In [73]:
```
from sympy import *
from sympy.plotting import (plot, plot_parametric)
```

#1a Derivative and Critical Values

In [74]:
```
x=symbols('x', real=True)
f=x**(4/5)*(x-4)**2
df=diff(f,x)
print(df.simplify())
cVals=solve(df,x)
print("The critical values of f are:",cVals)
```

```
12.8*x**(-0.2) - 14.4*x**0.8 + 2.8*x**1.8
The critical values of f are: [1.14285714285714, 4.00000000000000]
```

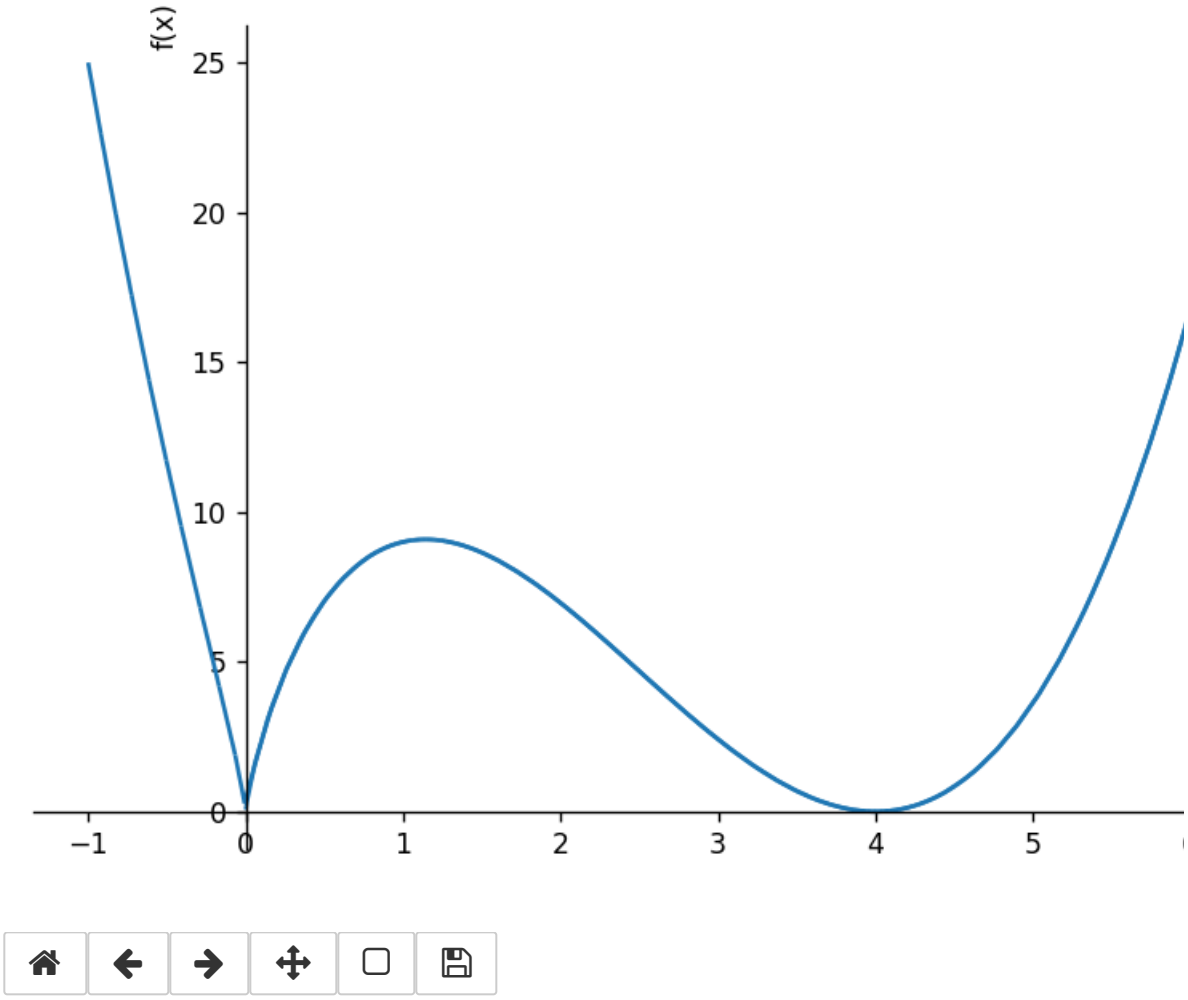
#1bc Graph of f and conclusion based on the graph

In [75]:
```
matplotlib notebook
```

In [76]:

```
g=abs(x)**(4/5)*(x-4)**2
plot((f,(x,-1,6,)),(g,(x,-1,6)))
print("The critical value of 1.14285714285714 is a local maximum.")
print("The critical value of 4.00000000000000 is a local minimum.")
```

Figure 1



```
The critical value of 1.14285714285714 is a local maximum.
The critical value of 4.00000000000000 is a local minimum.
```

#2 Critical values of f

In [ ]:

#2b absolute extrema on [0,1]

In [ ]:

In [ ]:
```
matplotlib notebook
```

In [ ]:

#3a Mean Value Theorem: find c

In [ ]:

#3b Illustration of MVT

In [ ]:

#4a Simplify f' - g'

In [ ]:

#4bc Conclusion based on answer to a

In [ ]: