4.1-4.3 Basic Graphs of Trigonometric Functions

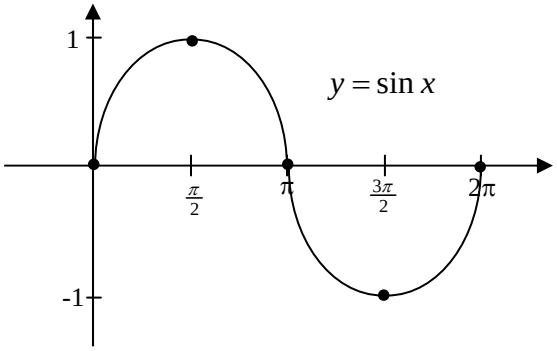
For graph of $y = c + a\sin b(x-d)$ or $y = c + a\cos b(x-d)$, where $b > 0$:

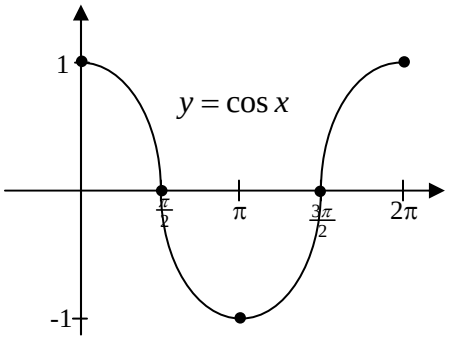
Amplitude: $|a|$

Period: $\dfrac{2\pi}{b}$

New Origin: (d, c)

(i.e. **phase shift** d units to the right if $d > 0$ or $|d|$ units to the left if $d < 0$,
vertical translation c units up if $c > 0$ or $|c|$ units down if $c < 0$)



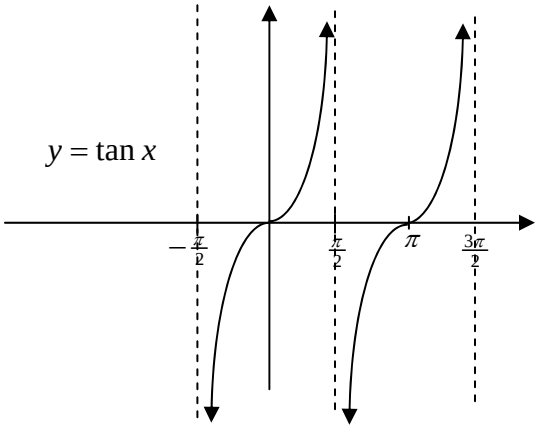


For graph of $y = c + a\tan b(x-d)$, where $b > 0$:

Period: $\dfrac{\pi}{b}$

New Origin: (d, c)

Asymptotes: $b(x-d) = -\dfrac{\pi}{2}$ and $b(x-d) = \dfrac{\pi}{2}$

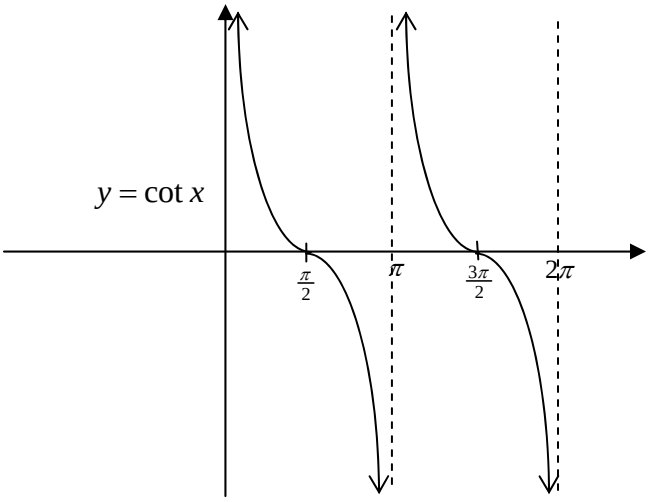


For graph of $y = c + a\cot b(x-d)$, where $b > 0$:

Period: $\dfrac{\pi}{b}$

New Origin: (d, c)

Asymptotes: $b(x-d) = 0$ and $b(x-d) = \pi$

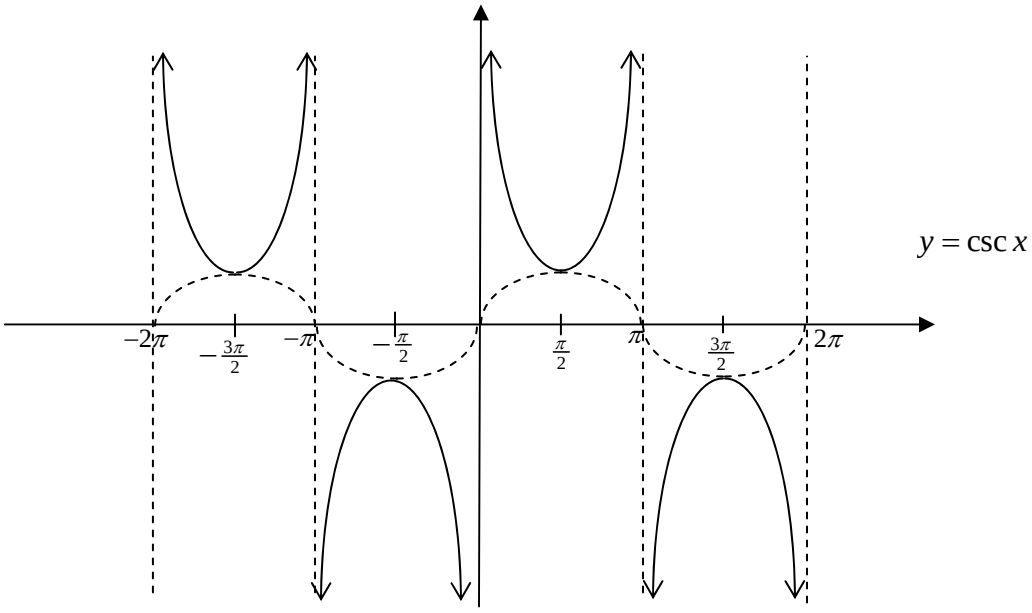


Graph of $y = c + a\csc b(x-d)$, where $b > 0$:

Period: $\dfrac{2\pi}{b}$

New Origin: (d, c)

Asymptotes: $b(x-d) = 0$, $b(x-d) = \pi$ and $b(x-d) = 2\pi$



Graph of $y = c + a\sec b(x-d)$, where $b > 0$:

Period: $\dfrac{2\pi}{b}$

New Origin: (d, c)

Asymptotes: $b(x-d) = \dfrac{\pi}{2}$, $b(x-d) = \dfrac{3\pi}{2}$ and $b(x-d) = \dfrac{(2n+1)\pi}{2}$