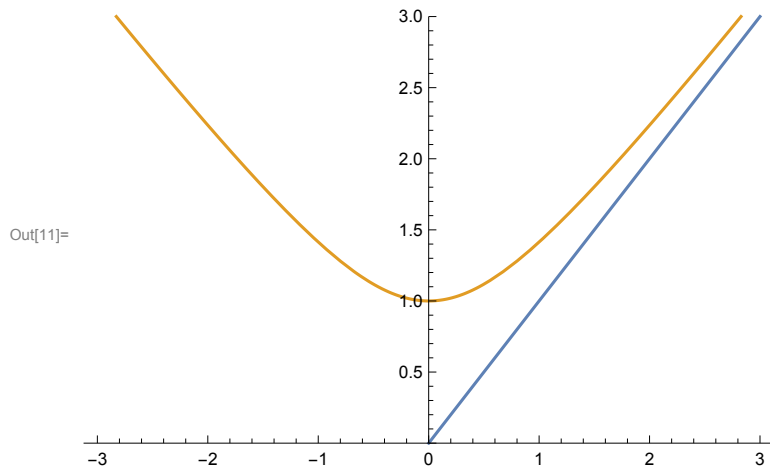


```
In[11]:= Plot[{x, Sqrt[1+x^2]}, {x, -3, 3}, PlotRange -> {0, 3}]
```



This function $f: \mathbb{R} \rightarrow \mathbb{R}$ defined by $f(x) = \sqrt{1+x^2}$ satisfies $|f(x) - f(y)| < |x-y|$ for all x, y in \mathbb{R} . (This follows from the Mean Value Theorem and the observation that $|f'(x)| < 1$ for all x .)

But there is no $c < 1$ such that $|f(x) - f(y)| \leq c|x-y|$ for all x, y in \mathbb{R} . So f is not a contraction, and indeed f has no fixed points.