## Appendices:

Appendix 1a: MATLAB Code

```
1       n = 0:127;
2       id = 1;
3       x = 3* cos(0.13 * pi * n + 0.5 );
4       omega= 0.13*pi;
5       SignalFile = fopen('SignalFileSAS.txt','w');
6       fprintf(SignalFile, '%f\n', x);
7       fclose(SignalFile);
8       SignalFile = fopen('SignalFileSAS.txt','r');
9       SignalValue = fscanf(SignalFile, '%f');
10      fclose(SignalFile);
11      xof3 = SignalValue(4);
12      xof7 = SignalValue(8);
13      xof114 = SignalValue(115);
14      xof127 = SignalValue(128);
15      fprintf('W = %f radian \n',omega);
16      fprintf('x%d[3] is %f\n',id, xof3);
17      fprintf('x%d[7] is %f\n',id, xof7);
18      fprintf('x%d[114] is %f\n',id, xof114);
19      fprintf('x%d[127] is %f\n',id, xof127);
20      figure;
21      stem(n, x, 'filled');
22      title('Graph of x_1[n] for n \in [0, 127]');
23      xlabel('n');
24      ylabel('x_1[n]');
25      grid on;
```

Appendix 1b: MATLAB Outputs

```
W = 0.408407 radian
x1[3] is -0.461435
x1[7] is -2.929477
x1[114] is -2.993570
x1[127] is -1.520264
```

Appendix 1c: Graph of the Function
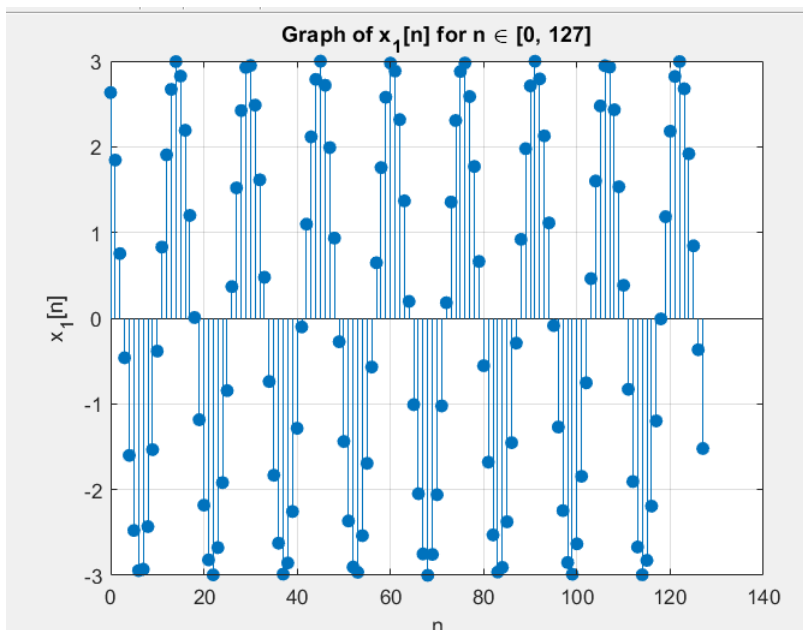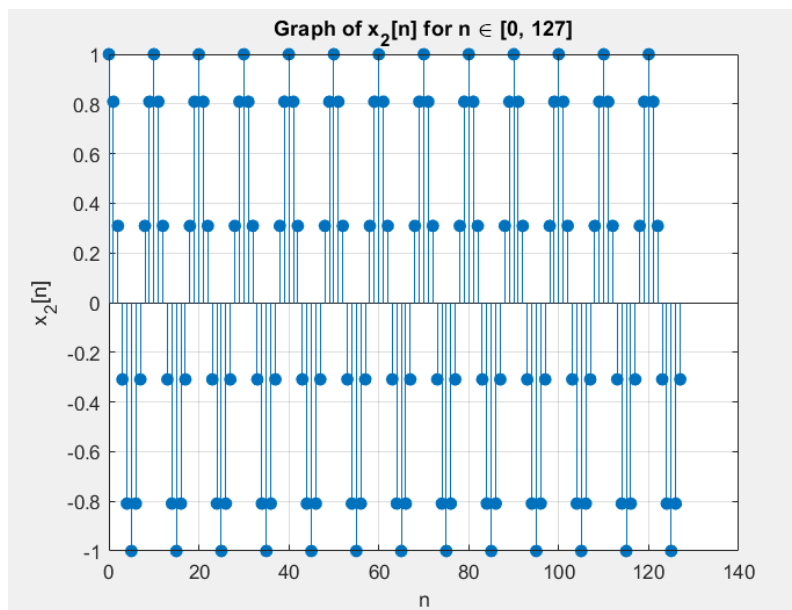
Appendix 2a: MATLAB Code

```
1    n = 0:127;
2    id = 2;
3    x = cos(2.2 * pi * n );
4    omega= 2.2*pi;
5    SignalFile = fopen('SignalFileSAS2.txt','w');
6    fprintf(SignalFile, '%f\n', x);
7    fclose(SignalFile);
8    SignalFile = fopen('SignalFileSAS2.txt','r');
9    SignalValue = fscanf(SignalFile, '%f');
10   fclose(SignalFile);
11   xof3 = SignalValue(4);
12   xof7 = SignalValue(8);
13   xof114 = SignalValue(115);
14   xof127 = SignalValue(128);
15   fprintf('w = %f radian \n',omega);
16   fprintf('x%d[3] is %f\n',id, xof3);
17   fprintf('x%d[7] is %f\n',id, xof7);
18   fprintf('x%d[114] is %f\n',id, xof114);
19   fprintf('x%d[127] is %f\n',id, xof127);
20   figure;
21   stem(n, x, 'filled');
22   title('Graph of x_2[n] for n \in [0, 127]');
23   xlabel('n');
24   ylabel('x_2[n]');
25   grid on;
```

Appendix 2b: MATLAB Outputs

```
w = 6.911504 radian
x2[3] is -0.309017
x2[7] is -0.309017
x2[114] is -0.809017
x2[127] is -0.309017
```

Appendix 2c: Graph of the Function
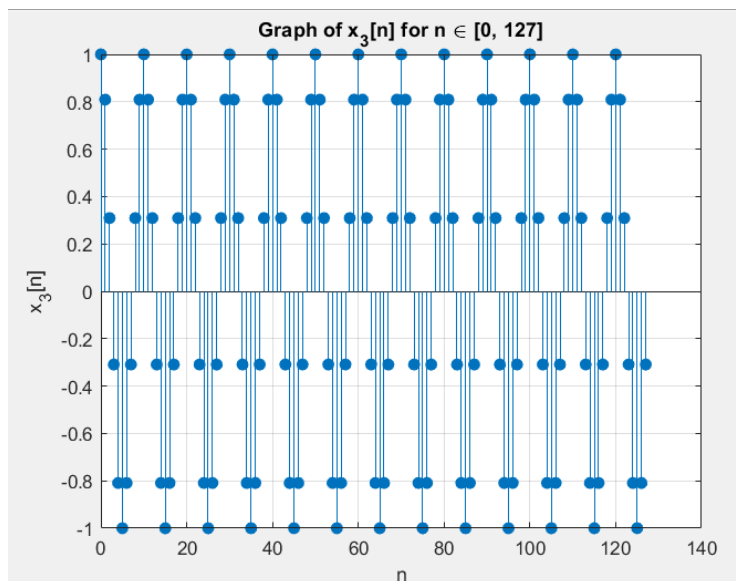
Appendix 3a: MATLAB Code

```
1    n = 0:127;
2    id = 3;
3    x = cos(-1.8 * pi * n );
4    omega= 1.8 *pi;
5    SignalFile = fopen('SignalFileSAS3.txt','w');
6    fprintf(SignalFile, '%f\n', x);
7    fclose(SignalFile);
8    SignalFile = fopen('SignalFileSAS3.txt','r');
9    SignalValue = fscanf(SignalFile, '%f');
10   fclose(SignalFile);
11   xof3 = SignalValue(4);
12   xof7 = SignalValue(8);
13   xof114 = SignalValue(115);
14   xof127 = SignalValue(128);
15   fprintf('w = %f radian \n',omega);
16   fprintf('x%d[3] is %f\n',id, xof3);
17   fprintf('x%d[7] is %f\n',id, xof7);
18   fprintf('x%d[114] is %f\n',id, xof114);
19   fprintf('x%d[127] is %f\n',id, xof127);
20   figure;
21   stem(n, x, 'filled');
22   title('Graph of x_3[n] for n \in [0, 127]');
23   xlabel('n');
24   ylabel('x_3[n]');
25   grid on;
```

Appendix 3b: MATLAB Outputs

```
w = 5.654867 radian
x3[3] is -0.309017
x3[7] is -0.309017
x3[114] is -0.809017
x3[127] is -0.309017
```

Appendix 3c: Graph of the Function

Graph of $x_3[n]$ for n ∈ [0, 127]
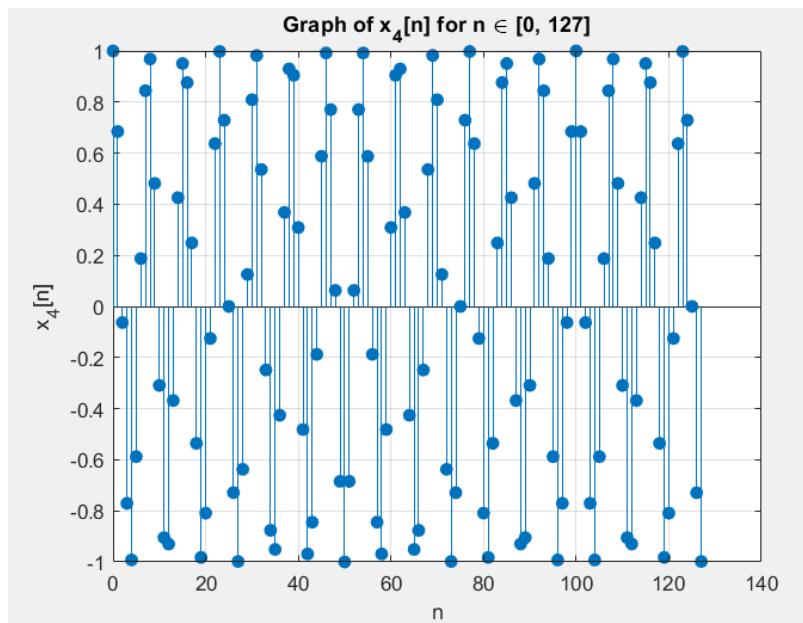
Appendix 4a: MATLAB Code

```
1    n = 0:127;
2    id = 4;
3    x = cos(0.26 * pi * n );
4    omega= 0.26*pi;
5    SignalFile = fopen('SignalFileSAS4.txt','w');
6    fprintf(SignalFile, '%f\n', x);
7    fclose(SignalFile);
8    SignalFile = fopen('SignalFileSAS4.txt','r');
9    SignalValue = fscanf(SignalFile, '%f');
10   fclose(SignalFile);
11   xof3 = SignalValue(4);
12   xof7 = SignalValue(8);
13   xof114 = SignalValue(115);
14   xof127 = SignalValue(128);
15   fprintf('w = %f radian \n',omega);
16   fprintf('x%d[3] is %f\n',id, xof3);
17   fprintf('x%d[7] is %f\n',id, xof7);
18   fprintf('x%d[114] is %f\n',id, xof114);
19   fprintf('x%d[127] is %f\n',id, xof127);
20   figure;
21   stem(n, x, 'filled');
22   title('Graph of x_4[n] for n \in [0, 127]');
23   xlabel('n');
24   ylabel('x_4[n]');
25   grid on;
```

Appendix 4b: MATLAB Outputs

```
w = 0.816814 radian
x4[3] is -0.770513
x4[7] is 0.844328
x4[114] is 0.425779
x4[127] is -0.998027
```

## Appendix 4c: Graph of the Function

Appendix 5a: MATLAB Code

```matlab
1    n = 0:127;
2    id = 5;
3    x = cos(0.26 * pi * n + 0.7);
4    omega=0.26 * pi;
5    SignalFile = fopen('SignalFileSAS5.txt','w');
6    fprintf(SignalFile, '%f\n', x);
7    fclose(SignalFile);
8    SignalFile = fopen('SignalFileSAS5.txt','r');
9    SignalValue = fscanf(SignalFile, '%f');
10   fclose(SignalFile);
11   xof3 = SignalValue(4);
12   xof7 = SignalValue(8);
13   xof114 = SignalValue(115);
14   xof127 = SignalValue(128);
15   fprintf('w = %f radian \n',omega);
16   fprintf('x%d[3] is %f\n',id, xof3);
17   fprintf('x%d[7] is %f\n',id, xof7);
18   fprintf('x%d[114] is %f\n',id, xof114);
19   fprintf('x%d[127] is %f\n',id, xof127);
20   figure;
21   stem(n, x, 'filled');
22   title('Graph of x_5[n] for n \in [0, 127]');
23   xlabel('n');
24   ylabel('x_5[n]');
25   grid on;
```

Appendix 5b: MATLAB Outputs

```
w = 0.816814 radian
x5[3] is -0.999961
x5[7] is 0.990967
x5[114] is 0.908560
x5[127] is -0.722882
```

Appendix 5c: Graph of the Function
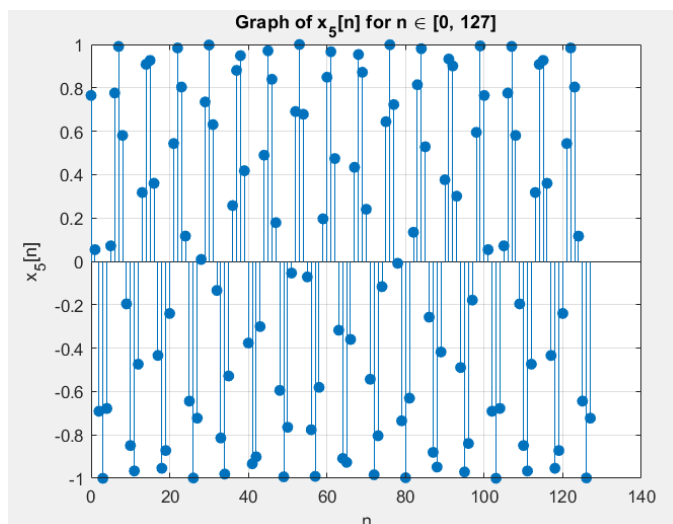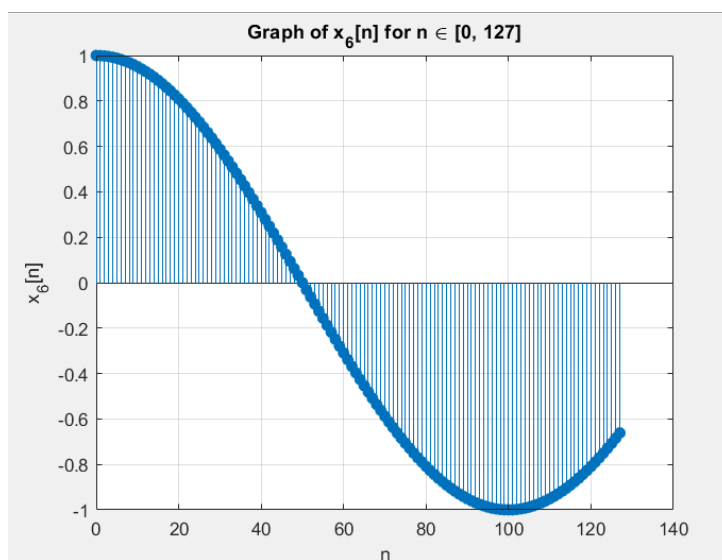
Appendix 6a: MATLAB Code

```
1    n = 0:127;
2    id = 6;
3    x = cos(0.01 * pi * n );
4    omega=0.01 * pi;
5    SignalFile = fopen('SignalFileSAS6.txt','w');
6    fprintf(SignalFile, '%f\n', x);
7    fclose(SignalFile);
8    SignalFile = fopen('SignalFileSAS6.txt','r');
9    SignalValue = fscanf(SignalFile, '%f');
10   fclose(SignalFile);
11   xof3 = SignalValue(4);
12   xof7 = SignalValue(8);
13   xof114 = SignalValue(115);
14   xof127 = SignalValue(128);
15   fprintf('w = %f radian \n',omega);
16   fprintf('x%d[3] is %f\n',id, xof3);
17   fprintf('x%d[7] is %f\n',id, xof7);
18   fprintf('x%d[114] is %f\n',id, xof114);
19   fprintf('x%d[127] is %f\n',id, xof127);
20   figure;
21   stem(n, x, 'filled');
22   title('Graph of x_6[n] for n \in [0, 127]');
23   xlabel('n');
24   ylabel('x_6[n]');
25   grid on;
```

Appendix 6b: MATLAB Outputs

```
w = 0.031416 radian
x6[3] is 0.995562
x6[7] is 0.975917
x6[114] is -0.904827
x6[127] is -0.661312
```

Appendix 6c: Graph of the Function
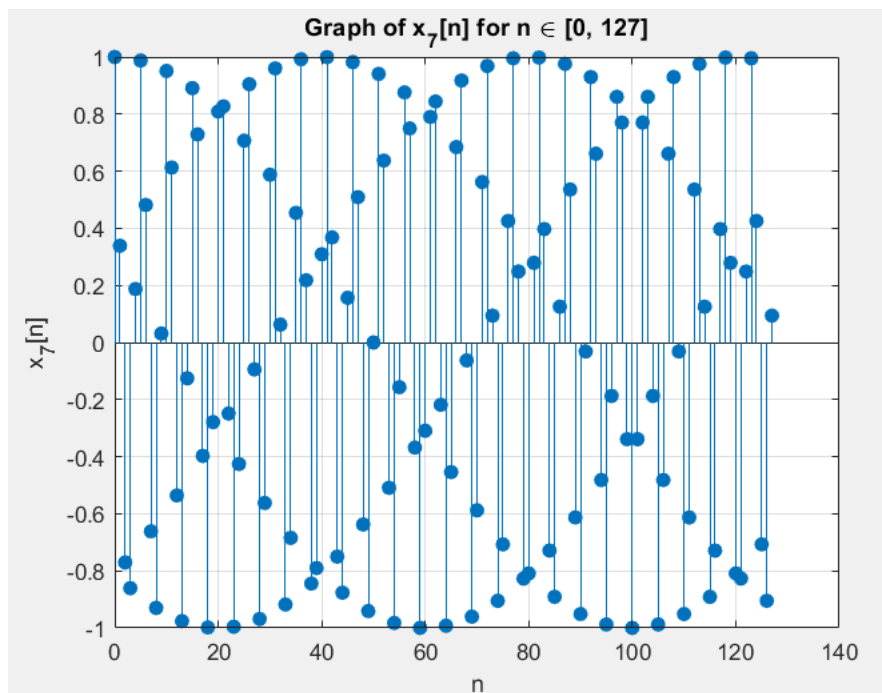
Appendix 7a: MATLAB Code

```
1      n = 0:127;
2      id = 7;
3      x = cos(0.39 * pi * n );
4      omega=0.39 * pi;
5      SignalFile = fopen('SignalFileSAS7.txt','w');
6      fprintf(SignalFile, '%f\n', x);
7      fclose(SignalFile);
8      SignalFile = fopen('SignalFileSAS7.txt','r');
9      SignalValue = fscanf(SignalFile, '%f');
10     fclose(SignalFile);
11     xof3 = SignalValue(4);
12     xof7 = SignalValue(8);
13     xof114 = SignalValue(115);
14     xof127 = SignalValue(128);
15     fprintf('w = %f radian \n',omega);
16     fprintf('x%d[3] is %f\n',id, xof3);
17     fprintf('x%d[7] is %f\n',id, xof7);
18     fprintf('x%d[114] is %f\n',id, xof114);
19     fprintf('x%d[127] is %f\n',id, xof127);
20     figure;
21     stem(n, x, 'filled');
22     title('Graph of x_7[n] for n \in [0, 127]');
23     xlabel('n');
24     ylabel('x_7[n]');
25     grid on;
```

Appendix 7b: MATLAB Outputs

```
w = 1.225221 radian
x7[3] is -0.860742
x7[7] is -0.661312
x7[114] is 0.125333
x7[127] is 0.094108
```

Appendix 7c: Graph of the Function
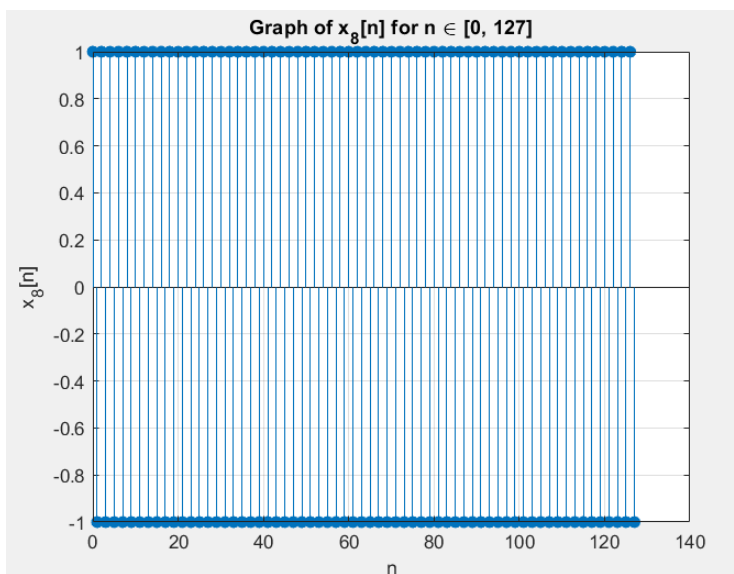
Appendix 8a: MATLAB Code

```
1      n = 0:127;
2      id = 8;
3      x = cos(1 * pi * n );
4      omega=1 * pi;
5      SignalFile = fopen('SignalFileSAS8.txt','w');
6      fprintf(SignalFile, '%f\n', x);
7      fclose(SignalFile);
8      SignalFile = fopen('SignalFileSAS8.txt','r');
9      SignalValue = fscanf(SignalFile, '%f');
10     fclose(SignalFile);
11     xof3 = SignalValue(4);
12     xof7 = SignalValue(8);
13     xof114 = SignalValue(115);
14     xof127 = SignalValue(128);
15     fprintf('w = %f radian \n',omega);
16     fprintf('x%d[3] is %f\n',id, xof3);
17     fprintf('x%d[7] is %f\n',id, xof7);
18     fprintf('x%d[114] is %f\n',id, xof114);
19     fprintf('x%d[127] is %f\n',id, xof127);
20     figure;
21     stem(n, x, 'filled');
22     title('Graph of x_8[n] for n \in [0, 127]');
23     xlabel('n');
24     ylabel('x_8[n]');
25     grid on;
```

Appendix 8b: MATLAB Outputs

```
w = 3.141593 radian
x8[3] is -1.000000
x8[7] is -1.000000
x8[114] is 1.000000
x8[127] is -1.000000
```

Appendix 8c: Graph of the Function

Graph of $x_8[n]$ for $n \in [0, 127]$
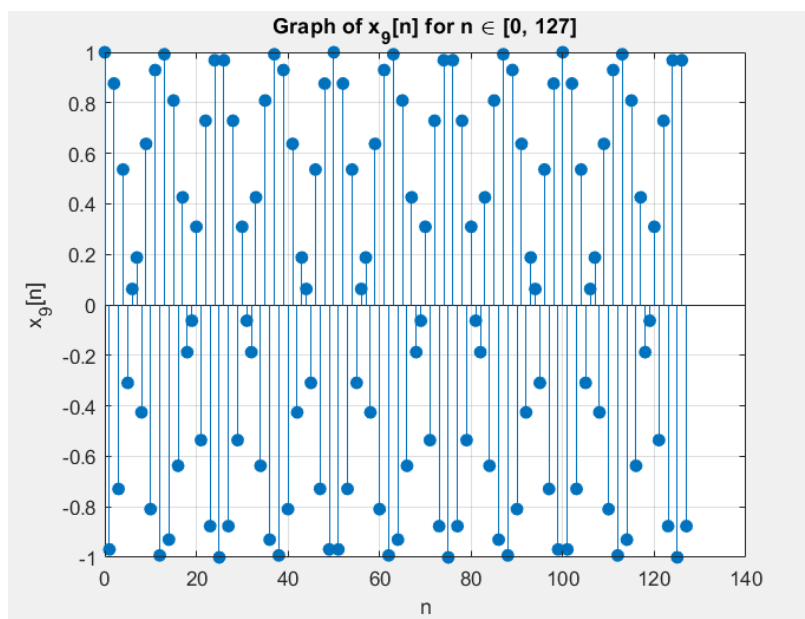
Appendix 9a: MATLAB Code

```
1     n = 0:127;
2     id = 9;
3     x = cos(1.08 * pi * n );
4     omega=1.08 * pi;
5     SignalFile = fopen('SignalFileSAS9.txt','w');
6     fprintf(SignalFile, '%f\n', x);
7     fclose(SignalFile);
8     SignalFile = fopen('SignalFileSAS9.txt','r');  |
9     SignalValue = fscanf(SignalFile, '%f');
10    fclose(SignalFile);
11    xof3 = SignalValue(4);
12    xof7 = SignalValue(8);
13    xof114 = SignalValue(115);
14    xof127 = SignalValue(128);
15    fprintf('w = %f radian \n',omega);
16    fprintf('x%d[3] is %f\n',id, xof3);
17    fprintf('x%d[7] is %f\n',id, xof7);
18    fprintf('x%d[114] is %f\n',id, xof114);
19    fprintf('x%d[127] is %f\n',id, xof127);
20    figure;
21    stem(n, x, 'filled');
22    title('Graph of x_9[n] for n \in [0, 127]');
23    xlabel('n');
24    ylabel('x_9[n]');
25    grid on;
```

Appendix 9b: MATLAB Outputs

```
w = 3.392920 radian
x9[3] is -0.728969
x9[7] is 0.187381
x9[114] is -0.929776
x9[127] is -0.876307
```

Appendix 9c: Graph of the Function

Graph of $x_9[n]$ for $n \in [0, 127]$
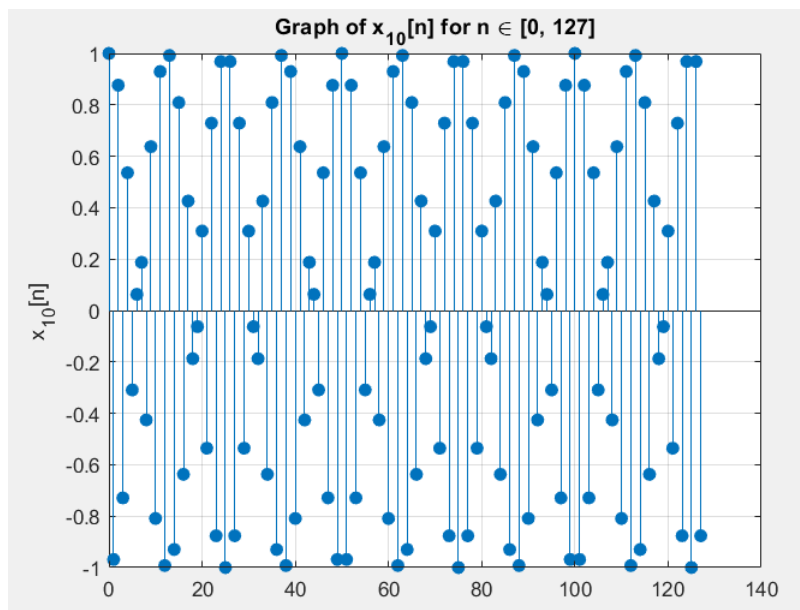
Appendix 10a: MATLAB Code

```
1       n = 0:127;
2       id = 10;
3       x = cos(0.92 * pi * n );
4       omega= 0.92 * pi;
5       SignalFile = fopen('SignalFileSAS10.txt','w');
6       fprintf(SignalFile, '%f\n', x);
7       fclose(SignalFile);
8       SignalFile = fopen('SignalFileSAS10.txt','r');
9       SignalValue = fscanf(SignalFile, '%f');
10      fclose(SignalFile);
11      xof3 = SignalValue(4);
12      xof7 = SignalValue(8);
13      xof114 = SignalValue(115);
14      xof127 = SignalValue(128);
15      fprintf('w = %f radian \n',omega);
16      fprintf('x%d[3] is %f\n',id, xof3);
17      fprintf('x%d[7] is %f\n',id, xof7);
18      fprintf('x%d[114] is %f\n',id, xof114);
19      fprintf('x%d[127] is %f\n',id, xof127);
20      figure;
21      stem(n, x, 'filled');
22      title('Graph of x_1_0[n] for n \in [0, 127]');
23      xlabel('n');
24      ylabel('x_1_0[n]');
25      grid on;
```

Appendix 10b: MATLAB Outputs

```
w = 2.890265 radian
x10[3] is -0.728969
x10[7] is 0.187381
x10[114] is -0.929776
x10[127] is -0.876307
```

Appendix 10c: Graph of the Function
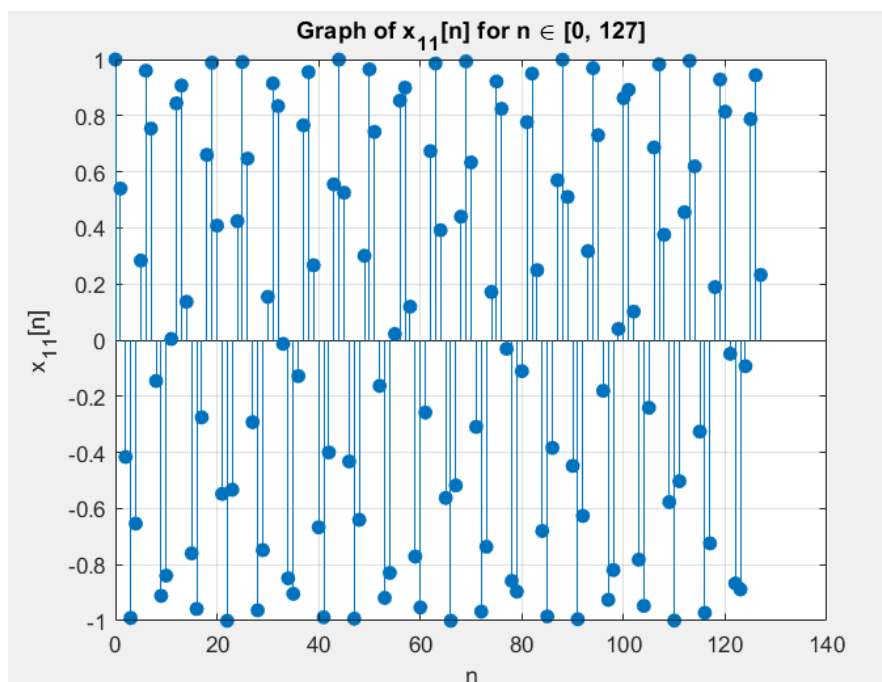
Appendix 11a: MATLAB Code

```
1       n = 0:127;
2       id = 11;
3       x = cos( n );
4       omega= 1;
5       SignalFile = fopen('SignalFileSAS11.txt','w');
6       fprintf(SignalFile, '%f\n', x);
7       fclose(SignalFile);
8       SignalFile = fopen('SignalFileSAS11.txt','r');
9       SignalValue = fscanf(SignalFile, '%f');
10      fclose(SignalFile);
11      xof3 = SignalValue(4);
12      xof7 = SignalValue(8);
13      xof114 = SignalValue(115);
14      xof127 = SignalValue(128);
15      fprintf('w = %f radian \n',omega);
16      fprintf('x%d[3] is %f\n',id, xof3);
17      fprintf('x%d[7] is %f\n',id, xof7);
18      fprintf('x%d[114] is %f\n',id, xof114);
19      fprintf('x%d[127] is %f\n',id, xof127);
20      figure;
21      stem(n, x, 'filled');
22      title('Graph of x_1_1[n] for n \in [0, 127]');
23      xlabel('n');
24      ylabel('x_1_1[n]');
25      grid on;
```

Appendix 11b: MATLAB Outputs

```
w = 1.000000 radian
x11[3] is -0.989992
x11[7] is 0.753902
x11[114] is 0.619521
x11[127] is 0.232359
```

Appendix 11c: Graph of the Function

Appendix 12a: MATLAB Code

```
1     n = 0:127;
2     id = 12;
3     x = cos(0.9*n +0.3);
4     omega= 0.9;
5     SignalFile = fopen('SignalFileSAS12.txt','w');
6     fprintf(SignalFile, '%f\n', x);
7     fclose(SignalFile);
8     SignalFile = fopen('SignalFileSAS12.txt','r');
9     SignalValue = fscanf(SignalFile, '%f');
10    fclose(SignalFile);
11    xof3 = SignalValue(4);
12    xof7 = SignalValue(8);
13    xof114 = SignalValue(115);
14    xof127 = SignalValue(128);
15    fprintf('w = %f radian \n',omega);
16    fprintf('x%d[3] is %f\n',id, xof3);
17    fprintf('x%d[7] is %f\n',id, xof7);
18    fprintf('x%d[114] is %f\n',id, xof114);
19    fprintf('x%d[127] is %f\n',id, xof127);
20    figure;
21    stem(n, x, 'filled');
22    title('Graph of x_1_2[n] for n \in [0, 127]');
23    xlabel('n');
24    ylabel('x_1_2[n]');
25    grid on;
```

Appendix 12b: MATLAB Outputs

```
w = 0.900000 radian
x12[3] is -0.989992
x12[7] is 0.950233
x12[114] is -0.716128
x12[127] is 0.068079
```

Appendix 12c: Graph of the Function

Graph of $x_{12}[n]$ for $n \in [0, 127]$