In[1]:= **Derivative of f(x) = (.5/(sqrt(1 + x^2))) - sqrt(1 + x^2)(1 - (.5/(1 + x^2))) + x**

Derivative:

Show steps

$$\frac{d}{dx}\left(f(x) = \frac{0.5}{\sqrt{1+x^2}} - \sqrt{1+x^2}\left(1 - \frac{0.5}{1+x^2}\right) + x\right) = \left(f'(x) = \frac{x\left(-x^2 - 2.\right)}{\left(x^2+1\right)^{3/2}} + 1\right)$$

Alternate form:

$$f'(x) = \frac{x^4 + 2.\,x^2 - 2.\,\sqrt{x^2+1}\,x - \sqrt{x^2+1}\,x^3 + 1.}{\left(x^2 + 1.\right)^2}$$

Expanded form:

Show steps

$$f'(x) = -\frac{2.\,x}{\left(x^2+1\right)^{3/2}} - \frac{x^3}{\left(x^2+1\right)^{3/2}} + 1$$

WolframAlpha

In[5]:= **Derivative of f(x) = ((x (-x^2 - 2.))/(x^2 + 1)^(3/2) + 1)**

Derivative:

Show steps

$$\frac{d}{dx}\left(f(x) = \frac{x\left(-x^2 - 2.\right)}{\left(x^2+1\right)^{3/2}} + 1\right) = \left(f'(x) = \frac{x^2 - 2.}{\sqrt{x^2+1}\,\left(x^2+1.\right)^2}\right)$$

Alternate forms:

$$f'(x) = \frac{x^2 - 2}{\left(x^2+1\right)^{5/2}}$$

$$f'(x) = \frac{\left(x^2 - 2.\right)\sqrt{x^2+1}}{\left(x^2+1.\right)^3}$$

$$f'(x) = \frac{x^2}{\sqrt{x^2+1}\,\left(x^2+1.\right)^2} - \frac{2.}{\sqrt{x^2+1}\,\left(x^2+1.\right)^2}$$

Alternate form assuming x is real:

$$f'(x) = \frac{x^2}{\sqrt{x^2+1}\,\left(x^2+1.\right)^2} - \frac{2.}{\sqrt{x^2+1}\,\left(x^2+1.\right)^2} + 0.\,i$$

WolframAlpha

In[48]:=
```
FirstDerivative[x_] := ((x (-(x^2) - 2)) / (((x^2) + 1)^(3 / 2))) + 1
FirstD[x_] := (x (-x^2 - 2.)) / (x^2 + 1)^(3 / 2) + 1
```

In[9]:=
```
FirstDerivative[0.6]
```

Out[9]= 0.107199

In[46]:=
```
SecondDerivative[x_] := (((x^2) - 2)) / ((Sqrt[(x^2) + 1]) ((x^2) + 1)^2)
SecondD[x_] := (x^2 - 2.) / (Sqrt[x^2 + 1] (x^2 + 1.)^2)
```

In[11]:=
```
SecondDerivative[0.6]
```

Out[11]= -0.76032

In[32]:=
```
0.6 - (FirstDerivative[0.6] / SecondDerivative[0.6])
```

Out[32]= 0.740991

In[35]:=
```
% - (FirstDerivative[%] / SecondDerivative[%])
```

In[50]:=
```
0.7861314312243325`
```

In[52]:=
```
0.7861314312243325`
0.6 - (FirstD[0.6] / SecondD[0.6])
```

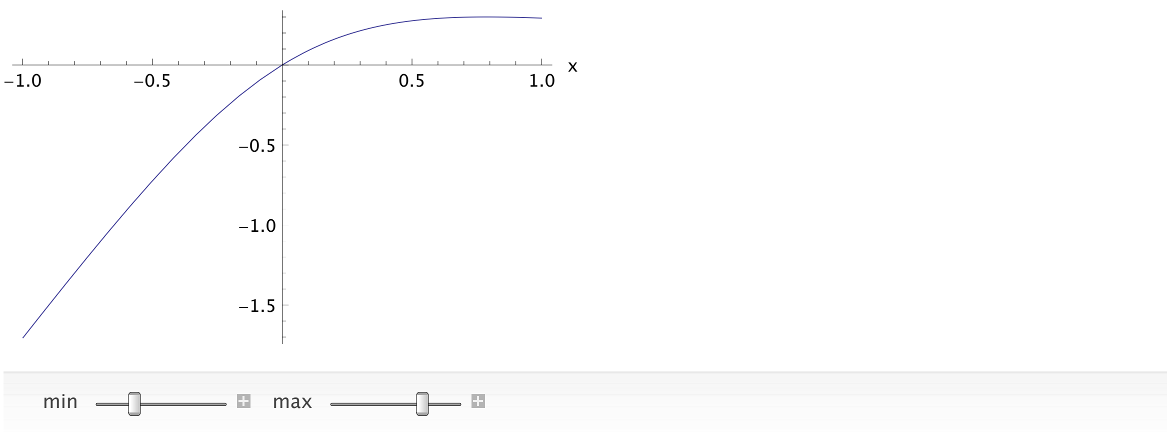
Out[52]= 0.786131

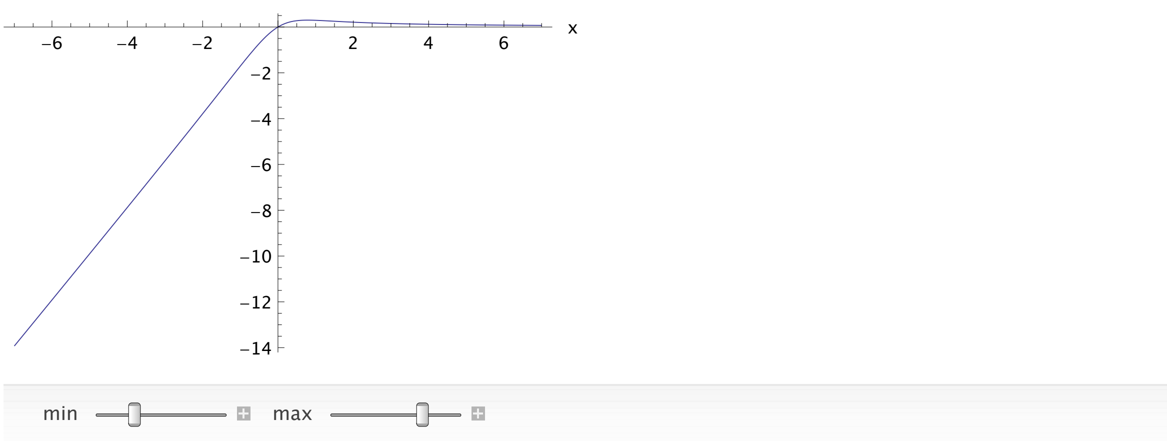
In[51]:= Plot f(x) = (.5/(sqrt(1 + x^2))) - sqrt(1 + x^2)(1 - (.5/(1 + x^2))) + x

Input interpretation:

plot	$f(x) = \frac{0.5}{\sqrt{1+x^2}} - \sqrt{1+x^2}\left(1 - \frac{0.5}{1+x^2}\right) + x$

Plots:





WolframAlpha

In[64]:= `0.6 - (FirstD[0.6] / SecondD[0.6])`

Out[64]= 0.740991

In[73]:= `% - (FirstD[%] / SecondD[%])`

Out[73]= 0.786151

```
In[74]:= % - (FirstD[%] / SecondD[%])

Out[74]= 0.786151

In[75]:= % - (FirstD[%] / SecondD[%])

Out[75]= 0.786151

In[76]:= % - (FirstD[%] / SecondD[%])

Out[76]= 0.786151

In[77]:= % - (FirstD[%] / SecondD[%])

Out[77]= 0.786151

In[78]:= .786151 - (FirstD[.786151] / SecondD[.786151])

Out[78]= 0.786151
```