

Vocabulary

- \* diameter [for Assignment 1]
- \* product; product metric space; product metric; product topological space [for Assignment 1]
- \* contraction mapping [for Assignment 1]
- \* homeomorphism

Examples

(None)

Homework

(None)

Homework

• Show that if  $f: X \rightarrow C$  satisfies (i) iff of cont. fnc (ii) where  $(X, d)$  and  $(C, \rho)$  are viewed as topological spaces with the metric space topology.

(i) Let  $(X, d)$  and  $(C, \rho)$  be metric spaces and  $f: X \rightarrow C$  a function. The function  $f: X \rightarrow C$  is continuous iff satisfies (i) iff  $x \in X$  and  $\epsilon > 0$  then there exist  $\delta > 0$  such that if  $d(x, y) < \delta$  then  $\rho(f(x), f(y)) < \epsilon$ .

(ii) Let  $(X, \tau)$  and  $(C, \rho)$  be topological spaces and  $f: X \rightarrow C$  a function. The function  $f: X \rightarrow C$  is continuous iff satisfies (ii) iff  $V$  is open in  $C$  then  $f^{-1}(V)$  is open in  $X$ .

• Given an example of an  $f$  which is continuous and not uniformly continuous.

• Show that  $f: \mathbb{R} \rightarrow \mathbb{R}$  is uniformly continuous.

$f: \mathbb{R} \rightarrow \mathbb{R}$   
 $x \mapsto \frac{1}{x^2}$