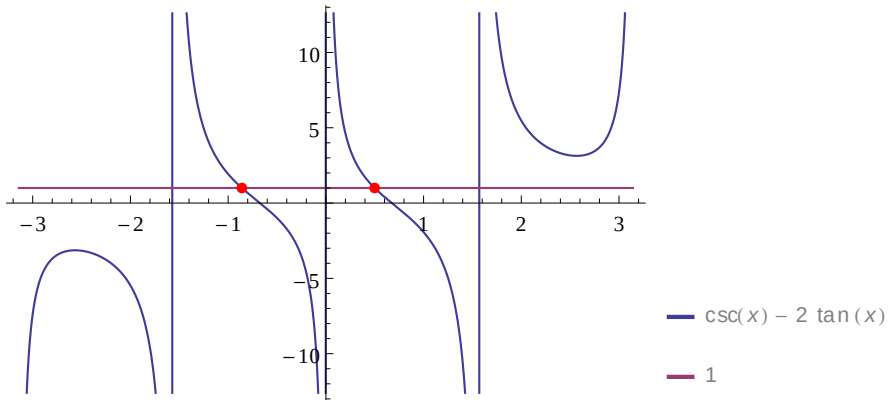
WolframAlpha computational knowledge engine

csc(x)−2tan(x)=1

Input:

$$\csc(x) - 2\tan(x) = 1$$

Plot:



Alternate forms:

$$\csc(x) = 2\tan(x) + 1$$

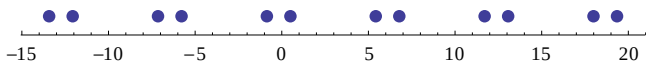
Alternate form assuming x is real:

$$-\frac{2\sin(x)}{\cos(2x) - 1} - \frac{2\sin(2x)}{\cos(2x) + 1} = 1$$

Solutions:

$$x \approx 2.(3.14159\,n - 0.429693)\,, \quad n \in \mathbb{Z}$$

Number line:



Real solutions:

$$x = -\tan^{-1}\left(\frac{1}{4}\left(1 - \frac{66}{25}\sqrt{\frac{3}{92 + 5\sqrt[3]{6616 - 24\sqrt{273}} + 10\sqrt[3]{827 + 3\sqrt{273}}}} + \right.\right.$$

$$\frac{\sqrt[3]{6616-24\sqrt{273}}\ \sqrt{92+5\sqrt[3]{6616-24\sqrt{273}}+10\sqrt[3]{827+3\sqrt{273}}}}{40\sqrt{3}}+$$

$$\frac{\sqrt[3]{827+3\sqrt{273}}\ \sqrt{92+5\sqrt[3]{6616-24\sqrt{273}}+10\sqrt[3]{827+3\sqrt{273}}}}{20\sqrt{3}}-$$

$$\frac{\left(92+5\sqrt[3]{6616-24\sqrt{273}}+10\sqrt[3]{827+3\sqrt{273}}\right)^{3/2}}{600\sqrt{3}}-$$

$$\frac{7}{50}\sqrt{3\left(92+5\sqrt[3]{6616-24\sqrt{273}}+10\sqrt[3]{827+3\sqrt{273}}\right)}+$$

$$7\Bigg/\left(5\sqrt{\left(3\Bigg/\left(\left(92+5\sqrt[3]{6616-24\sqrt{273}}+10\sqrt[3]{827+3\sqrt{273}}\right)\right.\right.\right.$$

$$\left.\left.\left.\left(\frac{184}{75}-\frac{1}{15}\sqrt[3]{6616-24\sqrt{273}}-\frac{2}{15}\sqrt[3]{827+3\sqrt{273}}+\frac{24}{25}\right.\right.\right.\right.$$

$$\left.\left.\left.\left.\sqrt{\frac{3}{92+5\sqrt[3]{6616-24\sqrt{273}}+10\sqrt[3]{827+3\sqrt{273}}}}\right)\right)\right)\right)-$$

$$\frac{1}{5}\sqrt{\left(\frac{184}{75}-\frac{1}{15}\sqrt[3]{6616-24\sqrt{273}}-\frac{2}{15}\sqrt[3]{827+3\sqrt{273}}+\right.}$$

$$\left.\frac{24}{25}\sqrt{\frac{3}{92+5\sqrt[3]{6616-24\sqrt{273}}+10\sqrt[3]{827+3\sqrt{273}}}}\right)+$$

$$\frac{1}{8}\sqrt[3]{6616-24\sqrt{273}}\sqrt{\left(\frac{184}{75}-\frac{1}{15}\sqrt[3]{6616-24\sqrt{273}}-\frac{2}{15}\sqrt[3]{827+3\sqrt{273}}+\frac{24}{25}\sqrt{\frac{3}{92+5\sqrt[3]{6616-24\sqrt{273}}+10\sqrt[3]{827+3\sqrt{273}}}}\right)}+$$

$$\frac{1}{4}\sqrt[3]{827+3\sqrt{273}}\sqrt{\left(\frac{184}{75}-\frac{1}{15}\sqrt[3]{6616-24\sqrt{273}}-\frac{2}{15}\sqrt[3]{827+3\sqrt{273}}+\frac{24}{25}\sqrt{\frac{3}{92+5\sqrt[3]{6616-24\sqrt{273}}+10\sqrt[3]{827+3\sqrt{273}}}}\right)}+$$

$$\frac{5}{8}\left(\frac{184}{75}-\frac{1}{15}\sqrt[3]{6616-24\sqrt{273}}-\frac{2}{15}\sqrt[3]{827+3\sqrt{273}}+\frac{24}{25}\sqrt{\frac{3}{92+5\sqrt[3]{6616-24\sqrt{273}}+10\sqrt[3]{827+3\sqrt{273}}}}\right)^{3/2}-$$

$$\frac{1}{10}\sqrt{\left(3\left(92+5\sqrt[3]{6616-24\sqrt{273}}+10\sqrt[3]{827+3\sqrt{273}}\right)\left(\frac{184}{75}-\frac{1}{15}\sqrt[3]{6616-24\sqrt{273}}-\frac{2}{15}\sqrt[3]{827+3\sqrt{273}}+\frac{24}{25}\sqrt{\frac{3}{92+5\sqrt[3]{6616-24\sqrt{273}}+10\sqrt[3]{827+3\sqrt{273}}}}\right)\right)}\approx$$

$$-0.859387$$