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10/25/2021

208 9:00AM 10/15/2021

Yeying Chen 9:00AM 10/15/2021

Question 1

```
syms x
f(x) = x^4-3*x^2+x
```

f(x) = $x^4 - 3\,x^2 + x$

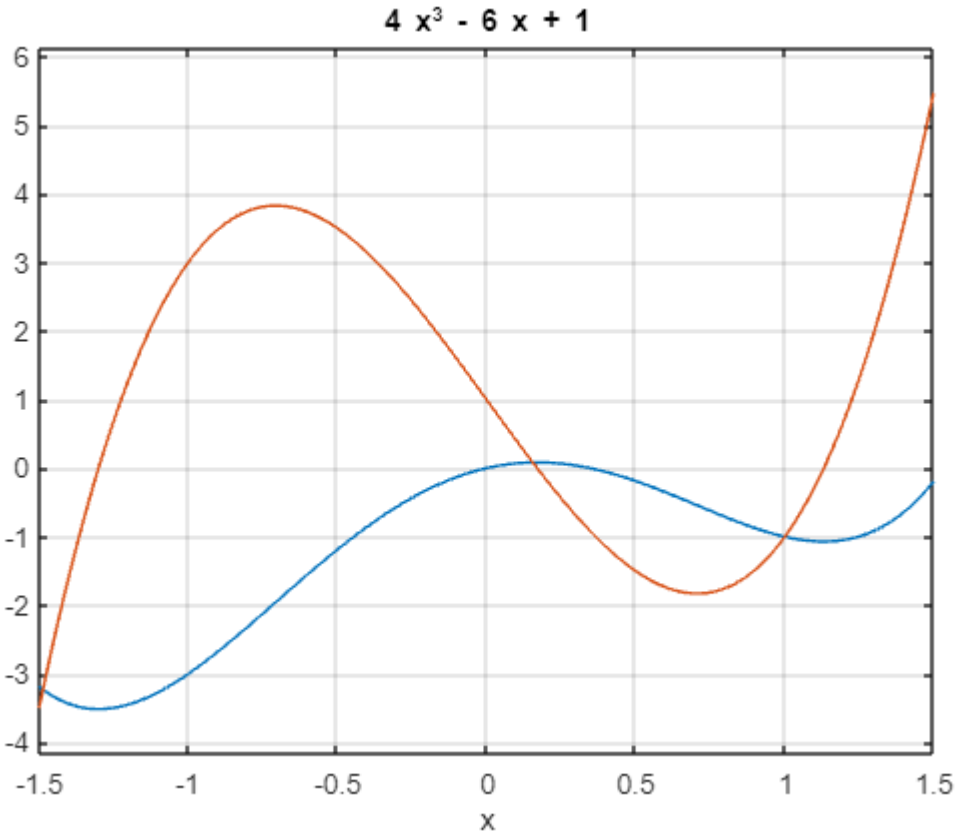
```
a=-1.5;b=1.5
```

```
b = 1.5000
```

```
hold off
ezplot(f(x),[a,b]) % Blue Line
hold on
df(x)=diff(f(x),x)
```

df(x) = $4\,x^3 - 6\,x + 1$

```
ezplot(df(x), [a,b]) %red line
hold off
grid on
```




```
mysolver(df(x),x)
```

```
ans =
```

$$\mathrm{root}\left(z^3-\frac{3z}{2}+\frac{1}{4},z\right)$$

```
c1=vpasolve(df(x),x,[-1.4 -1.2])
```

```
c1 = −1.300839565941577126232185180093 9
```

```
c2=vpasolve(df(x),x,[0 0.5])
```

```
c2 = 0.16993844331159127616610499085551
```

```
c3=vpasolve(df(x),x,[1 1.4])
```

```
c3 = 1.130901122629985850066080189238 4
```

```
[f(a) f(c1) f(c2) f(c3) (f(b))]'
```

```
ans =
```

$$\begin{pmatrix} -\frac{51}{16} \\ -3.513905038934789021409467688054 4 \\ 0.084135220710943074506792383505855 \\ -1.070230181776154053097324695451 5 \\ -\frac{3}{16} \end{pmatrix}$$

```
[vpa(f(a)) f(c1) f(c2) f(c3) vpa(f(b))]'
```

ans =

$$\begin{pmatrix} -3.1875 \\ -3.513905038934789021409467688054 4 \\ 0.084135220710943074506792383505855 \\ -1.070230181776154053097324695451 5 \\ -0.1875 \end{pmatrix}$$

The absolute Maximum is f(c2) = 0.0841352207

The absolute Mininum is f(c1) = -3.1539050389

The critical points are:

-1.3008

0.1699

1.1309

```
syms x
f(x) = x^(3/4)-sin(x)+1/2
```

f(x) =

$$x^{3/4} - \sin(x) + \frac{1}{2}$$

```
a=0;b=2*pi
```

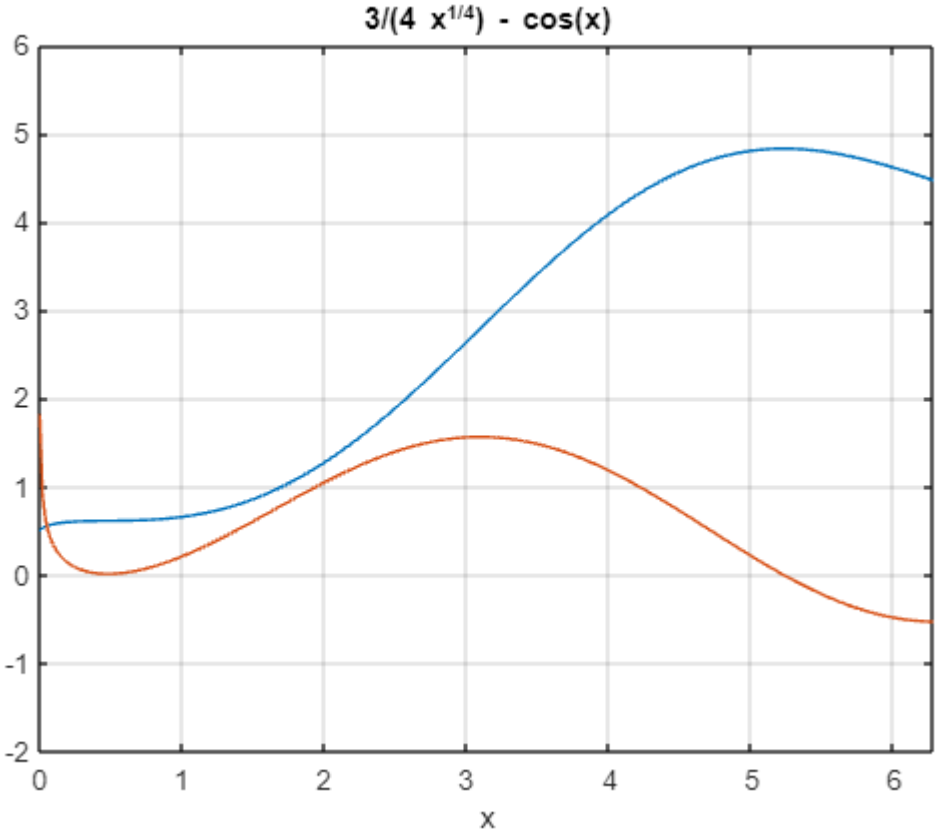
b = 6.2832

```
ezplot(f(x),[a,b]) % Blue Line
hold on
df(x)=diff(f(x),x)
```

df(x) =

$$\frac{3}{4\,x^{1/4}} - \cos(x)$$

```
ezplot(df(x), [a,b -2 6]) %red line
hold off
grid on
```




```
mysolver(df(x),x)
```

```
ans =
```

$$\text{solve}\left(\frac{3}{4\,x^{1/4}} - \cos(x), x, \text{Real}\right)$$

```
c1=vpasolve(df(x),x,[4.5 5.5])
```

```
c1 =
```

$$5.231279861964813503291437378619 6$$

```
[f(a) f(c1) (f(b))]'
```

```
ans =
```

$$\begin{pmatrix} \frac{1}{2} \\ 4.827412784480720791458138191492 1 \\ (2\,\pi)^{3/4}+\frac{1}{2} \end{pmatrix}$$

```
[vpa(f(a)) f(c1) vpa(f(b))]'
```

```
ans =
```

$$\begin{pmatrix} 0.5 \\ 4.827412784480720791458138191492 1 \\ 4.468577824072802499272009462119 \end{pmatrix}$$

The absolute Maximum is f(c2) = 4.8274127844

The absolute Mininum is f(c1) = 0.5

The critical points are:

5.2312