Math 242 Lab 1
Introduction to Calculus in Mathematica

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Lab Assignment 1

- Complete ALL Lab Assignment Questions (page 5 and 6 in the lab handout) (with codes and computation results)
- Submit “lastnameLab01.nb”
  and “lastnameLab01.pdf” (File->Save As→pdf) on Canvas
- Deadline: **Tomorrow 11:59pm**
- Correct computation results (without codes) are available on Canvas→Files→Lab→Lab_01_Introduction→lab1_examples_hints

Basics

- **“Enter” or “Return”**-next line, “**Shift+Enter” or “Shift+Return”**-evaluate the cell (run the codes)
- “Alt+1” or “command+1” to make a “title” cell.
- “Alt+4” or “command+4” to make a “Section” cell.
- **Stop evaluating---click “Alt” + “.” or “command” + “.”**
- Remember to save the file often!

[ ] , { } and ( )

- Built-in functions and constants always start with capital letter, and follow by square brackets.
  - Example: Pi, E, Exp[x], Log[x] (not ln[x] nor Ln[x]), Sin[x], ArcSin[x]
- Curly braces are also for the syntax.
  - Example:
  - Plot[Sin[x],{x,0,1}]
  - Plot[{Sin[x],Cos[x]}, {x,0,1}]
- For other mathematical forms., only use round parentheses
  - Example:
  - Correct: (x^2(x+1))/((x+2)x)
  - Wrong: [x^2(x+1)]/{(x+2)x}

Derivatives

- **Example: Compute the third derivatives of x^5 at x=2**
- **Method1: Using “expressions”**
  - **Clear[f]**
  - **f=x^5**
  - **D[f,{x,3}]/.x->2**

Derivatives

- **Example: Compute the third derivatives of x^5 at x=2**
- **Method2: Using “function”**
  - **Clear[f]**
  - **f[x_]=x^5**
  - **f’’’[2]** (recommend)
  - Or **D[f[x],{x,3}]/.x->2**

Integrals

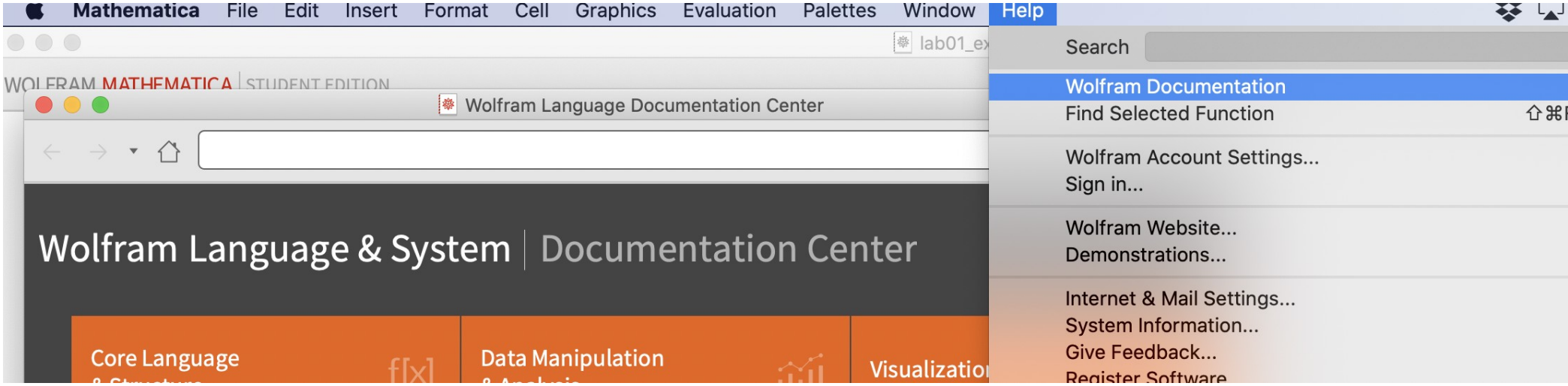
- **Example: Integrate x^5 from 0 to 2**
- **Using “function”**
  - **Clear[f]**
  - **f[x_]=x^5**
  - **Integrate[f[x],{x,0,2}]**

Plot

- **Example: Plot x^5 on the interval (0, 2)**
  - **Clear[f]**
  - **f[x_]=x^5**
  - **Plot[f[x],{x,0,2}]**

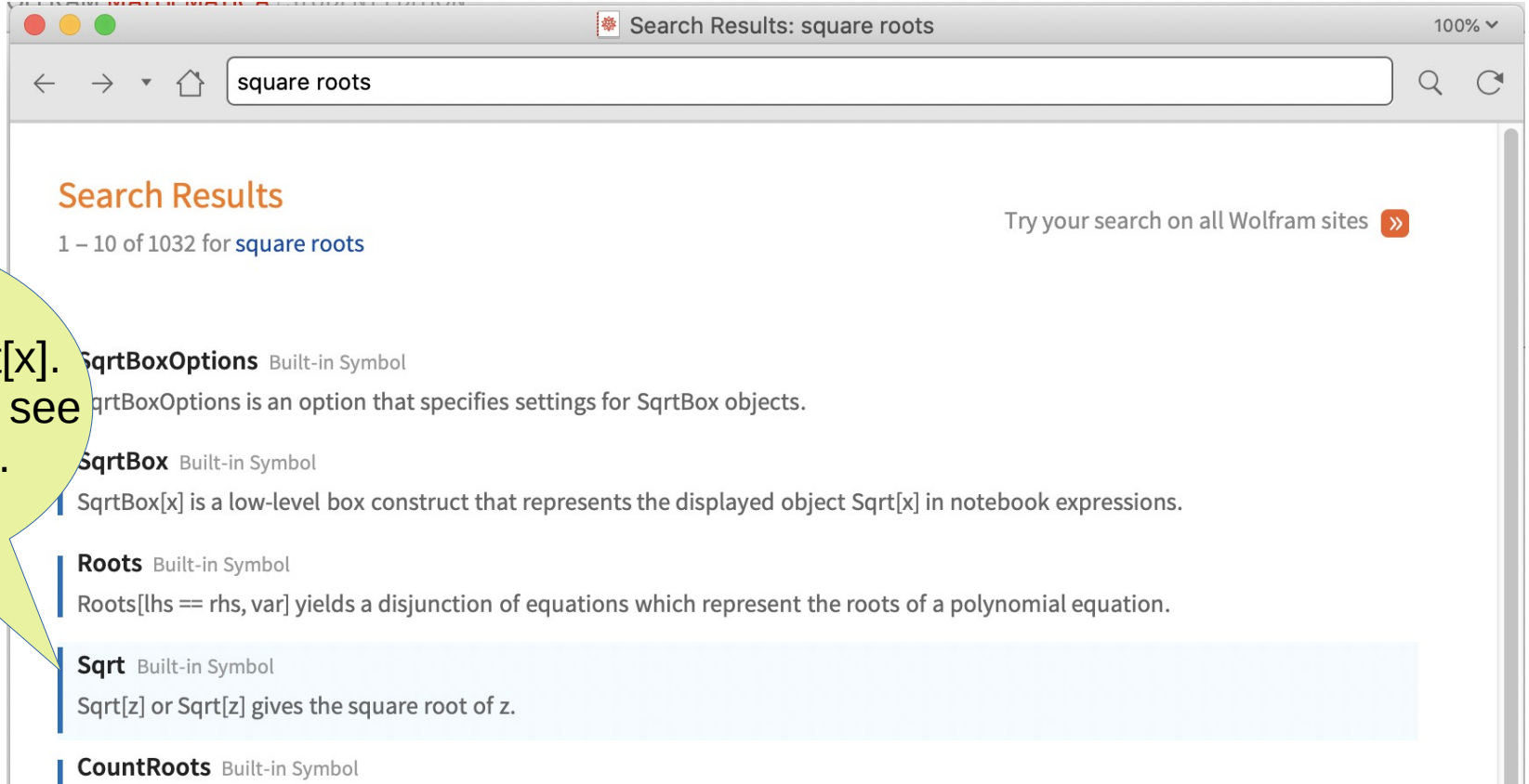
Find a function

- **Example: How to type square root of x?**
- **Go to Help → Wolfram Documentation and search “square root”**



Find a function

- **Example: How to type square root of x?**



So we want Sqrt[x]. Click this “Sqrt” to see more example.

Wrong

- 1/1+x^2
- e^x
- sin(x)
- Sin^3[x]
- arctan(x)
- ClearAll, or Clear

Correct

- 1/(1+x^2)
- Exp[x] or E^x
- Sin[x]
- (Sin[x])^3
- ArcTan[x]
- Clear[f], or Clear[f,x,a]

Wrong

- f=x^5
  f''[x]
  f''[3]
  D[f[x],{x,2}]
- f[x]=x^5
  f''[3]
- f[x_]=x^5
  f''
  D[f,{x,2}]

Correct

- f=x^5
  D[f,{x,2}]
  D[f,{x,2}]/.x->3
- f[x_]=x^5
  f''[x]
  f''[3]
  D[f[x],{x,2}]
  D[f[x],{x,2}]/.x->3