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Housekeeping

```
clc; clear; close all;
```

Constants

```
P = 10*10^3; % N
EI = 10^6; % Nm^2
L = 0.5; % m

xPlot = linspace(0, L, 1000);
```

Problem 6.3a: Answer

```
vB = -((4*L^2 - 5*L + 2)*P)/(4*EI*L)
phiB = -((4*L^2 - 6*L + 3)*P)/(2*EI*L^2)
```

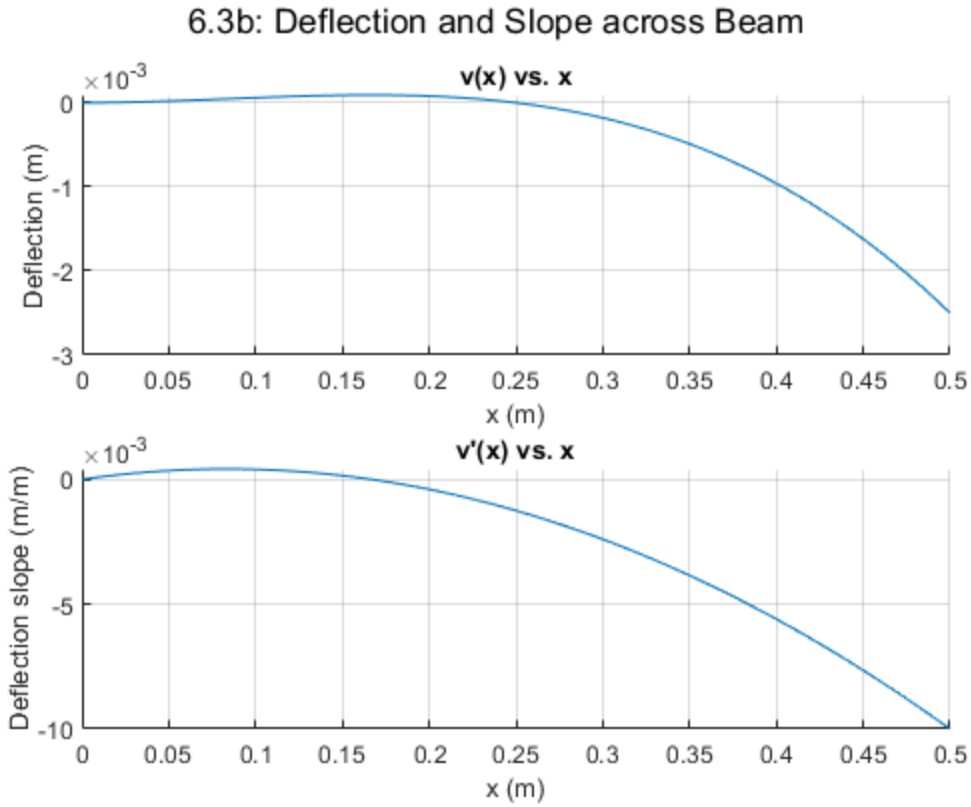
```
vB =

   -0.0025
```

```
phiB =

   -0.0200
```

Problem 6.3b - Plot v(x) and v'(x)

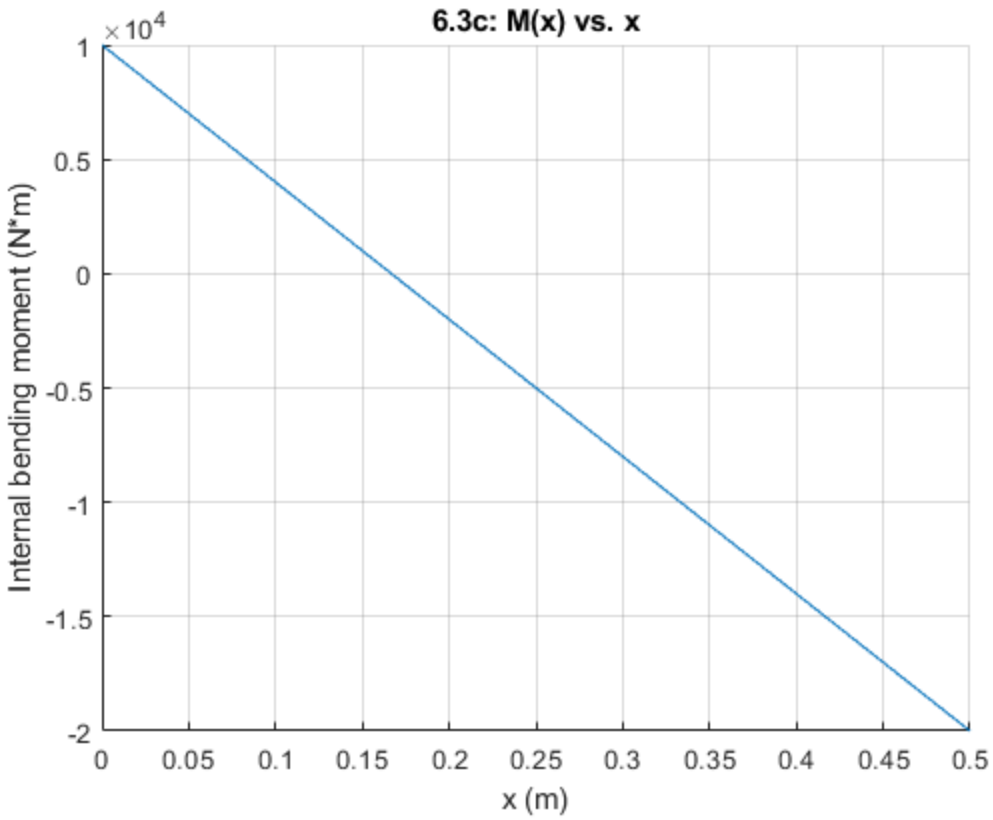
```
v = @(x)( (3*(x/L).^2 - 2*(x/L).^3)*vB + ((x/L).^3 - (x/L).^2)*L*phiB );
vPrime = @(x)( (6*x/L - 6*(x/L).^2)*vB + (3*(x/L).^2 - 2*x/L)*L*phiB );

figure
sgtitle("6.3b: Deflection and Slope across Beam")
subplot(2,1,1)
hold on
grid on
title("v(x) vs. x")
```

```
plot(xPlot, v(xPlot))
xlabel("x (m)")
ylabel("Deflection (m)")

subplot(2,1,2)
hold on
grid on
title("v'(x) vs. x")
plot(xPlot, vPrime(xPlot))
xlabel("x (m)")
ylabel("Deflection slope (m/m)")
```



Problem 6.3c - Plot M(x) = EI*v''(x)

```
kappa = @(x)( (6/L - 12*x/L)*vB + (6*x - 2)*phiB );
M = @(x)(EI*kappa(x));

figure
hold on
grid on
title("6.3c: M(x) vs. x")
plot(xPlot, M(xPlot));
xlabel("x (m)")
ylabel("Internal bending moment (N*m)")
```



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