6.2: Graphs of Other Trigonometric Functions
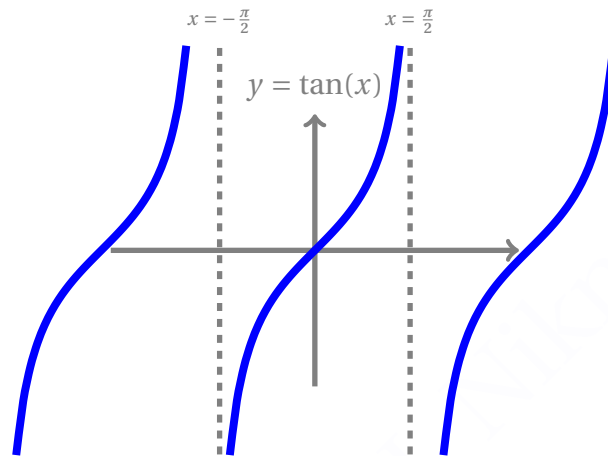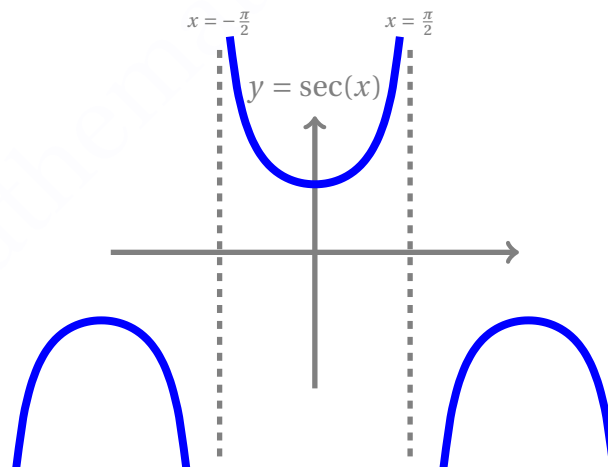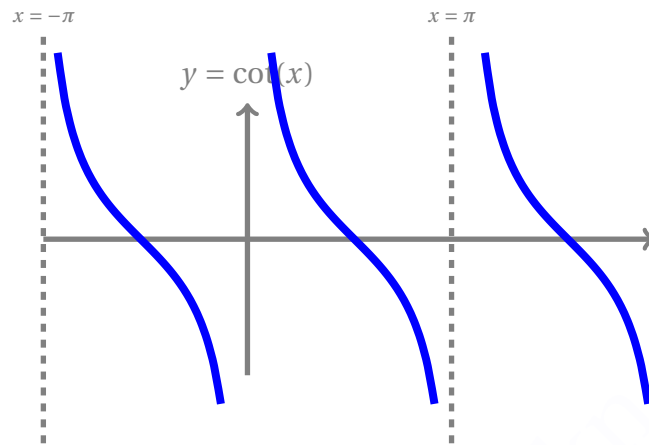
- Tangent Function $\tan(x) = \dfrac{\sin(x)}{\cos(x)}$. **Vertical Asymptotes** are when the denominator is zero. Period is π. Domain is where the denominator is not zero. Range is all real numbers.

- Secant Function $\sec(x) = \dfrac{1}{\cos(x)}$. **Vertical Asymptotes** are when the denominator is zero. Domain is where the denominator is not zero. Range is $(-\infty, -1] \cup [1, \infty)]$. Period is 2π.

- Cotangent Function $\cot(x) = \dfrac{\cos(x)}{\sin(x)}$. **Vertical Asymptotes** are when the denominator is zero. Period π. Domain is where the denominator is not zero. Range is all real numbers.
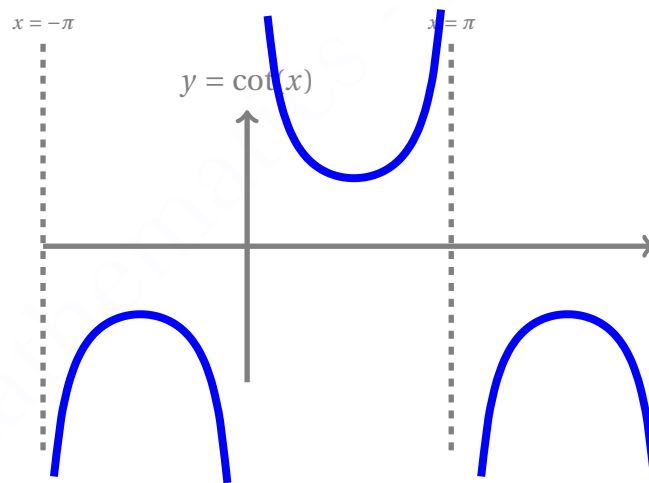

- Cosecant Function $\csc(x) = \dfrac{1}{\sin(x)}$. **Vertical Asymptotes** are when the denominator is zero. Domain is where the denominator is not zero. Range is $(-\infty, -1] \cup [1, \infty)]$. Period 2π.

- Transformations: Transformations may be applied as before to change the period, location of asymptotes, and domain and range.

  For example, for function $f(x) = A\tan(Bx + C) + D$, period is $P = \dfrac{\pi}{|B|}$; asymptotes are calculated by solving for x in $Bx + C = \dfrac{\pi}{2} + k\pi$; domain is all x but the x-values found in $Bx + C = \dfrac{\pi}{2} + k\pi$; range is $\mathbb{R}$.

  And for function $f(x) = A\sec(Bx + C) + D$, period is $P = \dfrac{2\pi}{|B|}$; asymptotes are calculated by solving for x in $Bx + C = \dfrac{\pi}{2} + 2k\pi$; domain is all x but the x-values found in $Bx + C = \dfrac{\pi}{2} + 2k\pi$; range is $(-\infty, -A] \cup [A, \infty)$.

1. Consider the function $f(x) = 3\tan(2x) - 5$.

   (a) Find the period.
   (b) Find the vertical asymptotes in one period.
   (c) Find the domain.
   (d) Find the range.

2. Consider the function $f(x) = 7\sec(5x) - 5$.

   (a) Find the period.
   (b) Find the vertical asymptotes in one period.
   (c) Find the domain.
   (d) Find the range.

Related Video

- Graph of Other Trigonometric Functions:
  https://mediahub.ku.edu/media/MATH+-+Graph+of+Other+Trigonometric+Functions.m4v/1_c7f8un4l