• **Uniqueness** Quantifier

(2)
$$\exists_1 x (x^2 = x)$$
 Domain of the Real no.

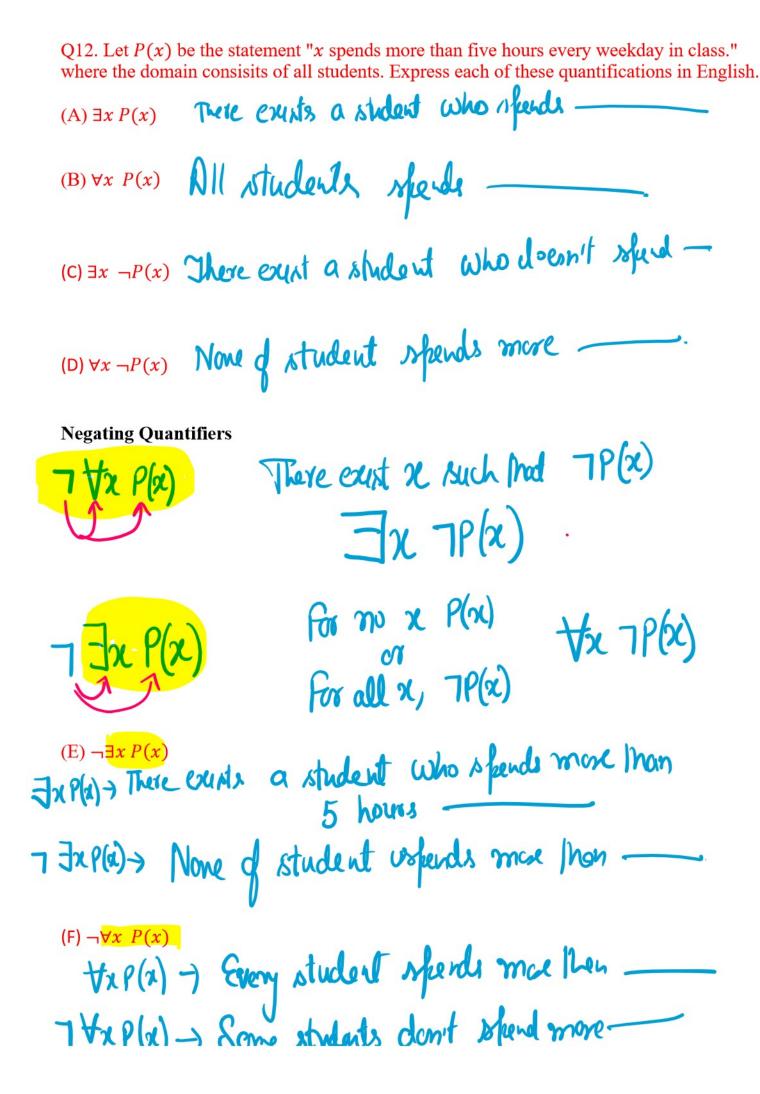
• Quantifiers with Restricted domains

A condition is but on domain.
We write The condition just next to Evantisher and after that
$$P(z)$$
 is written in brackets.

$$\forall x |x| \geq 1 \quad (x^2 \geq x) \quad \forall x \quad (|x| \geq 1 \longrightarrow x^2 \geq x)$$

$$\exists \chi \times 0 \quad (\chi = \chi) \quad 0 \quad 0 \quad \forall = \chi$$

$$\exists \chi \quad (\chi > 0 \quad \wedge \quad \chi = \chi)$$



7 tx P(x) -> Some students don't spend more

Q13. Let P(x) be the statement "x can speak Russian" and let Q(x) be the statement "x knows the computer language C++". Write the following using proposition, logical connectives, quantifiers. The domain consists of all students at your school.

(A) There is a student at your school who can speak Russian and who knows C++.

 $\exists x P(x) \land Q(x)$

(B) There is a student at your school who can speak Russian but does not know C++.

3x P(x) 1 7Q(x)

(C) Every student at your school either can speak Russian or knows C++.

 $\forall x P(x) \vee Q(x)$

(D) No student at your school can speak Russian or knows C++.

Let C(x) be the statement "x has a cat," let D(x) be the statement "x has a dog," and let F(x) be the statement "x has a ferret." Express each of these statements in terms of C(x), D(x), F(x), quantifiers, and logical connectives. Let the domain consist of all students in your class.

- a) A student in your class has a cat, a dog, and a ferret.
- b) All students in your class have a cat, a dog, or a ferret.
- c) Some student in your class has a cat and a ferret, but not a dog.
- d) No student in your class has a cat, a dog, and a ferret.
- e) For each of the three animals, cats, dogs, and ferrets, there is a student in your class who has one of these animals as a pet.