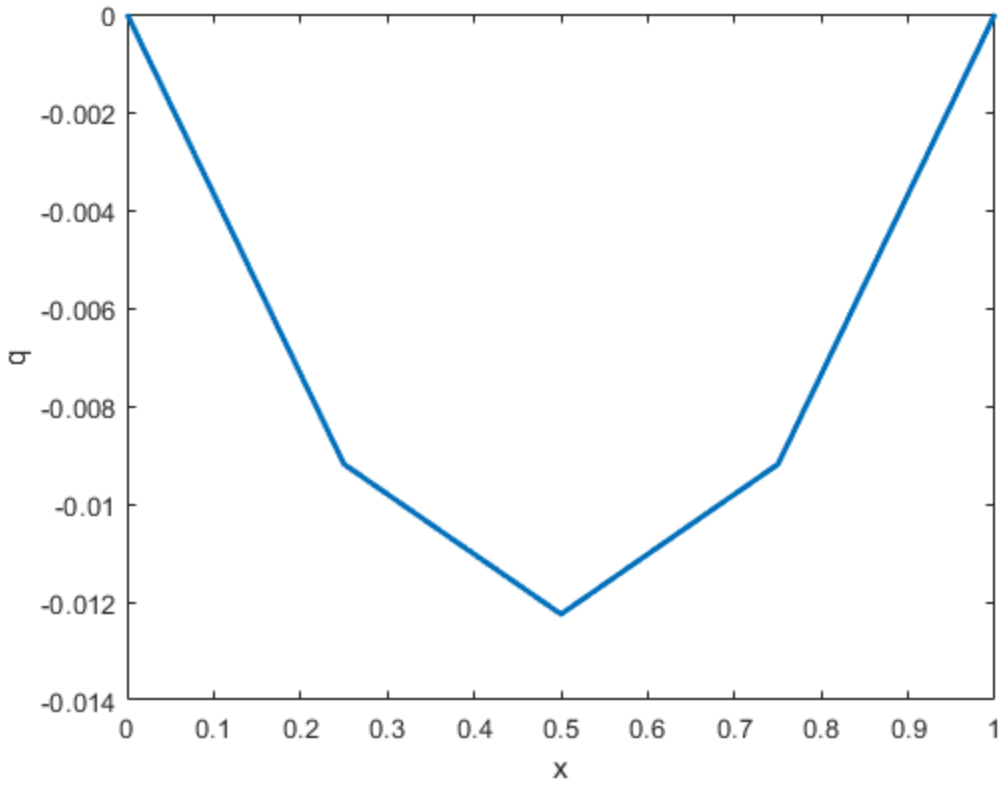
```
%2.6.3.b n=4
clc;
clear all;
n=4;
a=0;
b=1;
h=(b-a)/n;
x=0:h:1;
tau=10;
g=-9.8;

A(1,1)=2*n*tau;
A(1,2)=-n*tau;
for i=2:n-2
    A(i,i-1)=-n*tau;
    A(i,i)=2*n*tau;
    A(i,i+1)=-n*tau;
end
A(n-1,n-2)=-n*tau;
A(n-1,n-1)=2*n*tau;

for i=1:n-1
    f(i)=(1/(10*n))*g;
end

q1=(A)\f';

q(1)=0;
for i=1:n-1
    q(i+1)=q1(i);
end
q(n+1)=0;
q'
plot(x,q,'linewidth',2)
xlabel('x')
ylabel('q')


ans =

         0
   -0.0092
   -0.0122
   -0.0092
         0
```

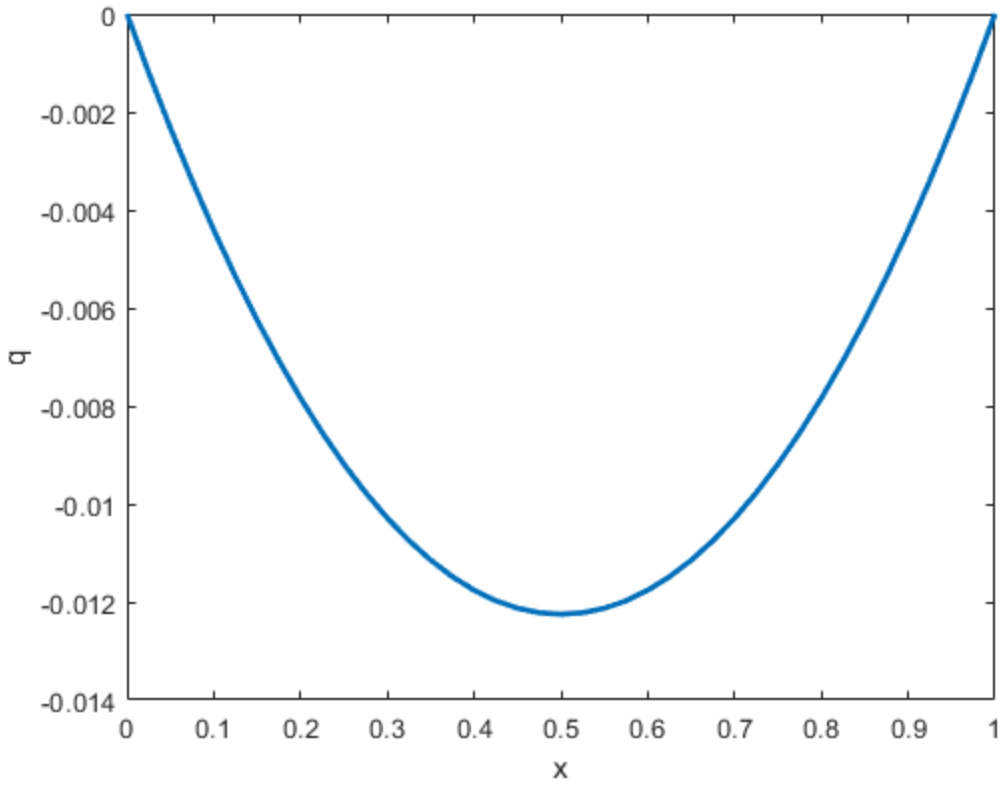



```
%2.6.3.b n=40
clc;
clear all;
n=40;
a=0;
b=1;
h=(b-a)/n;
x=0:h:1;
tau=10;
g=-9.8;

A(1,1)=2*n*tau;
A(1,2)=-n*tau;
for i=2:n-2
A(i,i-1)=-n*tau;
A(i,i)=2*n*tau;
A(i,i+1)=-n*tau;
end
A(n-1,n-2)=-n*tau;
A(n-1,n-1)=2*n*tau;

for i=1:n-1
f(i)=(1/(10*n))*g;
end

q1=(A)\f';
```

```
q(1)=0;
for i=1:n-1
q(i+1)=q1(i);
end
q(n+1)=0;
q'
plot(x,q,'linewidth',2)
xlabel('x')
ylabel('q')
```

```
ans =

         0
   -0.0012
   -0.0023
   -0.0034
   -0.0044
   -0.0054
   -0.0062
   -0.0071
   -0.0078
   -0.0085
   -0.0092
   -0.0098
   -0.0103
   -0.0107
   -0.0111
   -0.0115
   -0.0118
   -0.0120
   -0.0121
   -0.0122
   -0.0122
   -0.0122
   -0.0121
   -0.0120
   -0.0118
   -0.0115
   -0.0111
   -0.0107
   -0.0103
   -0.0098
   -0.0092
   -0.0085
   -0.0078
   -0.0071
   -0.0062
   -0.0054
   -0.0044
   -0.0034
   -0.0023
   -0.0012
```

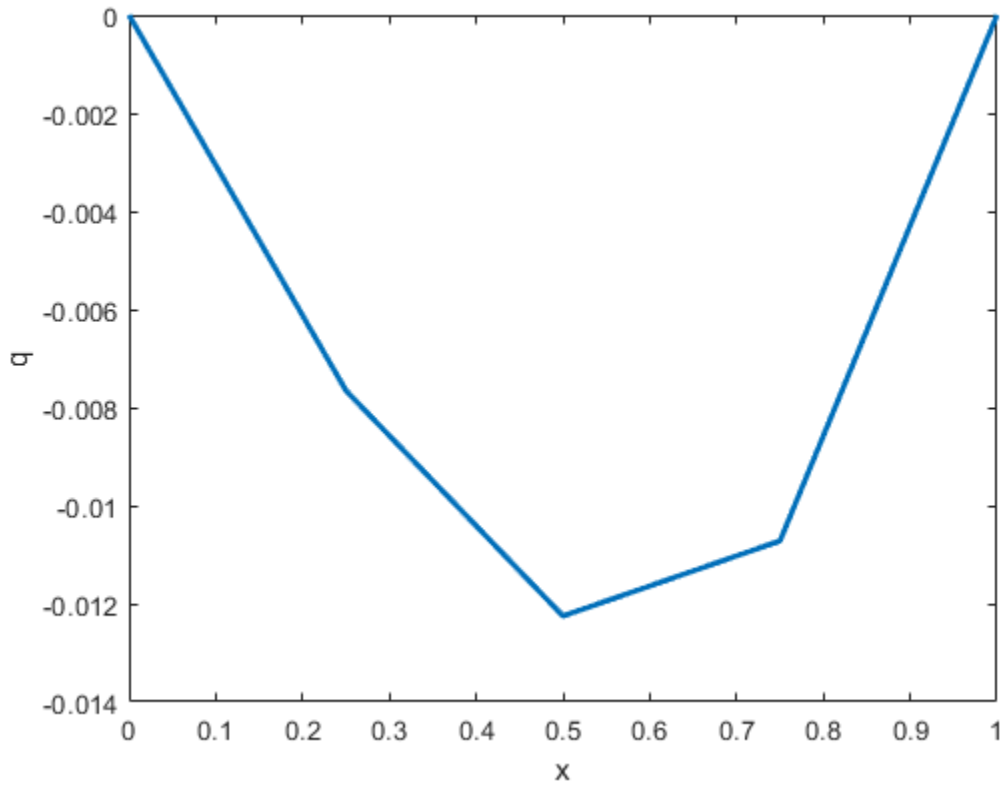
0




```
%2.6.3.c n=4
clc;
clear all;
n=4;
a=0;
b=1;
h=(b-a)/n;
x=0:h:1;
tau=10;
g=-9.8;

A(1,1)=2*n*tau;
A(1,2)=-n*tau;
for i=2:n-2
A(i,i-1)=-n*tau;
A(i,i)=2*n*tau;
A(i,i+1)=-n*tau;
end
A(n-1,n-2)=-n*tau;
A(n-1,n-1)=2*n*tau;

for i=1:n-1
f(i)=(i/(5*n^2))*g;
```

```
end

q1=(A)\f';

q(1)=0;
for i=1:n-1
q(i+1)=q1(i);
end
q(n+1)=0;
q'
plot(x,q,'linewidth',2)
xlabel('x')
ylabel('q')
```

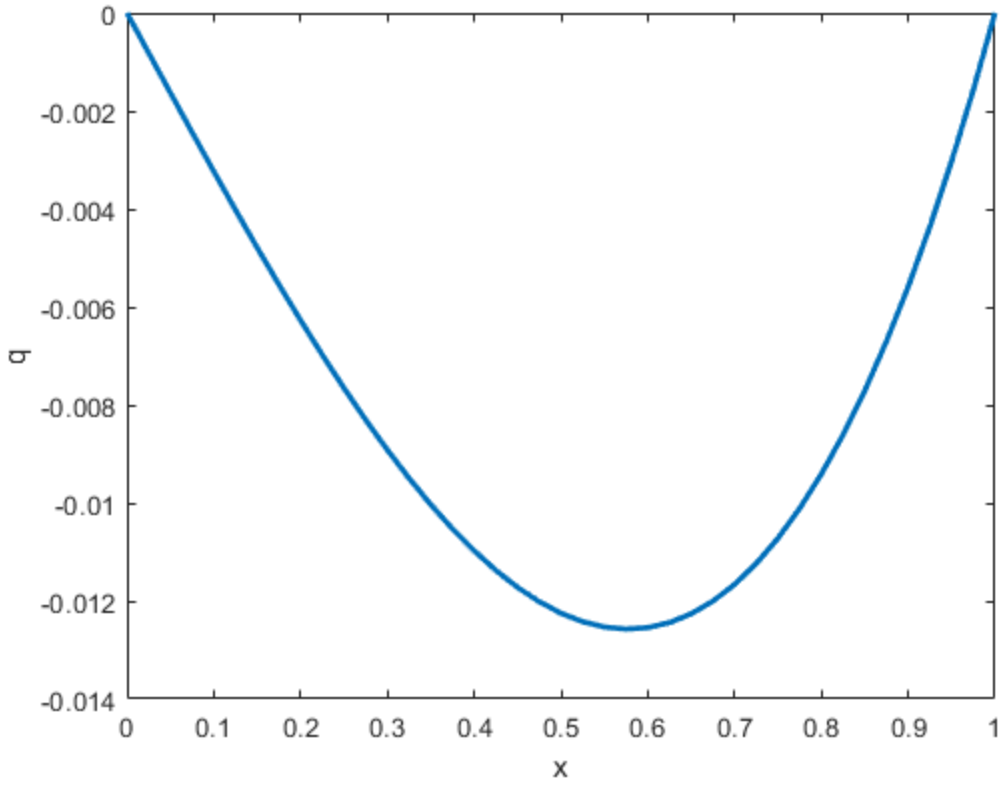
```
ans =

         0
   -0.0077
   -0.0122
   -0.0107
         0
```




```
%2.6.3.c n=40
clc;
clear all;
```

```
n=40;
a=0;
b=1;
h=(b-a)/n;
x=0:h:1;
tau=10;
g=-9.8;

A(1,1)=2*n*tau;
A(1,2)=-n*tau;
for i=2:n-2
A(i,i-1)=-n*tau;
A(i,i)=2*n*tau;
A(i,i+1)=-n*tau;
end
A(n-1,n-2)=-n*tau;
A(n-1,n-1)=2*n*tau;

for i=1:n-1
f(i)=(i/(5*n^2))*g;
end

q1=(A)\f';

q(1)=0;
for i=1:n-1
q(i+1)=q1(i);
end
q(n+1)=0;
q'
plot(x,q,'linewidth',2)
xlabel('x')
ylabel('q')


ans =

         0
   -0.0008
   -0.0016
   -0.0024
   -0.0032
   -0.0040
   -0.0048
   -0.0055
   -0.0063
   -0.0070
   -0.0077
   -0.0083
   -0.0089
   -0.0095
   -0.0100
   -0.0105
   -0.0110
```

```
-0.0114
-0.0117
-0.0120
-0.0122
-0.0124
-0.0125
-0.0126
-0.0125
-0.0124
-0.0123
-0.0120
-0.0117
-0.0112
-0.0107
-0.0101
-0.0094
-0.0086
-0.0077
-0.0067
-0.0056
-0.0044
-0.0030
-0.0016
      0
```



```
%2.8.1
clear all
clc

for n=2:16
    fprintf('n=%d, condition number is %.4e and norm is %f
\n',n,cond(hilb(n)), norm(hilb(n),2))
end
```

```
n=2, condition number is 1.9281e+01 and norm is 1.267592
n=3, condition number is 5.2406e+02 and norm is 1.408319
n=4, condition number is 1.5514e+04 and norm is 1.500214
n=5, condition number is 4.7661e+05 and norm is 1.567051
n=6, condition number is 1.4951e+07 and norm is 1.618900
n=7, condition number is 4.7537e+08 and norm is 1.660885
n=8, condition number is 1.5258e+10 and norm is 1.695939
n=9, condition number is 4.9315e+11 and norm is 1.725883
n=10, condition number is 1.6025e+13 and norm is 1.751920
n=11, condition number is 5.2232e+14 and norm is 1.774883
n=12, condition number is 1.7086e+16 and norm is 1.795372
n=13, condition number is 6.8773e+17 and norm is 1.813830
n=14, condition number is 4.2669e+17 and norm is 1.830595
n=15, condition number is 4.5413e+17 and norm is 1.845928
n=16, condition number is 3.9829e+17 and norm is 1.860036
```

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