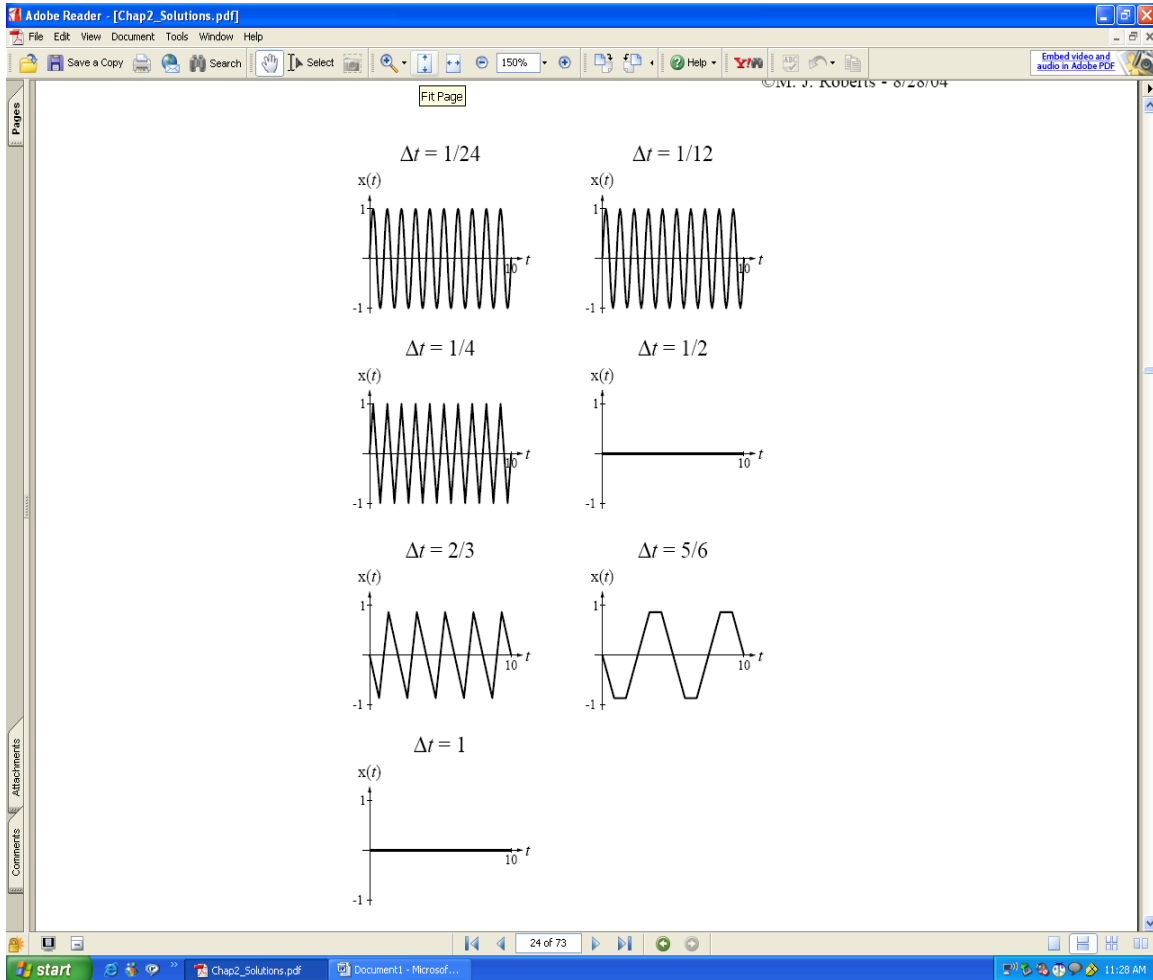


## Homework 1 Solution (EE2111)

26) Though the given signal is a continuous time signal, in MATLAB we sample it with the given time resolution. We plot the graph with the obtained sample points. The obtained sample points are a discrete time signal. We plot a continuous time graph using discrete time values. We observe that as the time resolution decreases, we obtain more distorted graph. Therefore, we get such plots.



For  $\Delta t = 1$ , we get sample points such that all values are zero.

27)

Substituting the value of  $t$  in the given equation we find the values

a)  $g(t) = 100 \sin \left( 200 \pi t + \frac{\pi}{4} \right)$

$$g(0.001) = 100 \sin \left( 200 \pi \times 0.001 + \frac{\pi}{4} \right) = 100 \sin \left( \frac{\pi}{5} + \frac{\pi}{4} \right) = 98.77$$

b)  $g(t) = 13 - 4t + 6t^2$

$$g(2) = 13 - 4(2) + 6(2)^2 = 29$$

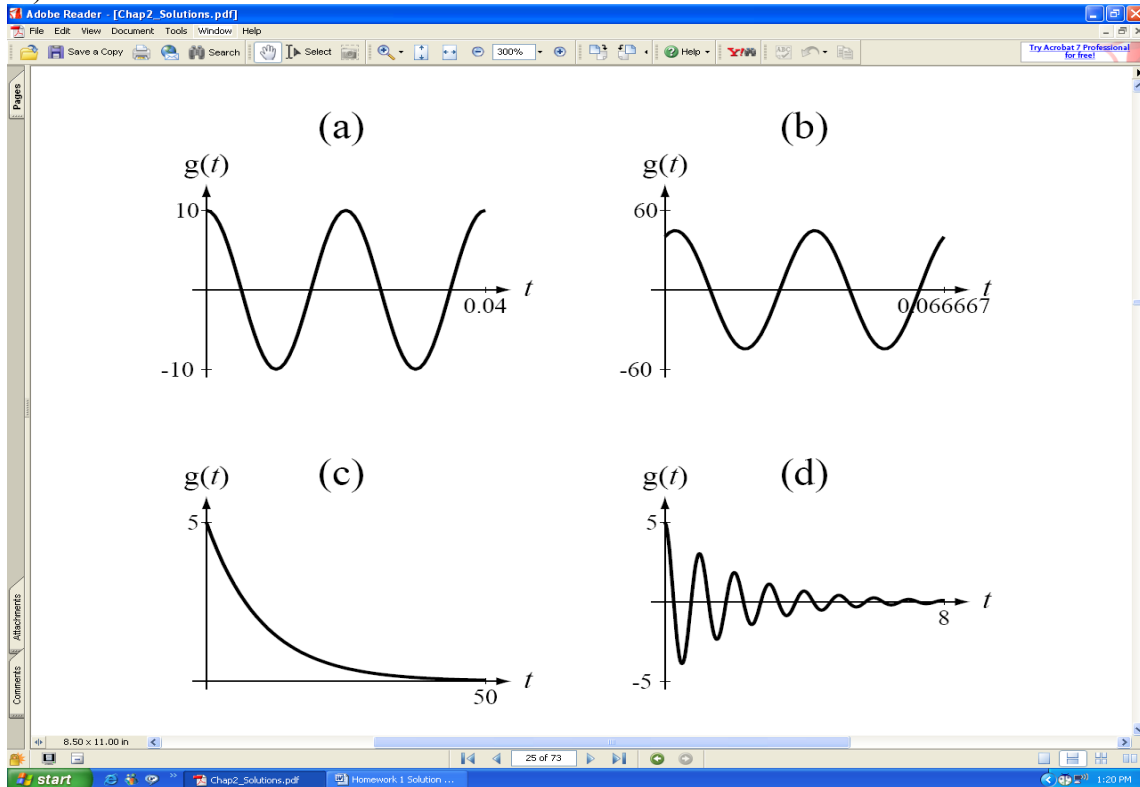
c)  $g(t) = -5 e^{-2t} e^{-j2\pi t}$

$$g(1/4) = -5 e^{-2(1/4)} e^{-j2\pi(1/4)} = -5 e^{-(1/2)} e^{-j\pi(1/2)}$$

Simplifying using Euler's identities

$$g(1/4) = j 3.03$$

28)

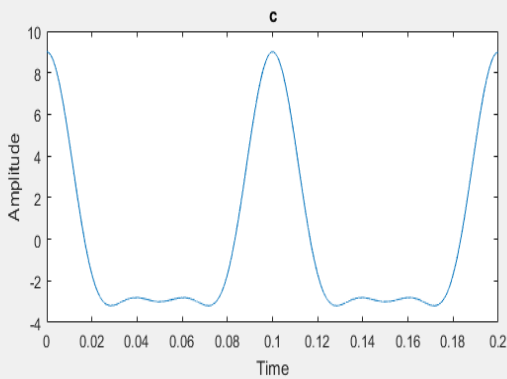
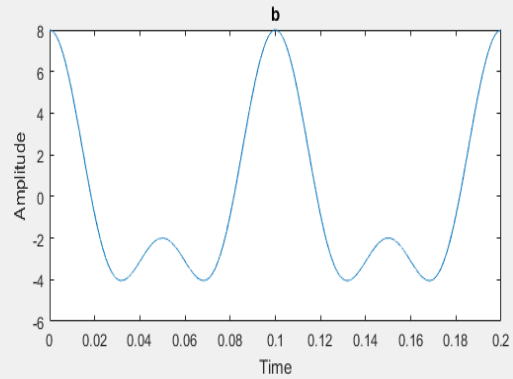
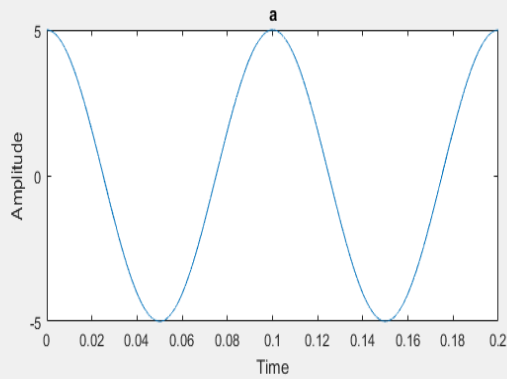


4) Plot the following signals

```
t=[0:0.00001:.2];  
x=5*cos(20*pi*t);  
y=3*cos(40*pi*t);  
z=cos(60*pi*t);  
w=x+y;  
v=w+z;  
subplot(2,2,1),plot(t,x)  
title('a')  
xlabel('Time')  
ylabel('Amplitude')
```

```
subplot(2,2,2),plot(t,w)  
title('b')  
xlabel('Time')  
ylabel('Amplitude')
```

```
subplot(2,2,3),plot(t,v)  
title('c')  
xlabel('Time')  
ylabel('Amplitude')
```



5)

- a) Amplitude = 20  
frequency = 200 hz  
phase =  $\pi$  rad
- b) Amplitude = 5  
frequency = 5 hz  
phase =  $\pi/4$  rad
- c) Amplitude = 4  
frequency = 2.5 hz  
phase = 0 rad

6)

Compact trigonometric  $\cos(200\pi t + \frac{\pi}{4})$

Trigonometric  $0.707 \cos(200\pi t) + 0.707 \sin(200\pi t)$

Complex Exponential  $0.5 e^{j200\pi t} e^{j\pi/4} + 0.5 e^{-j200\pi t} e^{-j\pi/4}$   
 $= 0.5 e^{j(200\pi t + \pi/4)} + 0.5 e^{-j(200\pi t + \pi/4)}$