

2.1

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NAME

COURSE INFO: URL

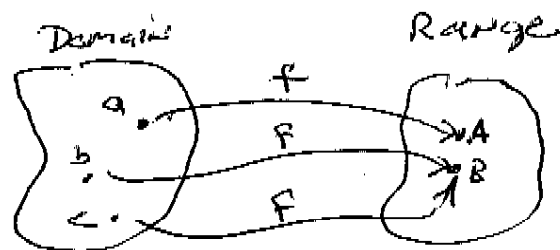
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2.1: FunctionsEx: f_{age} in the world.

- grade is a f_{ct} of time spent studying.
- Salary is a f_{ct} of age.
- cell phone bill is a f_{ct} of monthly usage.

Definition: function

A f_{ct} ~~is~~ is a rule that assigns to each element ~~in~~ in its domain exactly one element in its range.



$$\text{OR, } f: a \mapsto A$$

$$f: b \mapsto B$$

$$f: c \mapsto B$$

notations
designed
to make
the "rule"
transparent

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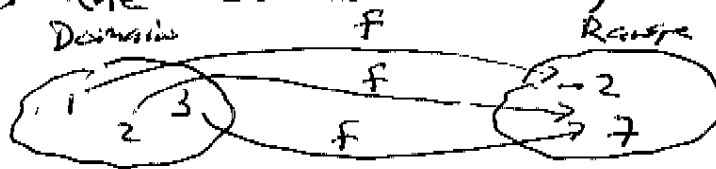
ex2: IF $g: z \mapsto z^2$, find
 a) $g(3)$ b) $g(1)$ c) $g(-2)$

To simplify the notation by writing
 $g(z) = z^2$

ex3: $h(t) = 2t^2 - t$
 a) $h(1)$ b) $h(5)$ c) $h(\frac{1}{2})$

Definition: The Domain is the set of all inputs for which a fct is defined. The Range is the set of all possible outputs of a fct ~~over~~ as the inputs vary thru the domain.

ex4: Find the domain & range of f if



$$D_f = \{1, 2, 3\} \qquad R_f = \{-2, 7\}$$

ex5: The grade scale from this class can be approximated by:

$$GPA(p) = \begin{cases} 0.0 & , 0 \leq p < 50 \\ 0.1(p-50) & , 50 \leq p \leq 90 \end{cases}$$

- a) $GPA(80)$ b) $GPA(100)$ c) $GPA(62.5)$

NOTE: The power or limitation of d) $GPA(45)$
since 45 is not in the domain.

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ex 6: IF $g(z) = z^2 - z$, evaluate

a) $g(x)$

b) $g(-x)$

c) $g(x+h)$

d) $\frac{g(x+h) - g(x)}{h}, h \neq 0$

(Difference Quotient)

ex 7: The cost C to produce y yards of fabric is given by $C(y) = 1500 + 3y - 0.09y^2 + 0.001y^3$

a) find & interpret $C(0)$ & $C(100)$

b) find & interpret $C(0)$ & $C(-10)$

c) construct a table of values for the fcn C for lengths of fabric from $0 \leq y \leq 100$

d) Does this make sense?

This leads to the concept of Domain.

Q: What values of y might seem reasonable?

ex 8: Find the domain of:

a) $g(z) = \frac{1}{z+3}$

sol. $\Rightarrow D_g = \{z \mid z \neq -3\}$

b) $h(t) = \sqrt{t-2}$

sol. $\Rightarrow D_h = \{t \mid t \geq 2\}$

ex 9: Find the domain of:

a) $f(a) = \frac{1}{a^2 + 2a - 3}$

sol. $\Rightarrow D_f = \{a \mid a \neq -3, a \neq 1\}$

b) $g(x) = \sqrt{4-x^2}$

sol. $\Rightarrow D_g = \{x \mid -2 \leq x \leq 2\}$

c) $h(t) = \frac{1}{\sqrt{t+1}}$

sol. $\Rightarrow D_h = \{t \mid t > -1\}$