

## 2.3 (cont)

Ex 6 (optve) If  $f$  is increasing throughout its domain, prove that  $f$  is one-to-one.

Pf Assume  $x_1$  and  $x_2$  are both in domain of  $f(x)$  such that  $x_1 \neq x_2$ .

Then either  $x_1 > x_2$  or  $x_1 < x_2$ .

Case 1:  $x_1 < x_2$

By defn of increasing,  $f(x_1) < f(x_2)$ .

$$\Rightarrow f(x_1) \neq f(x_2)$$

$\Rightarrow$  by defn,  $f(x)$  is 1-1.

Case 2:  $x_1 > x_2$

Then by defn of increasing  $f(x_2) < f(x_1)$

$$\Rightarrow f(x_1) \neq f(x_2)$$

$\Rightarrow$  again by defn,  $f(x)$  is 1-1. //