## MATH 11022: More Trig Graphs

Example 1: Graph one cycle of $y=\tan x$.


## Results:

- One cycle is from $-\frac{\pi}{2}<x<\frac{\pi}{2}$.
- The domain of $f(x)=\tan x$ is $\left\{x \left\lvert\, x \neq \frac{\pi}{2}+n \pi\right., n=0, \pm 1, \pm 2, \ldots\right\}$.
- The graph of $y=\tan x$ has vertical asymptotes at $x=\frac{\pi}{2}+n \pi, n=0, \pm 1, \pm 2, \ldots$.
- For all $x$ in its domain, $-\infty<\tan x<\infty$.

Example 2: Graph one cycle of the following functions.
(a) $y=\tan (2 x)$
(b) $y=-\tan \left(\frac{1}{8} x\right)$
(c) $\quad y=\tan \left(3 x-\frac{\pi}{2}\right)$

Example 3: Graph one cycle of $y=\csc x$.


## Results:

- One cycle is from $0<x<\pi$ and $\pi<x<2 \pi$.
- The domain of $f(x)=\csc x$ is $\{x \mid x \neq n \pi, n=0, \pm 1, \pm 2, \ldots\}$.
- The graph of $y=\csc x$ has vertical asymptotes at $x=n \pi, n=0, \pm 1, \pm 2, \ldots$.
- For all $x$ in its domain, $\csc x \leq-1$ or $1 \leq \csc x$. That is, $|\csc x| \geq 1$.

Example 4: Graph one cycle of $y=\sec x$.


## Results:

- One cycle is from $0 \leq x<\frac{\pi}{2}, \frac{\pi}{2}<x<\frac{3 \pi}{2}$, and $\frac{3 \pi}{2}<x \leq 2 \pi$.
- The domain of $f(x)=\sec x$ is $\left\{x \left\lvert\, x \neq \frac{\pi}{2}+n \pi\right., n=0, \pm 1, \pm 2, \ldots\right\}$.
- The graph of $y=\sec x$ has vertical asymptotes at $x=\frac{\pi}{2}+n \pi, n=0, \pm 1, \pm 2, \ldots$.
- For all $x$ in its domain, $\sec x \leq-1$ or $1 \leq \sec x$. That is, $|\sec x| \geq 1$.

Example 5: Graph one cycle of the following functions.
(a) $y=2 \sec (2 x-\pi)$
(b) $y=2 \csc \left(\frac{1}{2} x-\frac{\pi}{4}\right)$

Example 6: Graph one cycle of $y=\cot x$.


## Results:

- One cycle is from $0<x<\pi$.
- The domain of $f(x)=\cot x$ is $\{x \mid x \neq \pi+n \pi, n=0, \pm 1, \pm 2, \ldots\}$.
- The graph of $y=\cot x$ has vertical asymptotes at $x=\pi+n \pi, n=0, \pm 1, \pm 2, \ldots$.
- For all $x$ in its domain, $-\infty<\cot x<\infty$.

Example 7: Graph one cycle of the following functions.
(a) $y=\cot (3 x)$
(b) $y=-\cot \left(\frac{1}{8} x\right)$

