

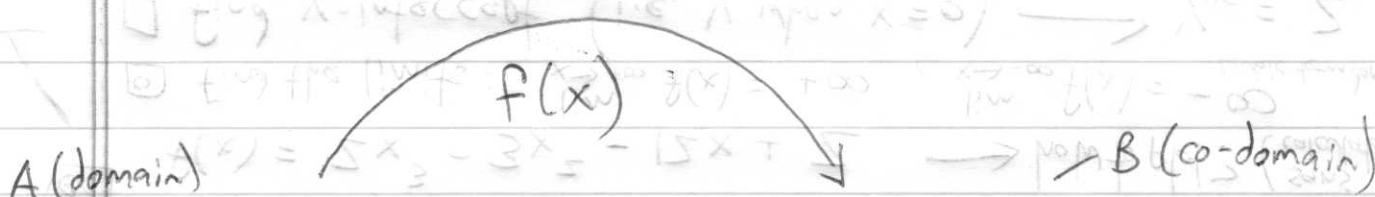
256A Lecture 2

8/26/09

get up + running on WebAssign

What is a function?

domain, range, vertical line test / one-to-one



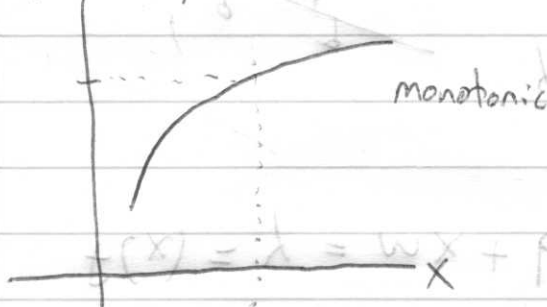
$x \in A$

$y \in B$

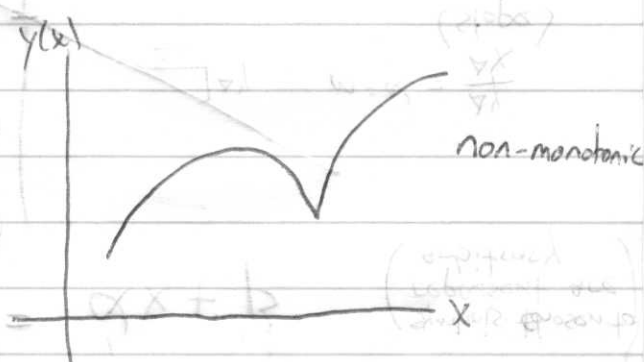
$f(A) \rightarrow$ the range of f $f: A \rightarrow B$

$\rightarrow f$ assigns $x \in A$ to exactly one $y \in B$ $x \rightarrow f(x)$

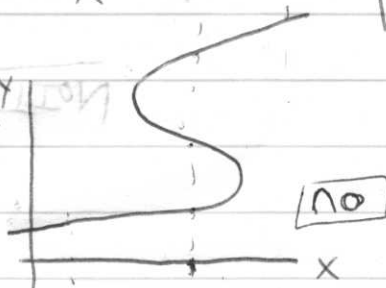
$f(x) = y(x) = y$



function



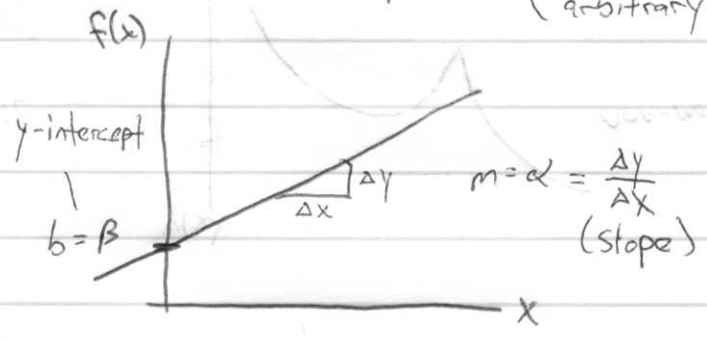
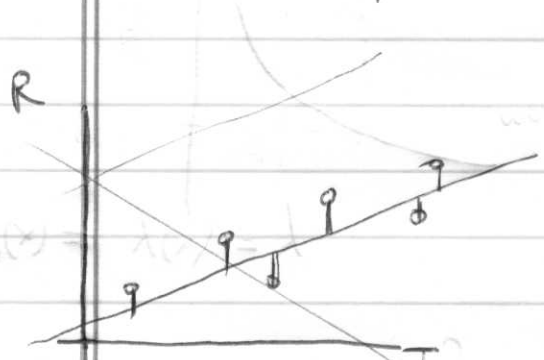
function? **Yes**



A LINEAR FUNCTION

$$f(x) = y = mx + b = \alpha x + \beta$$

(symbols chosen to represent are arbitrary)



Linear regression / least-squares fit (something we come to later in the semester)

B Polynomials

general form: $f(x) = a_0 + a_1x + a_2x^2 + \dots + a_nx^n$

$$\zeta(\theta) = \alpha + \beta\theta + \delta\theta^2 + \dots \text{ (diff. choice of var. names)}$$

ex

$$f(x) = 2x^3 - 3x^2 - 12x + 2 \rightarrow \text{how to plot? (sans calculator)}$$

0 find the limits: $\lim_{x \rightarrow +\infty} f(x) = +\infty$, $\lim_{x \rightarrow -\infty} f(x) = -\infty$ (cubic term dom.)

1 find y-intercept (i.e. y when $x=0$) $\rightarrow y_{int} = 2$

2 find x-intercept (i.e. x when $y=0$)
 $0 = 2x^3 - 3x^2 - 12x + 2$ too hard!!

3 find critical points:

$$\frac{df}{dx} = 6x^2 - 6x - 12 = 0 \rightarrow x = -1, 2$$

$$\frac{d^2f}{dx^2} = 12x - 6 \rightarrow \text{check 2nd derivative to verify concavity}$$

$$\left. \frac{d^2f}{dx^2} \right|_{x=-1} = -12 - 6 = -18$$

