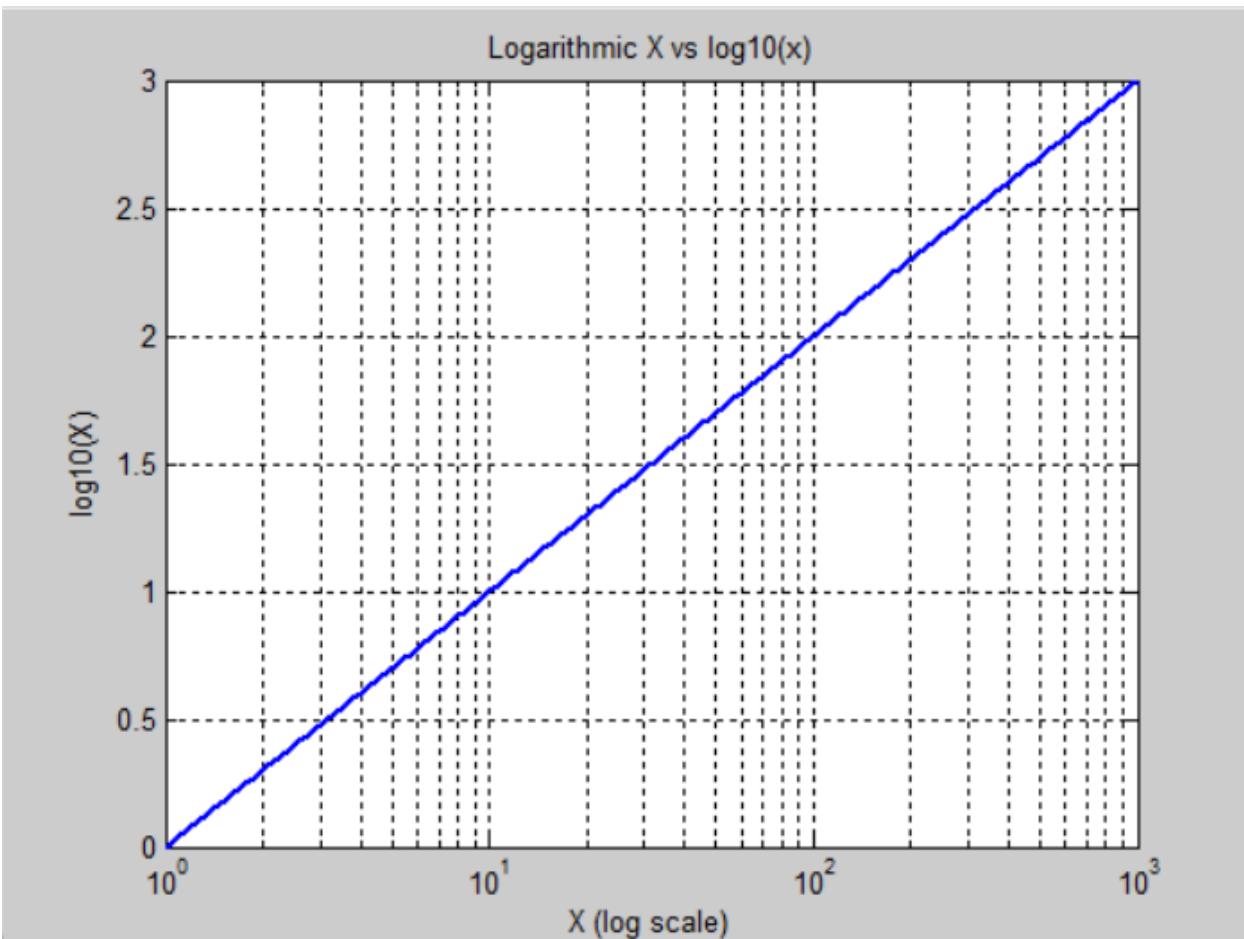


### Problem 1: Plot $\log_{10}(x)$ for values from 1 to 1000

Source Code:

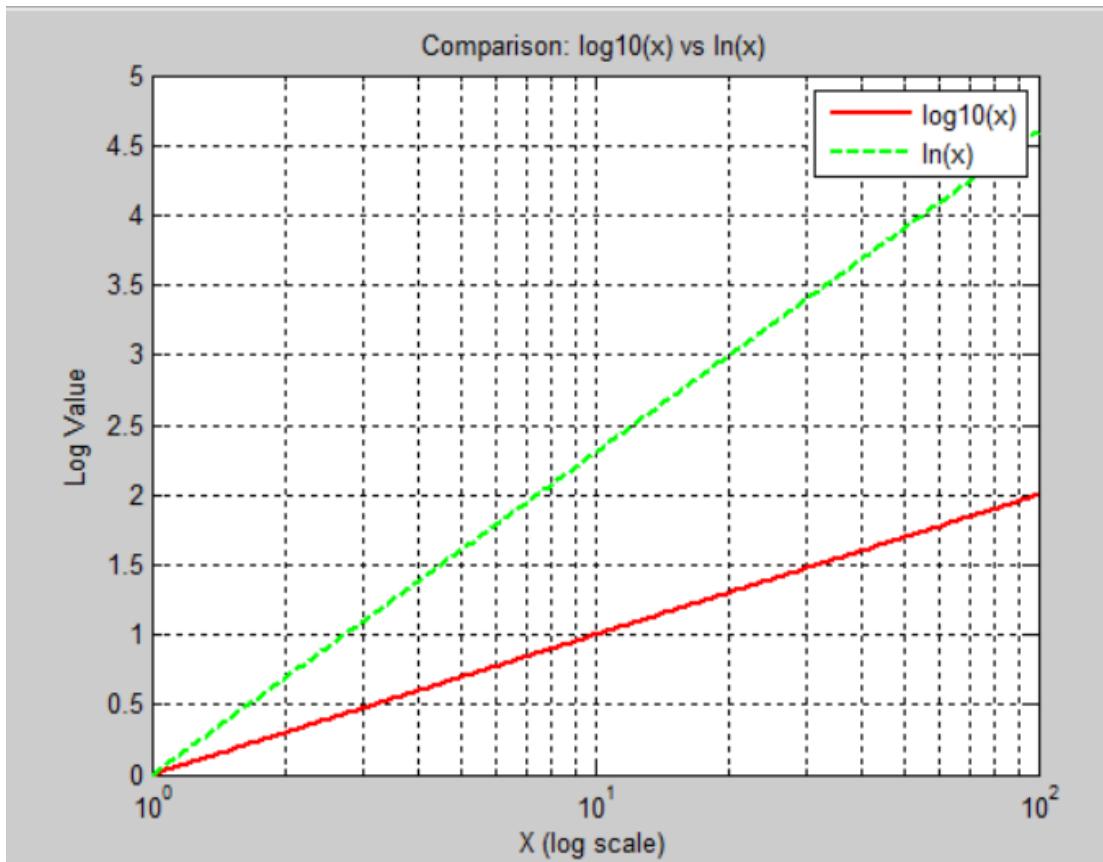
```
Editor - D:\Academic\2nd year\2nd semester\Data Communication Lab\Lab 1\labreport.m
labreport.m + | 
1 % Problem 1: Log10 Function Plot
2 x = logspace(0,3,200); % from 10^0 to 10^3
3 y = log10(x);
4 semilogx(x, y, 'b', 'LineWidth', 2);
5 title('Logarithmic X vs log10(x)');
6 xlabel('X (log scale)');
7 ylabel('log10(X)');
8 grid on;
9
```



## Problem 2: Compare $\log_{10}(x)$ and $\ln(x)$ on the same plot

Source Code:

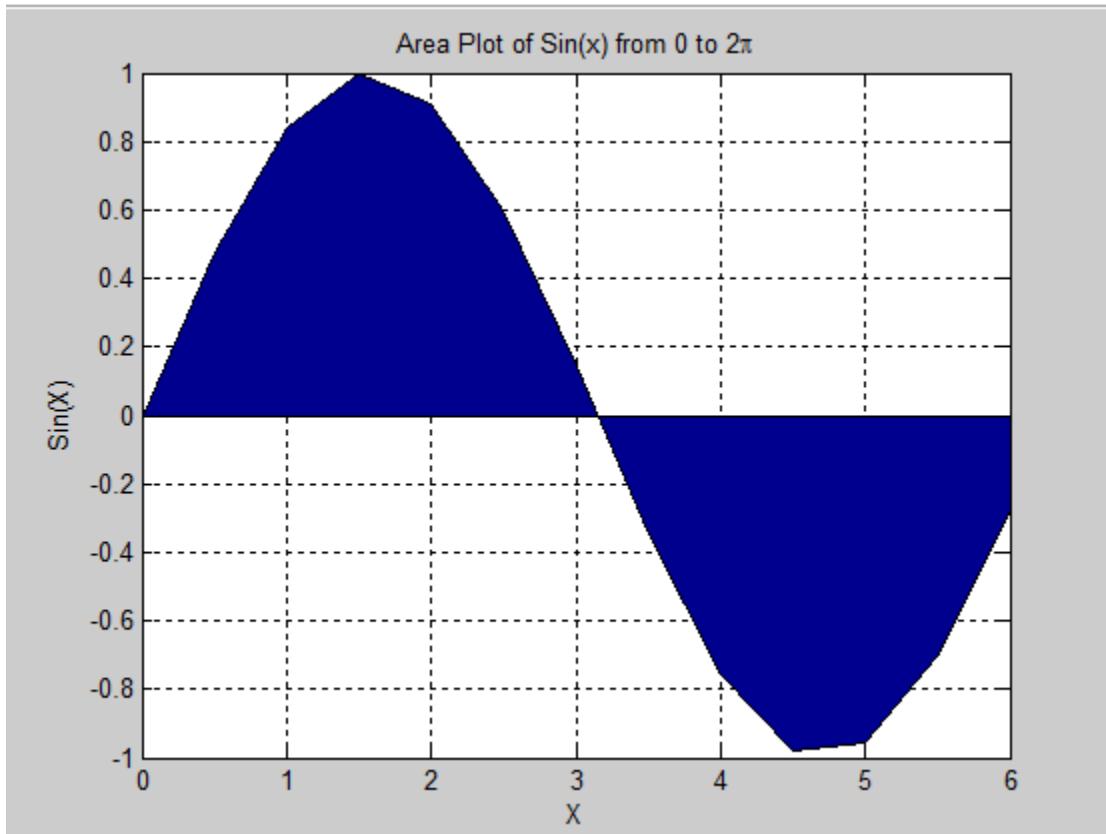
```
labreport.m* × +  
10 % Problem 2: Compare log10 and ln  
11 - x = logspace(0,2,200);  
12 - y1 = log10(x);  
13 - y2 = log(x);  
14 - semilogx(x, y1, 'r', 'LineWidth', 2);  
15 - hold on;  
16 - semilogx(x, y2, 'g--', 'LineWidth', 2);  
17 - title('Comparison: log10(x) vs ln(x)');  
18 - xlabel('X (log scale)');  
19 - ylabel('Log Value');  
20 - legend('log10(x)', 'ln(x)');  
21 - grid on;
```



**Problem 3:** Area plot of  $\sin(x)$  from 0 to  $2\pi$

Source Code:

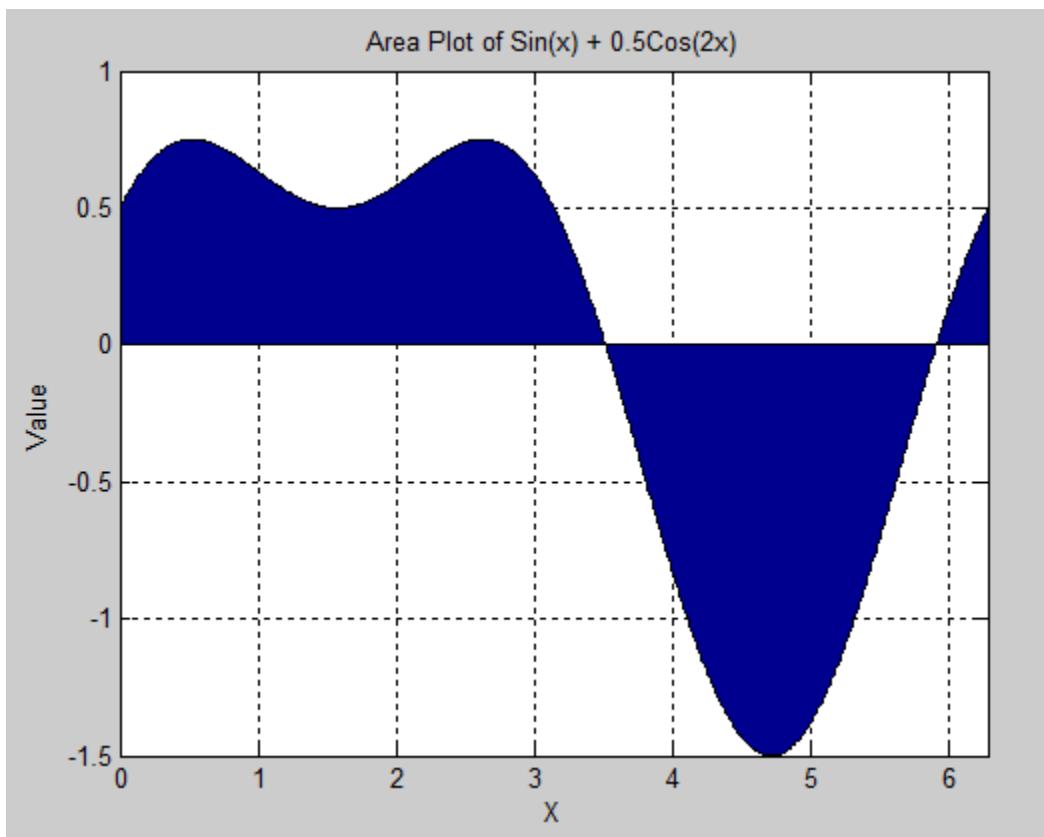
```
% Problem 3: Area Plot of Sin(x)  
x = 0:0.5:2*pi;  
y = sin(x);  
area(x, y);  
title('Area Plot of Sin(x) from 0 to 2\pi');  
xlabel('X');  
ylabel('Sin(X)');  
grid on;
```



**Problem 4:** Area plot of  $\sin(x) + 0.5\cos(2x)$

Source Code:

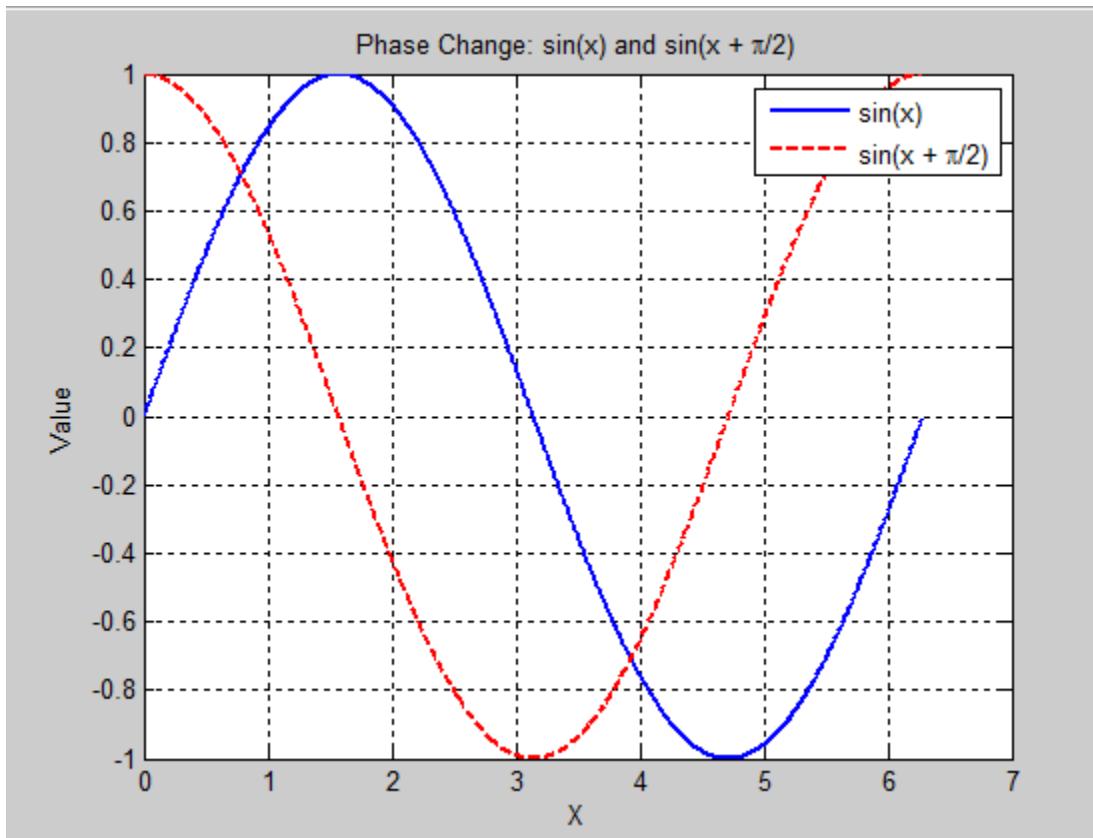
```
% Problem 4: Area Plot of Sin(x) + 0.5Cos(2x)
x = 0:0.01:2*pi;
y = sin(x) + 0.5*cos(2*x);
area(x, y);
title('Area Plot of Sin(x) + 0.5Cos(2x)');
xlabel('X');
ylabel('Value');
grid on;
```



**Problem 5:** Plot  $\sin(x)$  and  $\sin(x + \pi/2)$  on the same graph

Source Code:

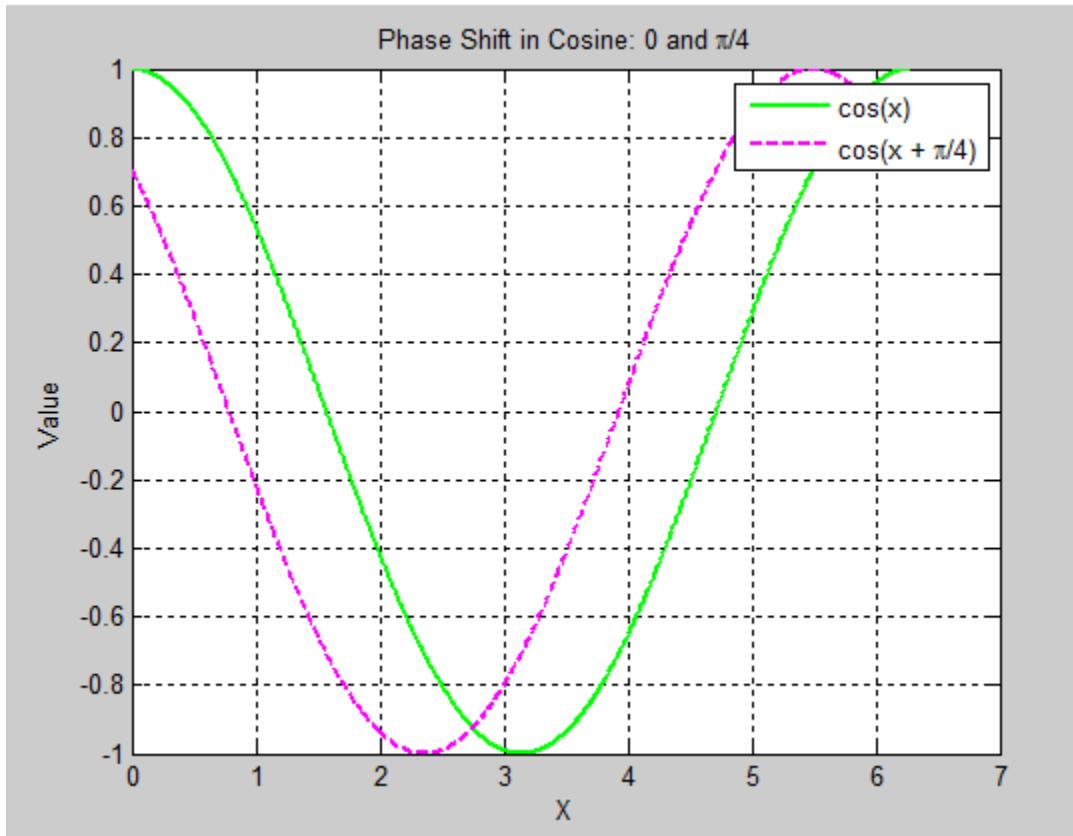
```
% Problem 5: Phase Change by pi/2
x = 0:0.01:2*pi;
y1 = sin(x);
y2 = sin(x + pi/2);
plot(x, y1, 'b', 'LineWidth', 2);
hold on;
plot(x, y2, 'r--', 'LineWidth', 2);
title('Phase Change: sin(x) and sin(x + \pi/2)');
xlabel('X');
ylabel('Value');
legend('sin(x)', 'sin(x + \pi/2)');
grid on;
```



**Problem 6:** Show phase shift by  $\pi/4$  in cosine wave

Source Code:

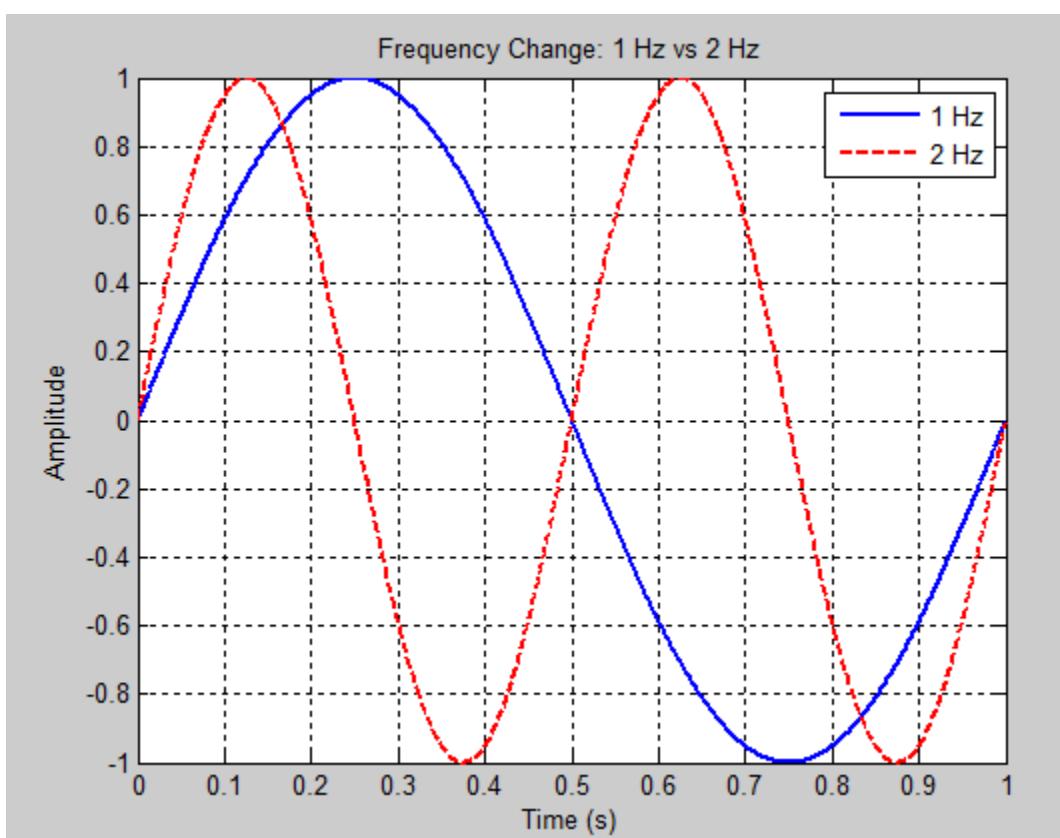
```
% Problem 6: Phase Change in Cosine Wave
x = 0:0.01:2*pi;
y1 = cos(x);
y2 = cos(x + pi/4);
plot(x, y1, 'g', 'LineWidth', 2);
hold on;
plot(x, y2, 'm--', 'LineWidth', 2);
title('Phase Shift in Cosine: 0 and \pi/4');
xlabel('X');
ylabel('Value');
legend('cos(x)', 'cos(x + \pi/4)');
grid on;
```



### Problem 7: Compare $\sin(2\pi x)$ and $\sin(4\pi x)$

Source Code:

```
68 % Problem 7: Frequency Comparison
69 x = 0:0.001:1;
70 y1 = sin(2*pi*1*x); % 1 Hz
71 y2 = sin(2*pi*2*x); % 2 Hz
72 plot(x, y1, 'b', 'LineWidth', 2);
73 hold on;
74 plot(x, y2, 'r--', 'LineWidth', 2);
75 title('Frequency Change: 1 Hz vs 2 Hz');
76 xlabel('Time (s)');
77 ylabel('Amplitude');
78 legend('1 Hz', '2 Hz');
79 grid on;
```



### Problem 8: Show 5 Hz and 10 Hz cosine waves

Source Code:

```
% Problem 8: Cosine Frequency Change
x = 0:0.001:1;
y1 = cos(2*pi*5*x); % 5 Hz
y2 = cos(2*pi*10*x); % 10 Hz
plot(x, y1, 'g', 'LineWidth', 2);
hold on;
plot(x, y2, 'm--', 'LineWidth', 2);
title('Cosine Waves: 5 Hz vs 10 Hz');
xlabel('Time (s)');
ylabel('Amplitude');
legend('5 Hz', '10 Hz');
grid on;
```

