\documentclass{article}

\usepackage{tikz}

\begin{document}

\begin{tikzpicture}

%\draw[step=.5cm,gray,ultra thin] (-2.9,-2.9) grid (2.9,2.9);

\draw[->] (-5,0) -- (5,0);

\draw[->] (0,-3) -- (0,3);

\draw[dash dot] (-pi/2,-3) -- (-pi/2,3);

\draw[dash dot] (pi/2,-3) -- (pi/2,3);

\draw[dash dot] (-pi\*3/2,-3) -- (-pi\*3/2,3);

\draw[dash dot] (pi\*3/2,-3) -- (pi\*3/2,3);

\draw[color=blue, domain= -pi/2+0.3:pi/2-0.3] plot ({\x,tan(\x r)}) node[right] {$f(x) = \tan x$};

\draw[color=blue, domain= pi/2+0.3:3\*pi/2-0.3] plot ({\x,tan(\x r)}) ;

\draw[color=blue, domain= -3\*pi/2+0.3:-pi/2-0.3] plot ({\x,tan(\x r)});

\draw (0,0) node[below=2pt,fill=white] {$0$};

\draw (pi/2,0) node[below=2pt,fill=white] {$\frac{\pi}{2}$};

\draw (-pi/2,0) node[below=2pt,fill=white] {$-\frac{\pi}{2}$};

\draw (3\*pi/2,0) node[below=2pt,fill=white] {$\frac{3\pi}{2}$};

\draw (-3\*pi/2,0) node[below=2pt,fill=white] {$-\frac{3\pi}{2}$};

\draw (-pi,0) node[below=2pt,fill=white] {$-\pi$};

\draw (pi,0) node[below=2pt,fill=white] {$\pi$};

\end{tikzpicture}

\end{document}