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- Let $P(x)$ be the statement " $x=x^2$ ". If the domain consists of the integers, what are these truth values?
 - $P(0)$
 - $P(1)$
 - $P(2)$
 - $P(-1)$
 - $\exists x P(x)$
 - $\forall x P(x)$
- Find a counterexample, if possible, to these universally quantified statements, where the domain for all variables consists of all integers.
 - $\forall x (x^2 \geq x)$
 - $\forall x (x > 0 \vee x < 0)$
 - $\forall x (x = 1)$

Answer:

- $P(x) \iff X = X^2$
 $P(0) \iff 0 = (0)^2$
 $P(0) \iff 0 = 0$
 TRUE
 - $P(x) \iff X = X^2$
 $P(1) \iff 1 = (1)^2$
 $P(1) \iff 1 = 1$
 TRUE
 - $P(x) \iff X = X^2$
 $P(2) \iff 2 = (2)^2$
 $P(2) \iff 2 \neq 4$
 FALSE
 - $P(x) \iff X = X^2$
 $P(-1) \iff -1 = (-1)^2$
 $P(-1) \iff -1 \neq 1$
 FALSE
 - $P(x) \iff X = X^2$
 $P(\exists x P(x)) \iff X = X^2$
 $P(\exists x P(x)) \iff X = X^2$
 TRUE
 - $P(x) \iff X = X^2$
 $P(\forall x P(x)) \iff X = X^2$
 $P(\forall x P(x)) \iff X \neq X^2$
 FALSE

a.) $\forall x (x^2 \geq x)$	No counter example because x^2 (since x is an integer) will always be greater
b.) $\forall x (x > 0 \vee x < 0)$	Counter example is $x = 0$; $0 > 0$ or $0 < 0$ is false
c.) $\forall x (x = 1)$	False, a Counter Example is $x = 2$ $2 \neq 1$

2.