

LOGISTICS

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Feb 2: Overview

1. graphing distance versus time
2. absolute value
3. Homework from an Advanced Standpoint
 - (a) Rethinking rules
 - (b) Formulas, Equations and functions
4. Cartoon and KK reading
5. Matters arising
6. Systems of Inequalities involving absolute value

1 Functions

Concept before Name

George goes for a walk in the park. The y -coordinate denote the distance along the path from his starting place that he has reached at time t .

Tell a story to explain this graph (on handout).

Is this the graph of a function. If so, what is the rule?

Piece-wise definable functions

Ahren's Axiom

Introduce the concept and help students understand it before giving a name.

Distance

Now consider the first two problems on the worksheet about trips to Urbana.

Absolute Value

The distance between two real numbers x and y is called the absolute value of $x - y$ and written:

$$|x - y|.$$

CME -202 Do problems on 202/203

Theorem 3.1

Theorem 1. *The absolute value of a number x is its distance from 0 on the number line.*

Absolute value again

$$x = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}$$

Absolute value in equations and inequalities

What are the points whose distance from 3 is 5. (CME 204)

Graph on the number line the set of points whose distance from 3 is at most 5.

Solve the following inequality and graph the solution set on the number line.

$$|2x - 5| < 10$$

Hard Problem

Solve the following inequality and graph the solution set on the number line. Do both intuitively, formally and with graphing calculator.

$$|.5x + 3.5| < 4$$

Systems of Inequalities

Carefully sketch on the graph below the solution region to the following system of inequalities. Label each of the straight lines on your graph.

$$\begin{array}{rcl} 2x - 3y & < & 3 \\ y & < & |2x - 5| \\ y & < & 5 \end{array}$$

Hint: Graph, then solve exactly to find the points of intersection that you actually need.

2 Homework from an advanced standpoint

RULES

Think about the question:

What is a rule?

as we look at the homework problems.

Handout

hw 1a, 4 exact; in-out vrs out-in

2a, $2^x - 1$ 2b, other rules

3 geometric and algebraic solutions: at least three approaches

CME

411-5, 422-2, 422-3;

RULES

What is a rule?

When are two rules different?

When are two rules *really* different?

Special functions

Consider the CME 422: 2 and 3

$y = 3$ or $f(x) = 3$ is a *constant* function.

$y = x$ or $f(x) = x$ is the *identity* function.

My Definition

A function consists of a *domain* and a *rule*.

The rule assigns exactly one output to each member of the domain.

Formulas vrs equations

What's the difference?

$$3x + 2 = 7x + 5$$

$$A = \pi r^2$$

The second abbreviates

$$A(r) = \pi r^2.$$

Matters Arising

Any other questions?

Systems of Inequalities

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