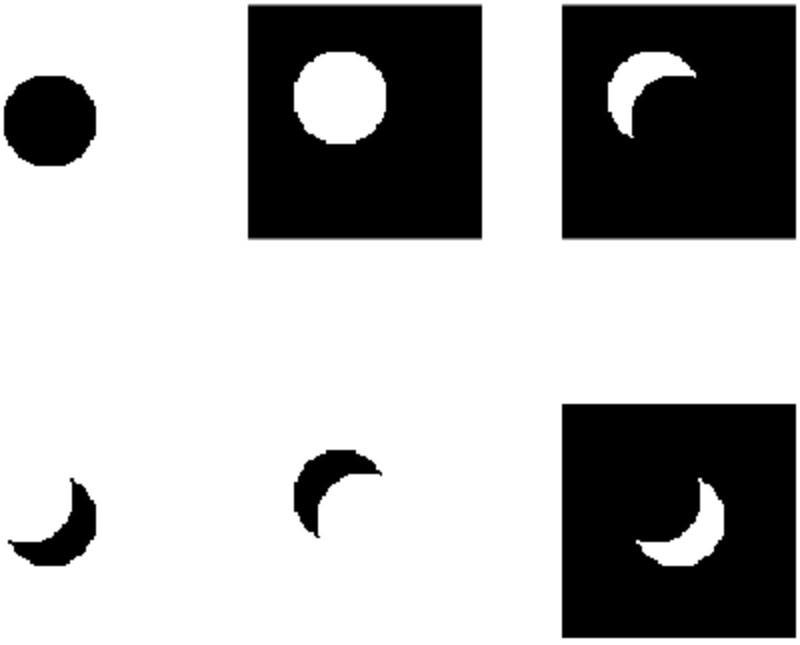
Table of Contents


```
% Pset 3 - Solutions
% Guy Bar Yosef
```

1.)

a)

```
A = ones(100);

% b)
B = zeros(100);

% c)
x = 1:100;
y = x;

[X,Y] = meshgrid(x,y);
A(:) = (sqrt((X-50).^2 + (Y-50).^2) >= 20);

% d)
B(:) = sqrt((X-40).^2 + (Y-40).^2) < 20;

% e)
figure
subplot(2,3,1)
imshow(A)

subplot(2,3,2)
imshow(B)

subplot(2,3,3)
imshow(and(A,B))

subplot(2,3,4)
imshow(or(A,B))

subplot(2,3,5)
imshow(~and(A,B))

subplot(2,3,6)
imshow(~or(A,B))
```

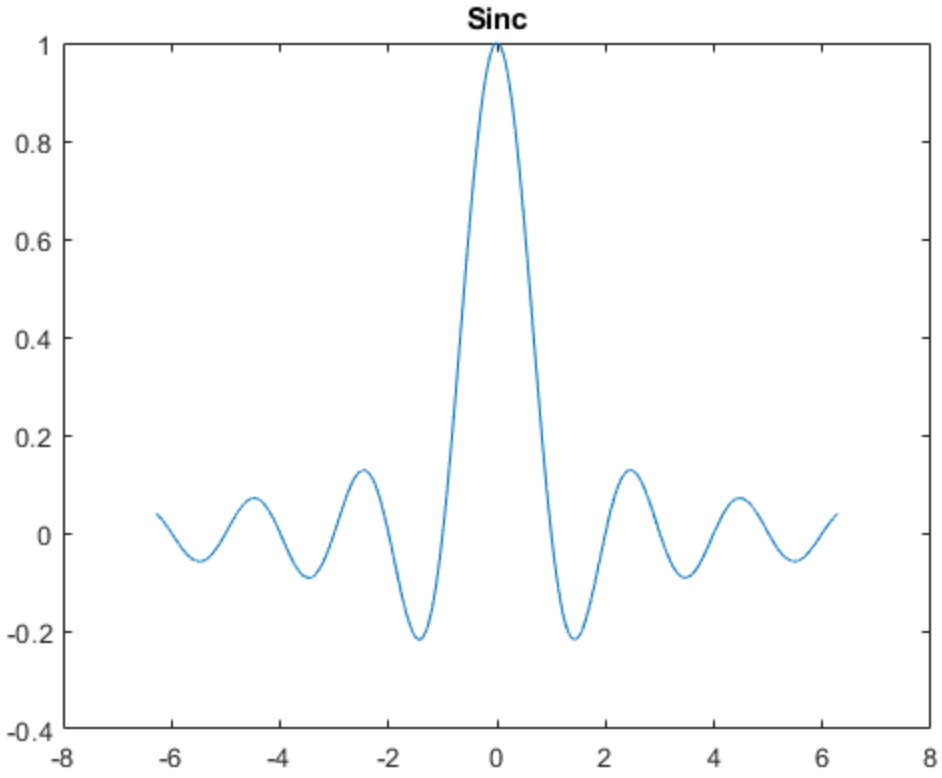


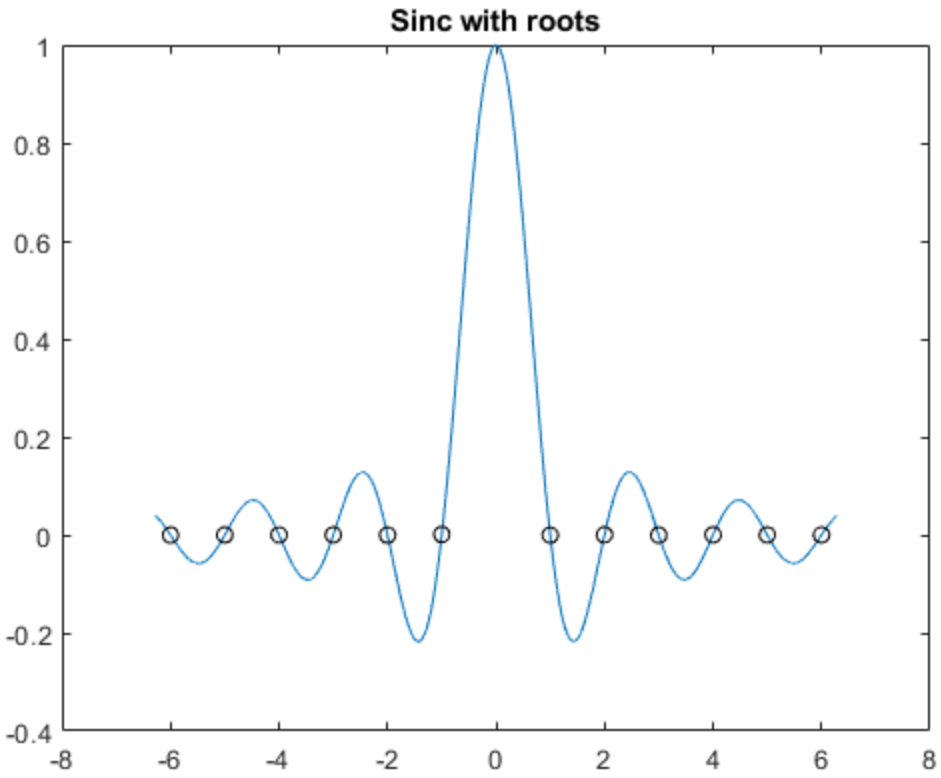
2.)

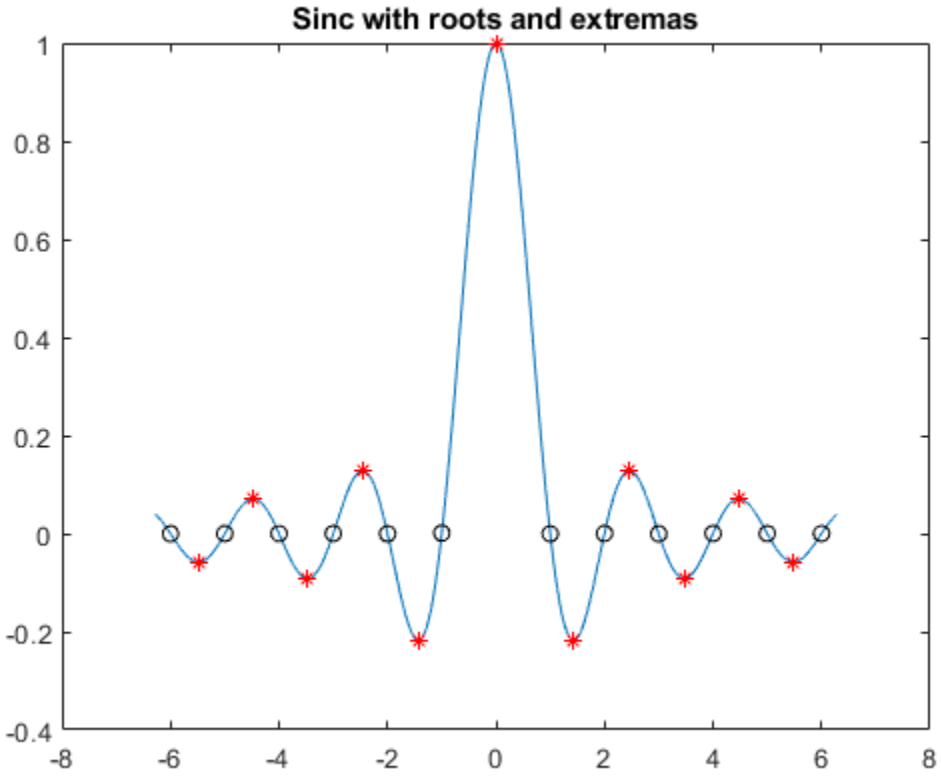
a)

```
x = linspace(-2*pi, 2*pi, 10001);
y = sinc(x);
figure
plot(x,y)
title('Sinc')

% b)
roots = @(y)  find(([0 y].*[y 0]) < 0);

% c)
figure
plot(x,y)
title('Sinc with roots')
root_indexes = roots(y);
hold on
plot(x(root_indexes), y(root_indexes), 'ko')

% d)
dydx = diff(y)./diff(x);
extremas = roots(dydx);
figure
plot(x,y)
```

```
title('Sinc with roots and extremas')
hold on
plot(x(root_indexes), y(root_indexes), 'ko')
plot(x(extremas), y(extremas), 'r*')
```




Sinc with roots
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-8
-6
-4
-2
0
2
4
6
8


Sinc with roots and extremas
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-8
-6
-4
-2
0
2
4
6
8

3)

```
[v,i] = findClosest(sin(linspace(0,5,100))+1, 3/2)

% the function
function [val, ind] = findClosest(x, desiredValue)
    tmp = abs(x(:)-desiredValue);
    tmp2 = min(tmp);
    ind = find(tmp - tmp2 == 0);
    val = x(ind);
end
```

```
v =

    1.4928


i =

    53
```

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