Jan 22. Graphs and Functions

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LOGISTICS

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The 4-fold way

1. verbal
2. symbolic
3. graphic
4. tabular

How are these related? Do you know how to use each approach?

Jan 22: Overview

1. functions
2. Homework from an Advanced Standpoint
   1. Equations and functions
   2. Equation solving concepts
   3. Equation solving/writing strategies
3. Matters arising

In-Out Machines

CME page 420 and 423
IMP homework 5:

In-Out Machines

CME page 420 and 423
IMP homework 5:

Find at least four rules for the following table:

In	Out
10	30

Functions

In your groups:
Discuss and agree on a definition of the word function. Write it down.

My Definition

A function consists of a *domain* and a *rule*.
The rule assigns exactly one output to each member of the domain.

Examples

Domain: integers
Rule: add 3

Domain: reals
rule: add 3

More discussion and Examples

Dicta

We have discussed functions without using variables.

Variables

A variable is a symbol that we may

1. use in mathematical expression: $x^2 + 2x + 3$
2. replace by a 'number'.

Describing Functions

CME page 426-427

Functions and Equations

Problem 3 page 364

Problem 10 page 366: graph

Equation solving concepts

What is the *logical* relation between the successive lines in the following?

$$\begin{aligned} 3x+7 &= 2x-4 && (1)\\ 3x &= 2x-11 && (2)\\ x &= -11 && (3) \end{aligned}$$

Statements and Justifications

$$\begin{array}{rcll} 3x+7 & = & 2x-4 & \text{Subtract 7 both sides} \\ 3x & = & 2x-11 & \text{Subtract } 2x \text{ both sides} \\ x & = & -11 & \end{array}$$

Solution as deduction

If the first equation is true so is the next one.
The deductions may not reverse so check is necessary to complete the argument.
Do problem 4e page 365 of CME.

Solution as deduction

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Do problem 11 page 366 of CME.

Strategies for Solving/Writing Equations

Substitution vrs elimination
problem 1 and 2 on CME 364
cost in dollars versus cost in cents. CME
Problems 7 and 8: CME 366

Matters Arising

Any other questions?

Complexities

Anscombe's data sets:
anscombe.doc
http://exploringdata.cqu.edu.au/anscomb2.htm

What's linear about this?

badmath.doc
http://www.woodrow.org/teachers/mi/1993/04brya.html