow the below guidelines.

- (1) If a statement is a quantified open sentence, then use needed quantifier(s) (e.g.:  $\forall$ ,  $\exists$ ,  $\exists!$ ).
- (2) Use logical connectives symbols (e.g.:  $\sim$ ,  $\wedge$ ,  $\vee$ ,  $\implies$ ,  $\iff$ ) instead of the English words.
- (3) Within an open sentence, you can use English words that are not logical connectives words.

E.g., within your open sentence, one can write: “ $x$  is even”.

Beware: “ $x$  and  $y$  are odd” should be expressed as “ $x$  is odd  $\wedge$   $y$  is odd”.

- (4) Within an open sentence, you can use math symbols that are not logical connectives (e.g.:  $x = y$ ,  $a \equiv b \pmod{n}$ ,  $a|b$ ,  $x + y = 17$ ).
- (5) Symbolically write the statement as it is stated (rather than something logically equivalent).

For example, the statement

if a real number is larger than 3, then its square is larger than 9 (1)

can be symbolically written as

$$(\forall x \in \mathbb{R}) [x > 3 \implies x^2 > 9] . \quad (\text{yes})$$

The statement in (1) is formulated as in (yes) so symbolically write (1) as (yes).

Do NOT symbolically write the statement in (1) as

$$(\forall x \in \mathbb{R}) [x^2 \leq 9 \implies x \leq 3] \quad (\text{no})$$

since (no) is not as (1) is formulated. Do note  $\langle$  will help you later  $\rangle$  that the statement in (yes) is logically equivalent to the statement in (no)  $\langle$  since  $[P \implies Q] \equiv [(\sim Q) \implies (\sim P)]$ , think contrapositive  $\rangle$ ; thus, if you need to prove the statement in (1), then you can prove (yes) or (no)  $\langle$  choice is yours when proving  $\rangle$ .