

Action

- Discuss "precision" handout
- Go through all stages of "box in barn" example.
- Work "triangle in circle" problems and "rectangle in triangle" problems
- Discuss "action vs process" conceptions of functions. (Use $y=3x$, $y=500x$, $y=\cos(x)$, and $y=(x+2)(x-3)(x+5)$ as examples.)
- Action, process, and covariation
- Examine the behavior of $y=x^{100}$.
 - What do you notice about the graph?
 - What happens between 0 and 1?
 - What happens at 1?
 - What happens at 2?
 - What happens at 80?
 - Why does the graph appear to "go vertical" no matter how we rescale it?
 - Is this a good example? Good for what?

Reason

So that teachers see the need to resist the temptation of loose or sloppy analysis of the parts of a mathematical model. Imprecision can lead to confusion

Demonstrate stages of conceptualizing the problem and the functional relationships.

Triangle in circle problem raises issue of choice of representation. In this problem, it is more convenient to track the central angle formed by one vertex (after noting that the triangle must be isosceles). The "rectangle in triangle" problem is all based in similarity.

Help teachers distinguish between levels of understandings that kids might have and the repercussions of those ways of thinking.

Students need to have a process conception of a function's definition before they can imagine variables covarying.

I anticipate they will say, "The graph goes straight up" or that the "graph lies flat between 0 and 1"

Need to rescale the y-axis to see that the graph does not "lie flat".

Rescale around 1