Graphing Tan, Cot, Sec, Csc Video Lecture

Sections 6.5 and 6.6

Course Learning Objectives:
Demonstrate an understanding of trigonometric functions and their applications.

Weekly Learning Objectives:

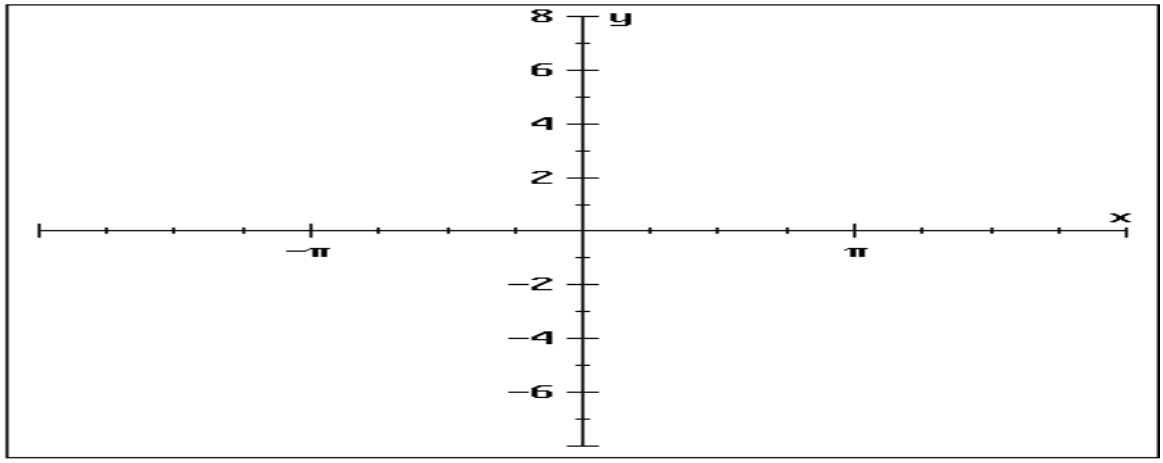
1) **Graph functions of the form y=a(tanbx+c)+d and y=a(cotbx+c)+d using transformations.**
2) **Graph functions of the form y=a(cscbx+c)+d and y=a(secbx+c)+d using transformations.**
3) **Determine the domain, range, amplitude, period, intercepts, extrema, asymptotes and symmetry of the tangent, cotangent, secant and cosecant functions.**
4) **Graph tangent, cotangent, secant and cosecant functions using key points.**

Graphing Tangent, Cotangent, Secant and Cosecant

$f(x) = \tan x$

Note: $\tan(t + n\pi) = \tan t$ We say $\tan t$ has a period of π

x	$\tan x$	x	$\tan x$	x	$\tan x$	x	$\tan x$
0		$\frac{2\pi}{3}$		$\frac{7\pi}{6}$		$\frac{5\pi}{3}$	
$\frac{\pi}{6}$		$\frac{3\pi}{4}$		$\frac{5\pi}{4}$		$\frac{7\pi}{4}$	
$\frac{\pi}{3}$		$\frac{5\pi}{6}$		$\frac{4\pi}{3}$		$\frac{11\pi}{6}$	
$\frac{\pi}{2}$		π		$\frac{3\pi}{2}$		2π	



Domain: Range: Symmetry:

Period: Intercepts: V. Asymp:

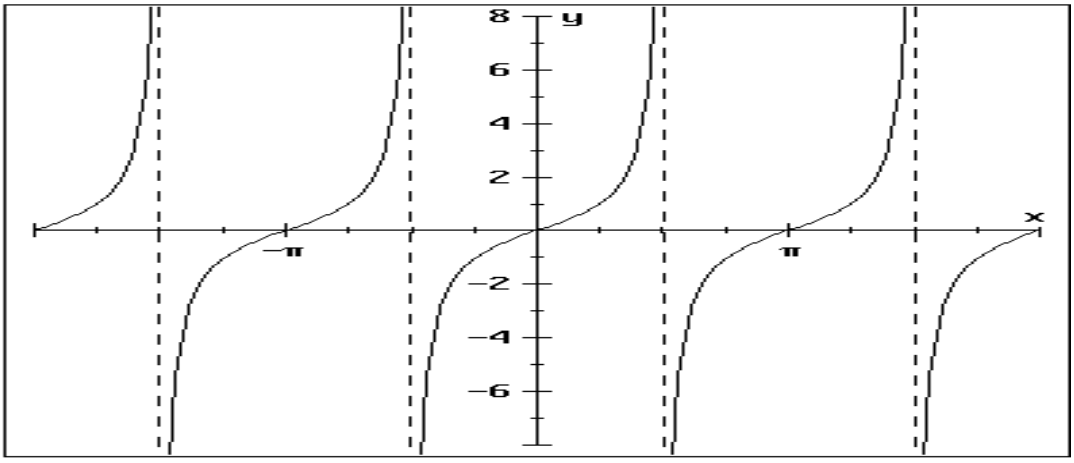
The most general form of the equation is

$f(x) = a\tan\,(bx + c) + d\; = a\tan b(x + \frac{c}{b}) + d$

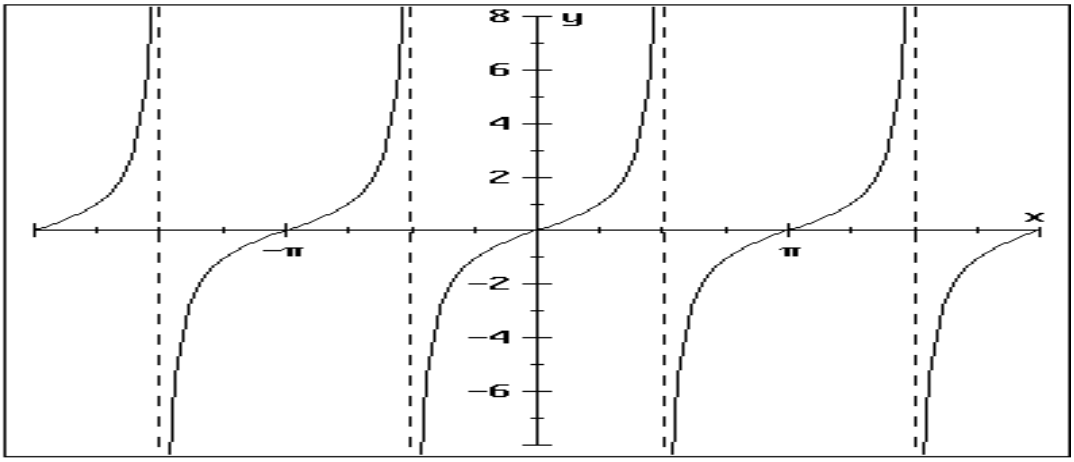
a→vertical stretch/compression
b→horizontal stretch/compression (period)
$\frac{c}{b}$→horizontal translation (phase shift)
d→vertical translation

Indicate the transformations implied and sketch the graph of each of the following:

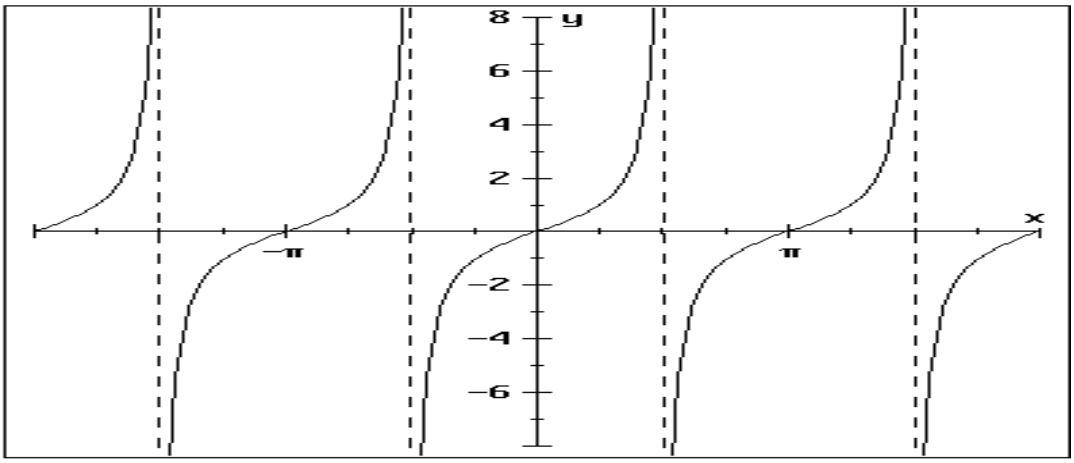
$f(x) = 2\tan x$



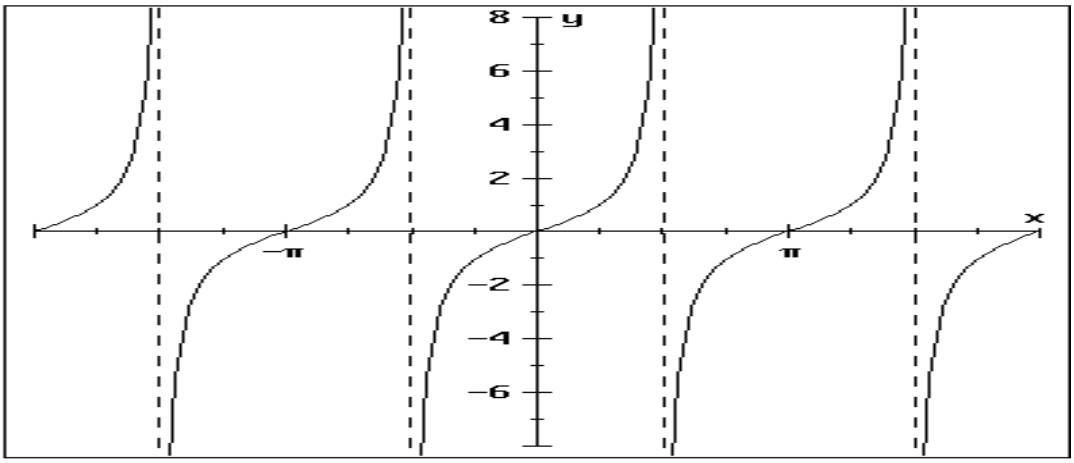
$g(x) = -\frac{1}{2}\tan x$



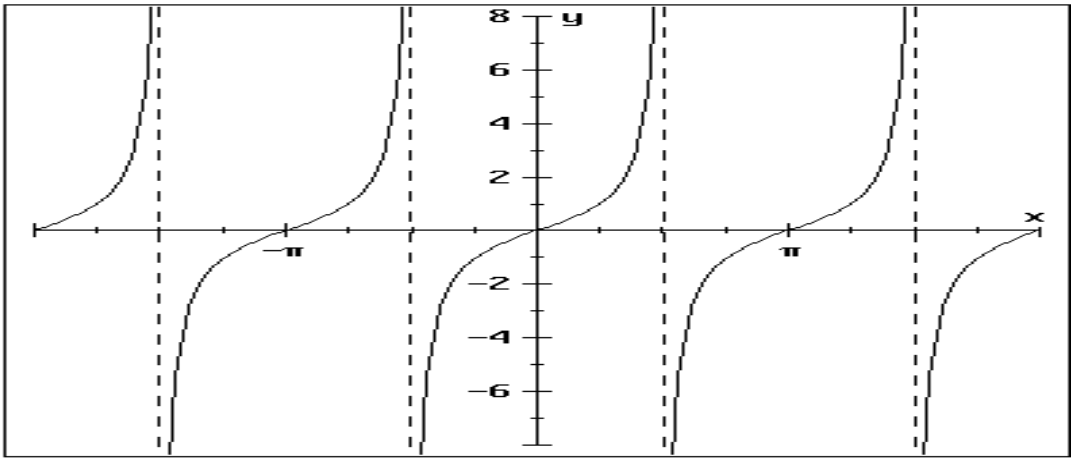
$l(x) = \tan\left(x - \frac{\pi}{4}\right)$



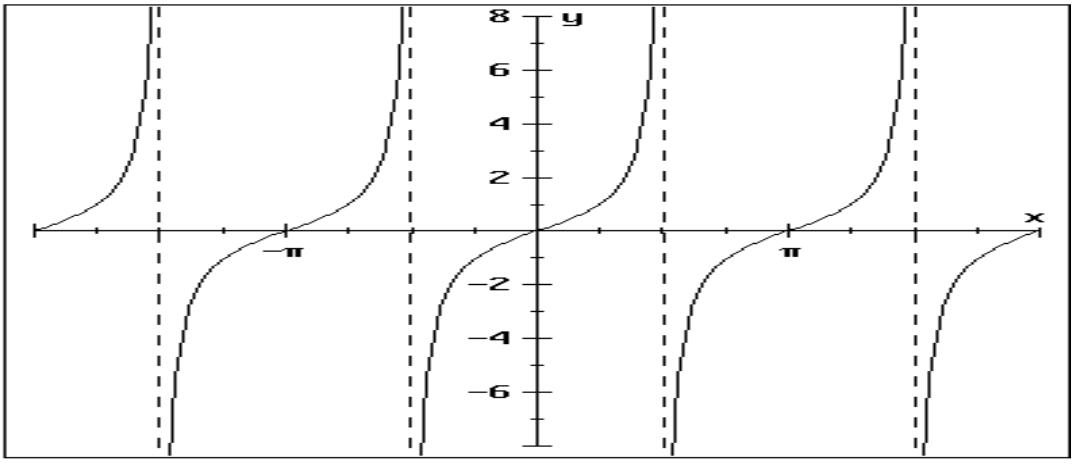
$r(x) = 4\tan 2x$



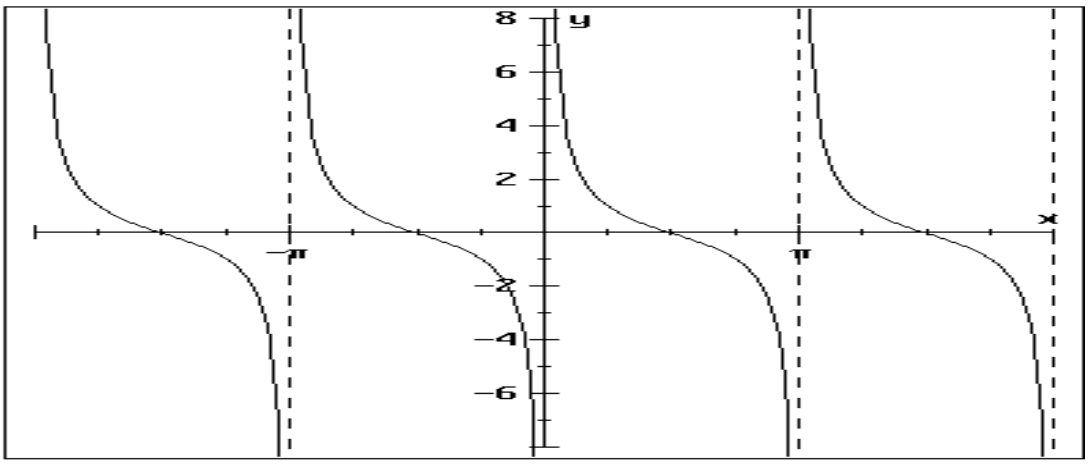
$h(x) = |\tan x|$



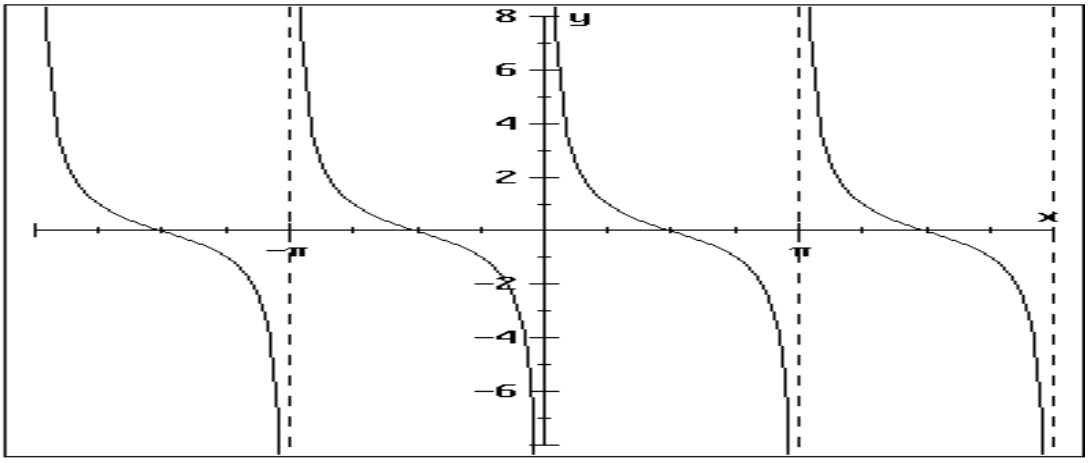
$f(x) = \cot(x) = \frac{1}{\tan x}$



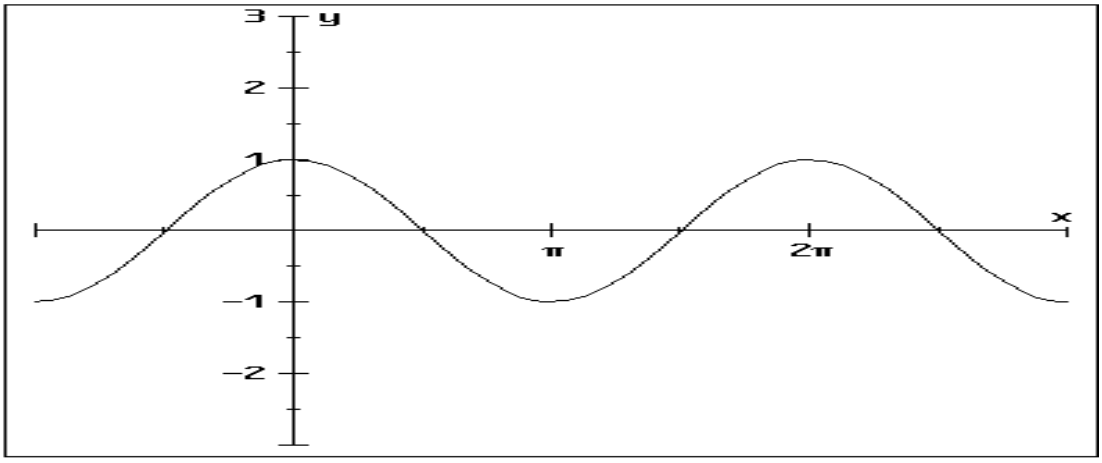
$g(x) = \cot\left(x + \frac{\pi}{4}\right)$



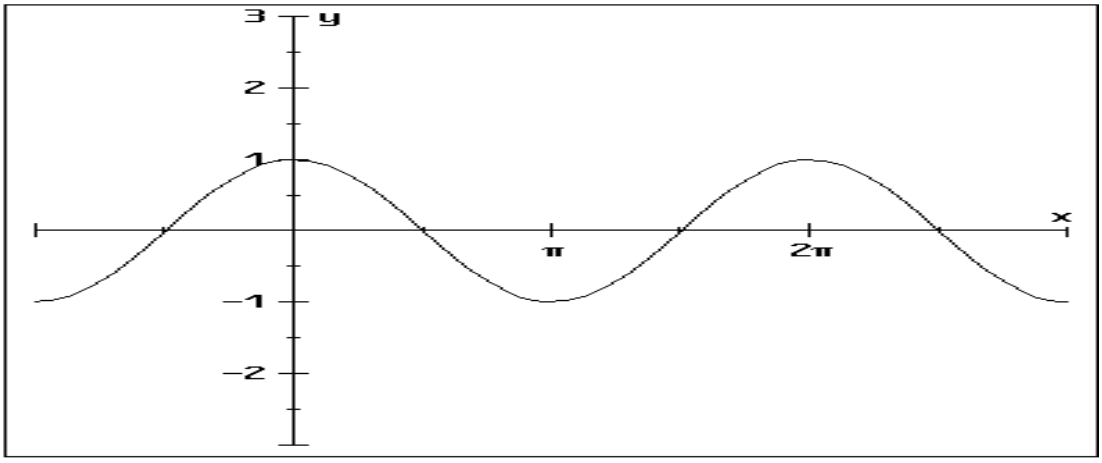
$g(x) = 2\cot 2x$



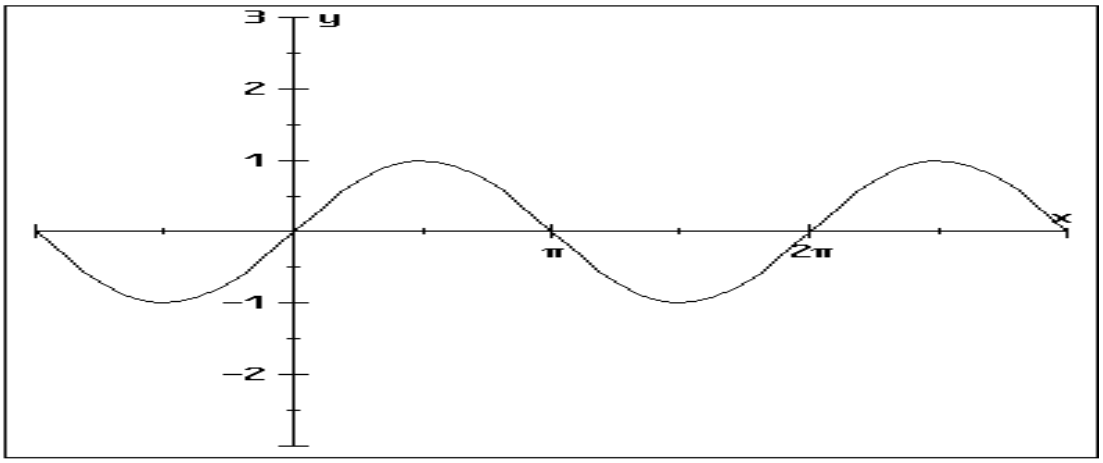
$f(x) = \sec\left(x - \frac{\pi}{4}\right)$



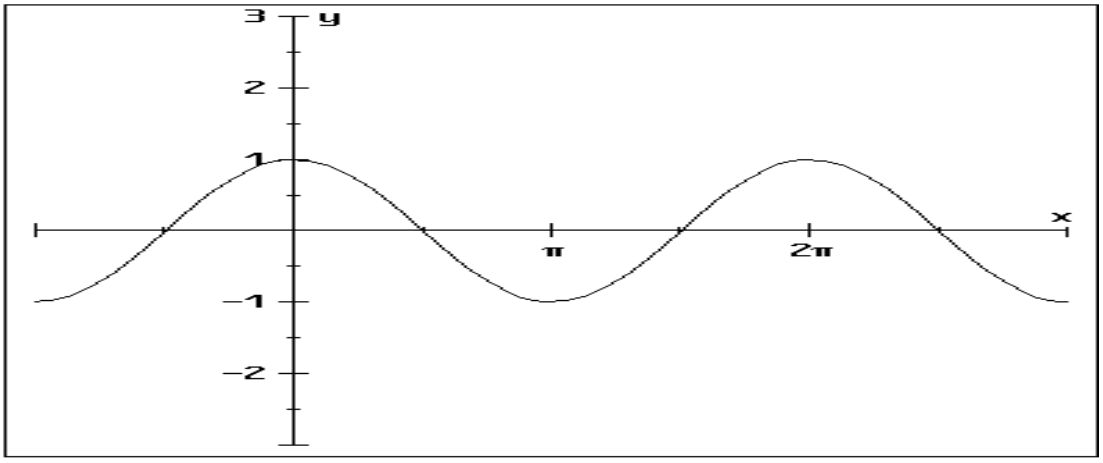
$h(x) = \sec 2x$



$f(x) = -\frac{1}{2}\csc(2x)$



$h(x) = \sec x + 1$



$g(x) = -\tan \pi x$

$f(x) = \sec \frac{\pi}{2}x - 1$