

In [27]:

```
%matplotlib inline

import matplotlib
import numpy as np
import matplotlib.pyplot as plt
```

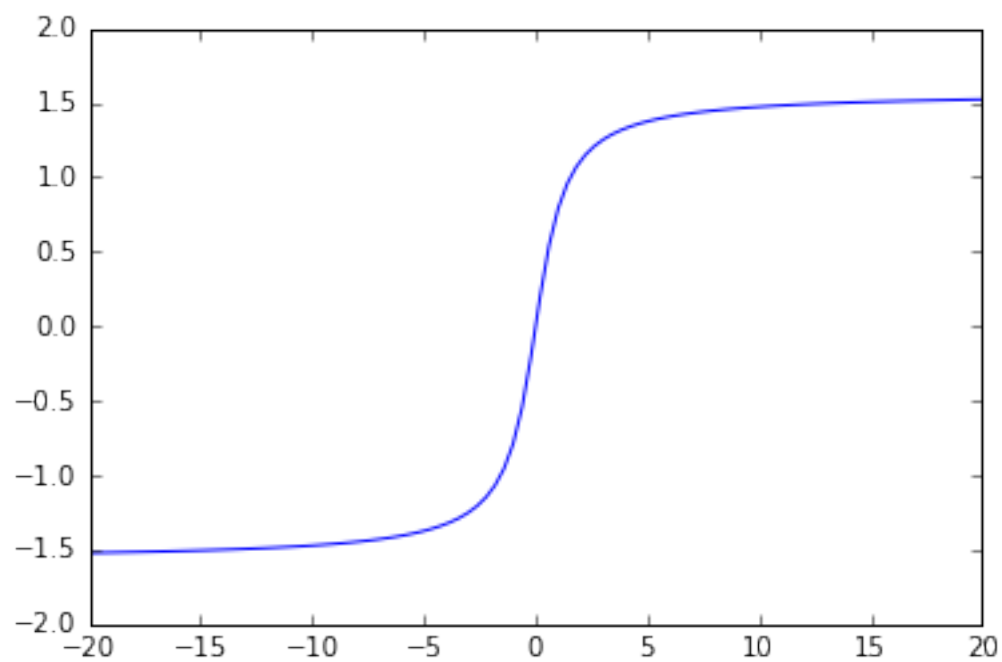
In [28]:

```
def f(x):
    return np.arctan(x)

def df(x):
    return 1/(1 + x**2)

xmesh = np.linspace(-20,20,100)
plt.plot(xmesh,f(xmesh))

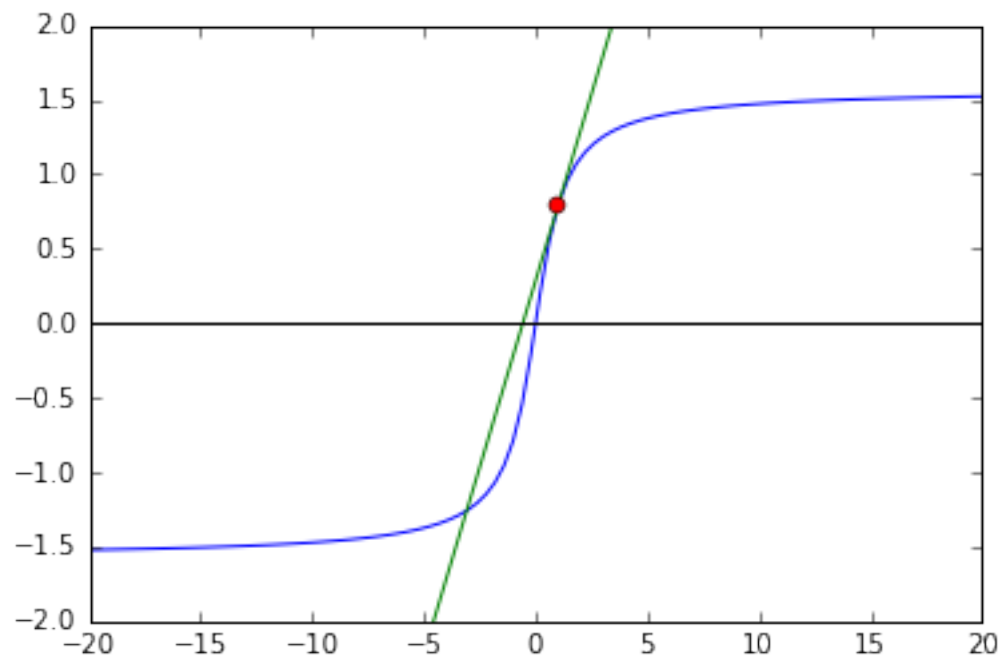
#xk = [2]  #this is a bad initial guess
xk = [1]  #this is a good initial guess
```



In [29]:

```
#Do this next cell many times  
x = xk[-1] #grab last guess  
slope = df(x)  
  
#plot approximate function  
pt.plot(xmesh, f(xmesh))  
pt.plot(xmesh, f(x) + slope*(xmesh - x))  
pt.plot(x, f(x), 'o')  
pt.ylim([-2, 2])  
pt.axhline(0, color="black")  
  
#compute approximate root/next iterate  
xnew = x - f(x)/slope  
xk.append(xnew)  
print(xnew)
```

-0.570796326795



In []: