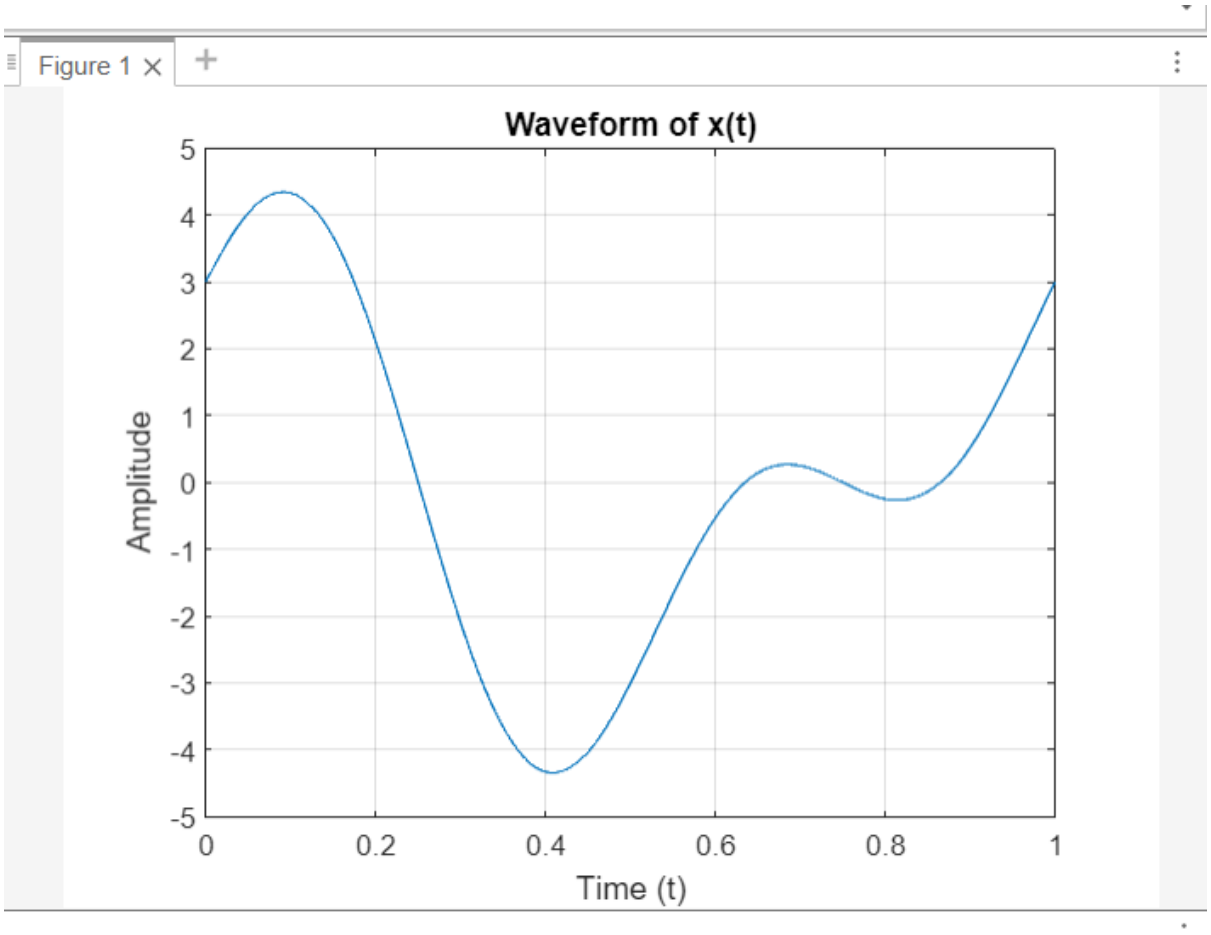
Problem 1
1-1)

```
% Define the time vector from 0 to 1 with 1000 points (one period)
t = linspace(0, 1, 1000);

% Define the signal x(t)
x = 3*cos(2*pi*t) + 2*sin(4*pi*t);

% Plot the waveform
plot(t, x);
xlabel('Time (t)');
ylabel('Amplitude');
title('Waveform of x(t)');
grid on;
```



1-2)

The frequency of a cosine or sine term A cos(wt) or A sin(wt) is given by f= w/2pi

So, f1= 2pi/2pi=1 and f2 = 4pi/2pi=2

1-3)

```
disp(['Frequency components present in x(t): ', num2str(f1), ' Hz and
', num2str(f2), ' Hz']);
% Define the period
T = 1;

% Define the signal x(t)
x = 3*cos(2*pi*t) + 2*sin(4*pi*t);

% Compute the average power
P = (1/T) * trapz(t, abs(x).^2);

disp(['Average power of x(t) over one period: ', num2str(P)]);
```

```
>> untitled
Frequency components present in x(t): 1 Hz and 2 Hz
Frequency components present in x(t): 1 Hz and 2 Hz
Average power of x(t) over one period: 6.5
```

Problem 2

2-1)

```
% Define the signal x[n]
x = [1, -2, 3, -4, 5];

% Compute the sum of all elements
sum_x = sum(x);

disp(['Sum of all elements in the signal: ', num2str(sum_x)]);
```

```
Length of the signal: 5
```

2-2)

```
% Define the signal x[n]
x = [1, -2, 3, -4, 5];

% Find the value of x[3]
x_3 = x(3);
disp(['Value of x[3]: ', num2str(x_3)]);
```

Value of x[3]: 3

2-3)

```
% Define the signal x[n]
x = [1, -2, 3, -4, 5];

% Compute the sum of all elements
sum_x = sum(x);

disp(['Sum of all elements in the signal: ', num2str(sum_x)]);
```

Sum of all elements in the signal: 3

2-4)

```
% Define the signal x[n]
x = [1, -2, 3, -4, 5];

% Calculate the energy of the signal
energy_x = sum(abs(x).^2);

disp(['Energy of the signal: ', num2str(energy_x)]);
```

Energy of the signal: 55