In [7]:
```
from sympy import *
from sympy.plotting import (plot, plot_parametric)
```

#1a Derivative and Critical Values

In [14]:
```
x=symbols('x', real=True)
f=x**nsimplify(4/5)*(x-4)**2
df=diff(f,x)
print("f'=",df.simplify())
cVals=solve(df,x)
cVals.append(0)
print("The critical values of f are:",cVals)
```

```
f'= 2*(x - 4)*(7*x - 8)/(5*x**(1/5))
The critical values of f are: [8/7, 4, 0]
```

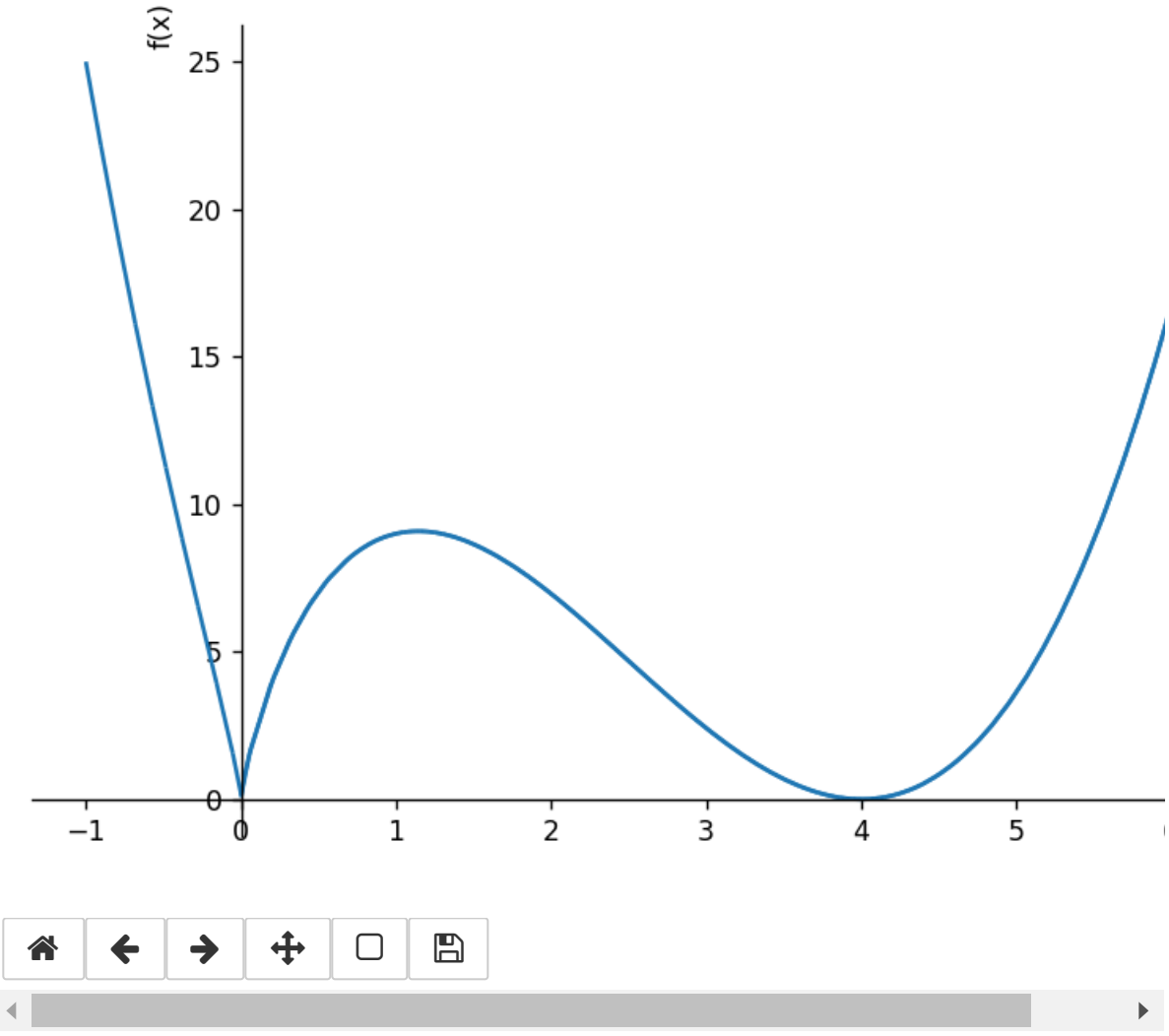
#1bc Graph of f and conclusion based on the graph

In [9]:
```
matplotlib notebook
```

In [12]:

```
g=abs(x)**(4/5)*(x-4)**2
plot((f,(x,-1,6,)),(g,(x,-1,6)))
print("The critical value of 8/7 is a local maximum.")
print("The critical value of 4 is a local minimum.")
print("The critical value of 0 is a local minimum.")
```

Figure 1




```
The critical value of 8/7 is a local maximum.
The critical value of 4 is a local minimum.
The critical value of 0 is a local minimum.
```

#2 Critical values of f

In [46]:

```
1080863910568919/9007199254740992
```

#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 [ ]: