Class 10: Monday September 22

The Miscrosope Equation and Relative Error

Definition: The Microscope Equation relates a change in the input to a change in the output based on our linear approximation at a point:

$$\Delta f \approx f'(a) \cdot \Delta x$$

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Example: CiC p 119, # 14

Suppose $z = g(t)$ and you are given $G(-4) = 7$ and $g'(-4) = 3.5$.

a. Write the Microscope Equation for g at $t = -4$.

b. Draw the graph of what you would see in the microscope

c. Estimate $g(-4.2)$ and $g(-3.75)$.

d. For what value near $t = -4$ would you estimate that $g = 6$?

Errors

Suppose we measure a number V with absolute error ΔV, then the **relative error** is $\dfrac{\Delta V}{V}$.

Example: CiC p. 127, # 6

a. Suppose the side of a square measures x meters with an error of Δx meters. Write an equation that describes how the error in the length propagates to an error in the area.

b. Write an equation that describes how the relative error in length propagates to a relative error in area.