Practice Problems

1. Draw a flat surface (i.e. same value in Z axis) of the size 8 points in X and 12 points in Y. Mark X, Y and Z axes with a single letter using the 'lebel' functions.
2. Draw a surface of the size 10 points in X axis and 11 points in Y axis but random Z values. Color the surface with 'rainbow' *colormap*.
3. Plot the function $y = 1/(1 + x^2)$ on 2 dimensions where x is a 100 element vector from -2π to 2π. Color the plot with green while using dashes to draw the line.
4. Draw the function $z = 1/(1 + x^2)$ on 2 dimensions X and Z by dividing the -2π to 2π range of x from steps of 0.1. Imagine that the drawn line of z is a 'thread' which if we can copy it multiple times and those copies are kept in parallel to the first one over the direction of a 3rd axis we will generate a surface representing the same curve.
    a. Use *meshgrid* function on the x vector and save the result on xx.
    b. Using *size* function find the size of xx.
    c. How does dimensions of xx relate to dimensions of x?
    d. Using the knowledge of vector multiplication, and **without using loops** for a given vector x write a single argument function to generate its 'meshgrid version' and return it in the variable *rep*. Name your function *replicate*. (Note: The order of multiplication matters and the result should be identical to the meshgrid function. Cross check with a small vector)
    e. Generate a surface of z using *surf* or *mesh* function by passing the *rep*.
5. Consider the function y = sin(x) - cos(x), evaluated over the vector x, which has 10 elements from -10 to 10. Using the *tic* and *toc* functions calculate the time taken to find the positive values of y. Fill the table below (replace the two sample rows as well) increasing the input size ten times until you reach 10 million element x vector.

Vector Size	Positive Count	Time taken by for loop (s)	Time taken by find (s)
10	4	0.000092983	0.000051975
100	49	0.00062799	0.000057220
1000			