Visualisation.

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Lecture 2

Visualisation

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- Draw the line $2x + 3y = 4$.
- Discuss what is the best strategy to draw this line?
- Why do you say this equation represents a line?

Visualisation

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- What is your strategy?
- While plotting $f(x)$ knowledge of the values of f at $x = 0$, $\pm\infty$ and the values of x at which $f(x)$ is zero are important bits of information.

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- Make a schematic graph of $ln(x)$.
- What is your strategy?
- Do you notice any relation between the graphs of e^x and $\ln(x)$? What is the reason for that?

Inverse function

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- Thus the graph of the inverse function is found by interchanging the x and y axis. (By reflecting the graph about the line $y = x$)

Code

- Let us look at the python code for visualizing some of these basic functions.

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- Let us look at the python code for visualizing some of these basic functions.
- You don't need to learn or work with this code but if you would like to play with it, I suggest you install anaconda and open the notebook in Jupyter.

- Differential of a real function,

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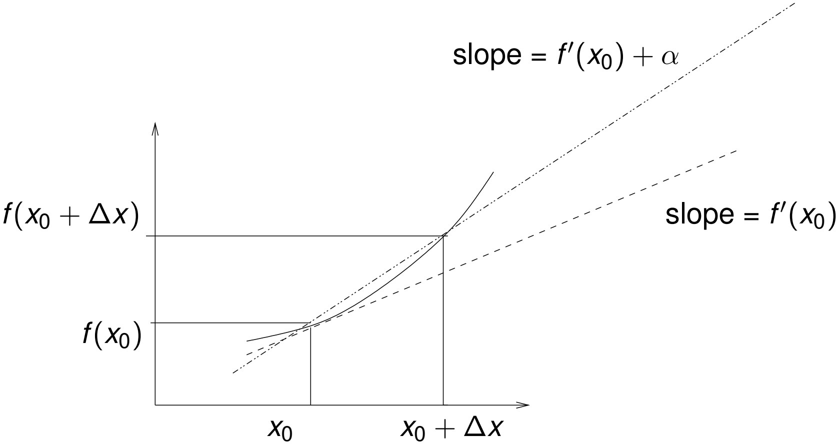
- In reality one is often interested in cases where Δx does not approach zero. In such a situation,

$$\frac{\Delta f}{\Delta x}(x_0) = \frac{f(x_0 + \Delta x) - f(x_0)}{\Delta x} = f'(x_0) + \alpha.$$

and for differentiable functions, $\alpha \to 0$ as $\Delta x \to 0$.


slope = $f'(x_0) + \alpha$
slope = $f'(x_0)$
$f(x_0 + \Delta x)$
$f(x_0)$
x_0
$x_0 + \Delta x$

- Exercises: sketch the graphs of
  (1) $x(1-x), x^3, x^3-x, e^{-x^2}$.
  (2) The inverse function $\sin^{-1}$ and cos^{-1}.