$f : A \to B$ is 1:1 iff $f(x_1) = f(x_2)$ implies $x_1 = x_2$.

$f : A \to B$ is 1:1 iff $x_1 \neq x_2$ implies $f(x_1) \neq f(x_2)$.

$f : A \to B$ is 1:1 iff for all $x_1 \neq x_2$, $f(x_1) \neq f(x_2)$.

$f : A \to B$ is NOT 1:1 iff there exists $x_1 \neq x_2$ such that $f(x_1) = f(x_2)$.

Determine if the following functions are 1:1. Prove it.

1.) $f : R \to R$, $f(x) = x^2$

2.) $f : [0, \infty) \to R$, $f(x) = x^2$

3.) $f : [0, \infty) \to [0, \infty)$, $f(x) = x^2$

4.) $f : R \to R$, $f(x) = x^3$

5.) $f : R \to R$, $f(x) = 2$

6.) $f : R \to R$, $f(x) = 8x + 2$

7.) $f : R \to R$, $f(x) = x^2 + 3x$

8.) $f : R \to R$, $f(x) = e^x$

9.) $f : R \to R$, $f(x) = x^4 + x^2$

10.) $f : R \to R$, $f(x) = sin(x)$