Handling a function in Matlab

1. Defining functions
   - Anonymous function: `funcName = @(inVar) funcExprs`
   - Inline function : `funcName = inline(funcExprs, inVar1, inVar2, ...)`
   - Using `function`: `function outVar = funcName(inVar1, inVar2, ...){ funcExprs }`

Graphs of functions

1. Plotting single variable functions: `plot`
   - Decorating options: color and marking, `linewidth`, `markersize`
   - Multiple drawing: `hold on`, `hold off`, `drawnow`
2. Plotting 2-variable functions: `surf`, `mesh`
   - How to use `meshgrid`
   - Predefined grid for sphere: `sphere`
3. Drawing implicit graphs
   - Implicit plots in 2d and 3d: `fimplicit`, `fimplicit3`
   - Plotting contour lines: `contour`, `contour3`
4. Adding legends
   - Titles, x and y-labels: `title`, `xlabel`, `ylabel`
   - Adding texts: `text`
   - Adding legends: `legend`

Scatter plot and regression **(only if time pemits)**

1. Drawing scatter plot: `scatter`
2. Finding regression line: `regress` (Need *Statistics and Machine Learning Toolbox*)
3. Drawing histogram: `histogram`

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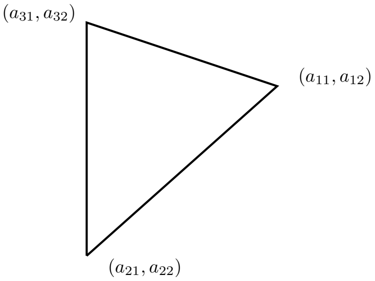
Exercise

1. Define the following function in three different ways: `f(x,y) = x^2+y^2` on `[-1,1]x[-1,1]`
2. Plot the graph of single variable function: `f(x) = x^2 - x + 1` on `[-2,2]`
3. Plot the graph of 2-variable function: `f(x,y) = x^2 - y^2` over `[-1,1]x[-1,1]`
4. Plot the graph of implicit equation: `x^2 + 2y^2 = 1`
5. Plot the graph of implicit equation: `x^3 + y^3 + z^3 = 1`
6. Write a function `triangle` which works as follows:
   - The input of the function is 3 × 2 matrix

$$A = \begin{bmatrix} a_{11} & a_{12} \\ a_{21} & a_{22} \\ a_{31} & a_{32} \end{bmatrix}$$

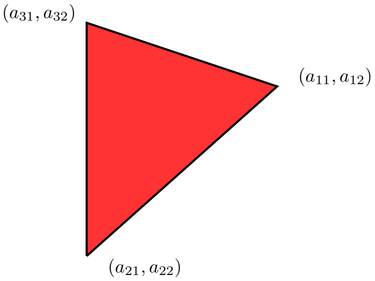
   - As an output, the function draws the triangle in $\mathbf{R}^2$ connecting three points: (a_{11}, a_{12}), (a_{21}, a_{22}), and (a_{31}, a_{32})



   - Test your result with

$$A = \begin{bmatrix} 2 & 5 \\ -1 & 0 \\ 3 & 1 \end{bmatrix}$$

   - Define another function `triangle_fill` which fills the triangle by red color using the function `fill(x,y,'r')`


(a_{31}, a_{32})
(a_{11}, a_{12})
(a_{21}, a_{22})