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Exercise Task: 1

Answer to the question no: 1

```
% generate successive integers from 1 to 100
int = 1 : 100
```

```
int = 1×100
     1     2     3     4     5     6     7     8     9    10    11    12    13 ···
```

```
% generate values from 100 to 1
value = flip (int)
```

```
value = 1×100
   100    99    98    97    96    95    94    93    92    91    90    89    88 ···
```

```
% values from 1 to 100 with the interval of 2
valueinterval = 1 : 2 : 100
```

```
valueinterval = 1×50
     1     3     5     7     9    11    13    15    17    19    21    23    25 ···
```

Answer to the question no: 2

```
% Find the intersection point of the signals visually
f=50
```

```
f = 50
```

```
F=8192
```

```
F = 8192
```

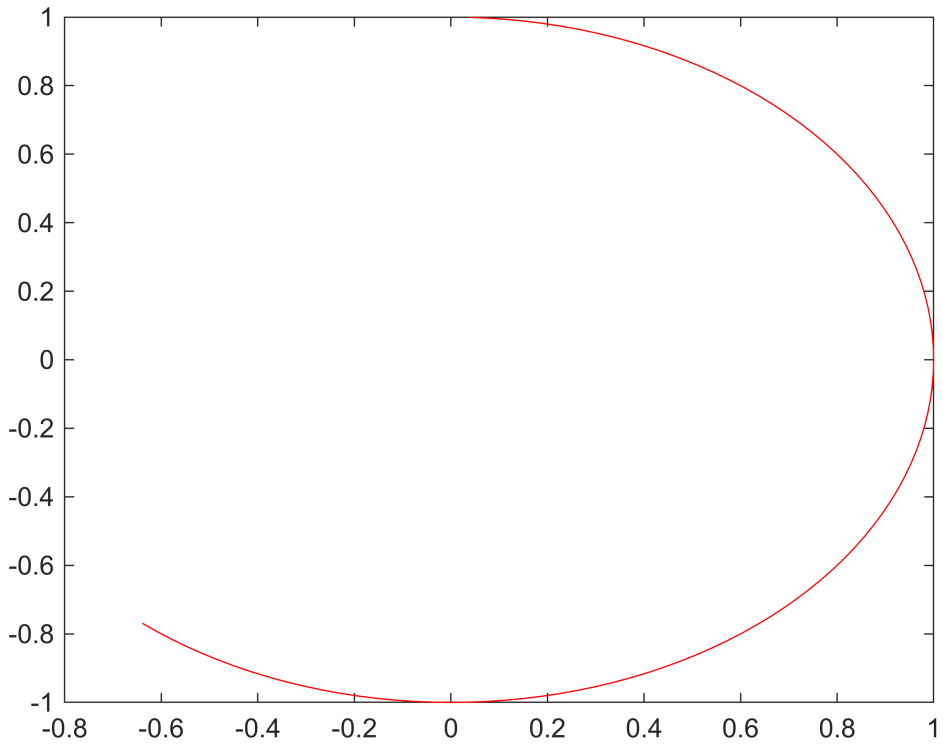
```
y1=sin(2*pi*int*(f/F))
```

```
y1 = 1×100
    0.0383    0.0766    0.1148    0.1528    0.1906    0.2281    0.2652    0.3020 ···
```

```
y2=cos(2*pi*int*(f/F))
```

```
y2 = 1×100
    0.9993    0.9971    0.9934    0.9883    0.9817    0.9736    0.9642    0.9533 ···
```

```
plot(y1,y2,'r')
```



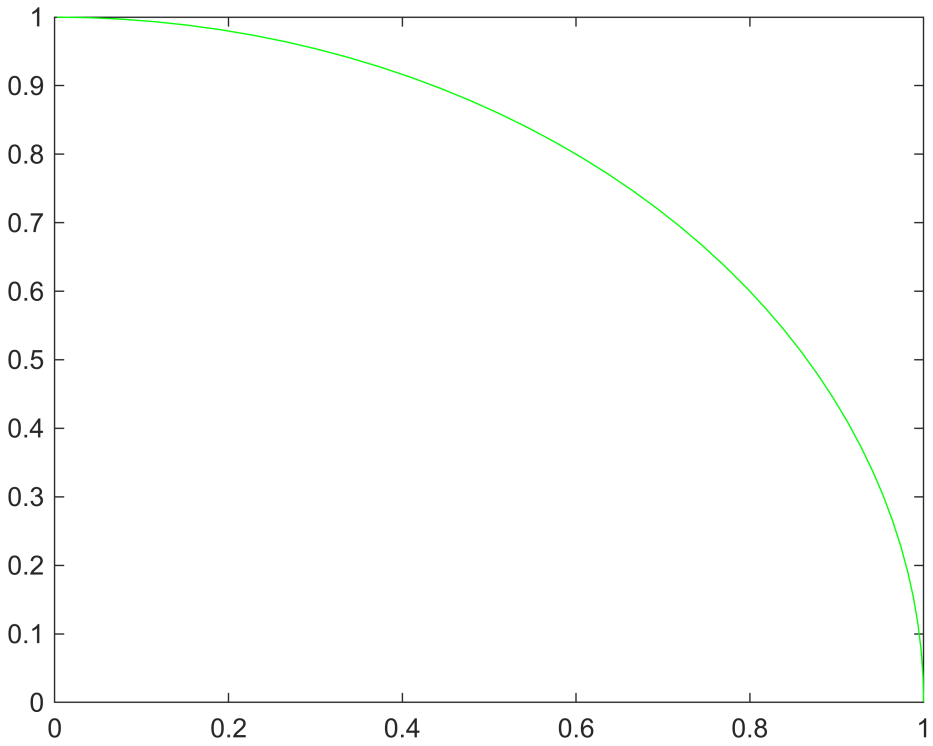

```
a1 = abs(y1)
```

```
a1 = 1×100
    0.0383    0.0766    0.1148    0.1528    0.1906    0.2281    0.2652    0.3020 ···
```

```
a2 = abs(y2)
```

```
a2 = 1×100
    0.9993    0.9971    0.9934    0.9883    0.9817    0.9736    0.9642    0.9533 ···
```

```
plot(a1, a2, 'g')
```



Here we don't find the exact point of intersection because y1 and y2 have all positive values and their direction is same also. So y1 and y2 don't overlap.

Answer to the question no: 3

```
% Generate its values in discrete points [1 100] and compare the difference of signal y1[n]
n = 0:1:100
```

```
n = 1×101
     0     1     2     3     4     5     6     7     8     9    10    11    12 ···
```

```
f = 50
```

```
f = 50
```

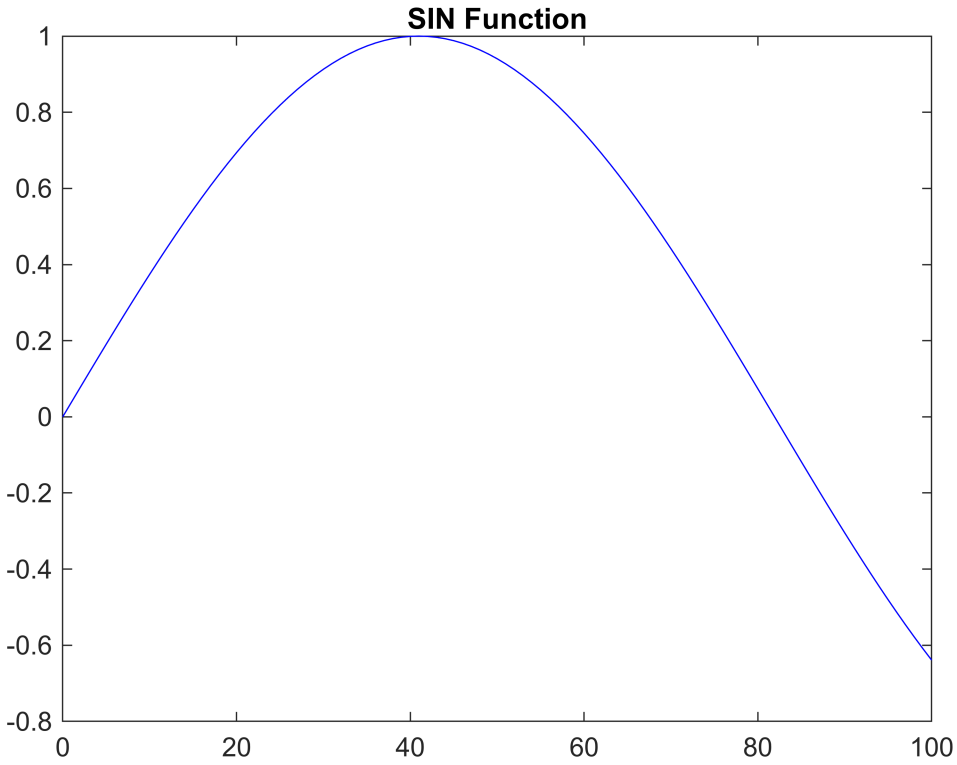
```
F = 8192
```

```
F = 8192
```

```
y1 = sin(2*pi*n*(f/F))
```

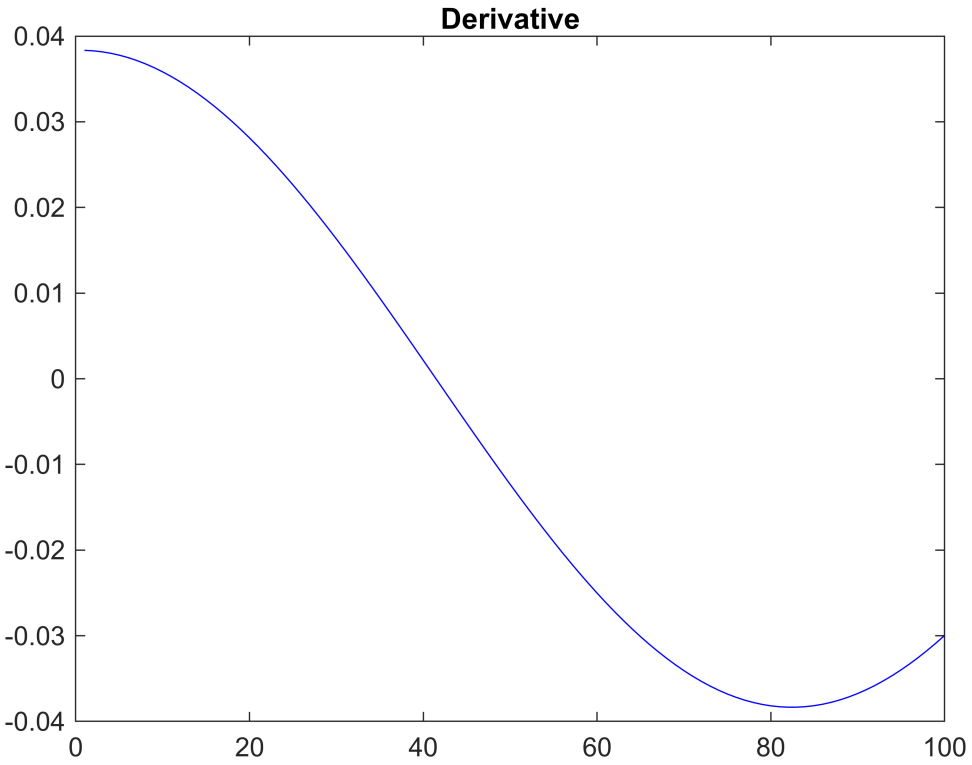
```
y1 = 1×101
         0    0.0383    0.0766    0.1148    0.1528    0.1906    0.2281    0.2652 ···
```

```
plot(n, y1,'b')
title('SIN Function')
```




```
%derivative
y1_diff = diff(y1)./diff(n);

plot(n(2:end), y1_diff, 'b')
title('Derivative')
```



Answer to the question no: 4

```
% Import using Home > Import Data > Select Matrix.txt and save as MatrixNumeric
% value of the 5th row
fifthRow = MatrixNumeric(5,:)
```

```
fifthRow = 1×1000
    0.2281    0.4441    0.6368    0.7958    0.9130    0.9820    0.9992    0.9638 ···
```

```
% listen 5th row
soundsc(fifthRow)

% Means of Rows
MeanRow = mean(MatrixNumeric,2)
```

```
MeanRow = 5×1
    0.0056
    0.0100
    0.0658
    0.0003
    0.0071
```

```
% Means of columns
MeanCol = mean(MatrixNumeric,1)
```

```
MeanCol = 1×1000
    0.2120    0.3438    0.3587    0.2832    0.1907    0.1596    0.2288    0.3756 ···
```

```
% Mean of whole matrix
MeanWhole = mean2(MatrixNumeric)
```

```
MeanWhole = 0.0178
```

Answer to the question no: 5

```
% Find the lowest sounding signal
lowSig = min(MatrixNumeric(:))
```

```
lowSig = -1
```

```
soundsc(lowSig)
```

Answer to the question no: 6

```
% Import using Home > Import Data > Select inco13par.txt and save as inco13parNumeric
mat = inco13parNumeric
```

```
mat = 529×16
    2.0000         0         0    8.0000    1.0000    0.0500         0   68.0000 ···
    3.0000         0         0    4.0000   30.0000    0.2000         0   72.0000
    4.0000         0         0    4.0000   40.0000    0.1000         0   72.0000
    5.0000         0         0   11.0000   60.0000    0.1500         0   71.0000
    6.0000         0         0    8.0000    5.0000       NaN         0       NaN
    8.0000         0         0       NaN   30.0000    0.9500         0   57.0000
   10.0000         0         0    5.0000    5.0000       NaN       NaN       NaN
   11.0000         0         0    5.0000    1.0000       NaN         0       NaN
   13.0000         0         0    6.0000   80.0000       NaN         0       NaN
   14.0000         0         0    8.0000   20.0000       NaN         0   27.0000
      ⋮
```

```
% Missing values for each variable
sum(ismissing(mat))
```

```
ans = 1×16
     0     0     1   144   108   335   111   183   127   116   191     2     0 ···
```

```
find(mat)
```

```
ans = 5680×1
     1
     2
     3
     4
     5
     6
     7
     8
     9
    10
     ⋮
```

```
isnan(mat)
```

```
ans = 529×16 logical array
   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0   0
   0   0   0   0   0   0   0   0   0   0   1   0   0   0   0   0
   0   0   0   0   0   1   0   1   0   0   1   0   0   0   0   0
   0   0   0   1   0   0   0   0   0   0   0   0   0   0   0   0
   0   0   0   0   0   1   1   1   1   1   1   0   0   0   0   0
   0   0   0   0   0   1   0   1   0   0   1   0   0   0   0   0
   0   0   0   0   0   1   0   1   0   0   1   0   0   0   0   0
   0   0   0   0   0   1   0   0   0   0   1   0   0   0   0   0
     ⋮
```