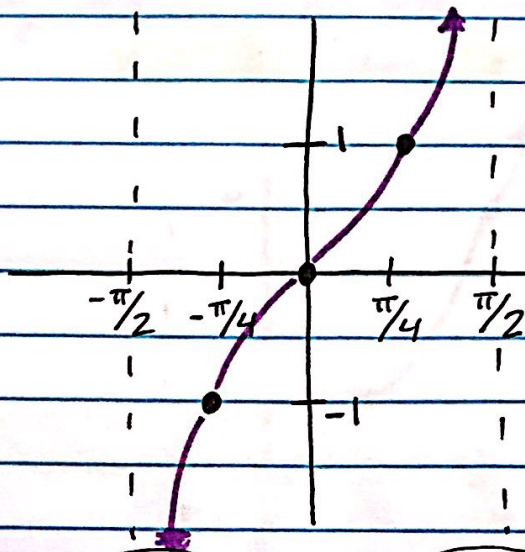


ex: Graphs of $y = \tan x$ and $y = \cot x$

$y = \tan x$

x	y
$-\pi/2$	undefined
$-\pi/4$	-1
0	0
$\pi/4$	1
$\pi/2$	undefined



Period: π
 Asy: $x = -\pi/2, x = \pi/2$
 Domain: $-\pi/2 \pm \pi n$
 $x \neq$
 Range: \mathbb{R}

$y = a \tan (bx+c) + d$

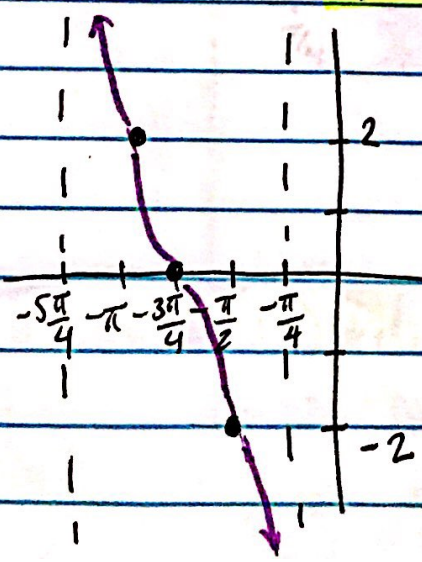
Period: $\frac{\pi}{b}$ Asy: $bx+c = -\pi/2$ and $bx+c = \pi/2$

Domain: $x \neq$ any asymptote \pm period $\cdot n$

ex: $y = -2 \tan (x + \frac{3\pi}{4})$ Per: π

Asy: $x + \frac{3\pi}{4} = -\pi/2$ and $x + \frac{3\pi}{4} = \pi/2$
 $x = -\frac{5\pi}{4}$ and $x = -\frac{\pi}{4}$

x	y
$-\frac{5\pi}{4}$	und
$-\pi$	2
$-\frac{3\pi}{4}$	0
$-\frac{\pi}{2}$	-2
$-\frac{\pi}{4}$	und

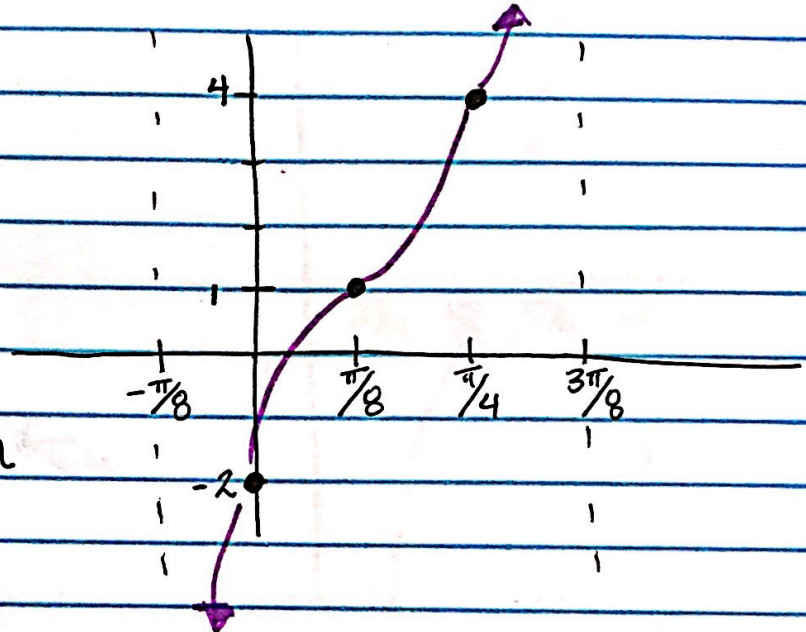


Domain: $x \neq -\frac{5\pi}{4} \pm \pi n$
 Range: \mathbb{R}

ex: $y = 3 \tan(2x - \frac{\pi}{4}) + 1$

Period: $\frac{\pi}{2}$ Asy: $2x - \frac{\pi}{4} = -\frac{\pi}{2}$ and $2x - \frac{\pi}{4} = \frac{\pi}{2}$
 $x = -\frac{\pi}{8}$ and $x = \frac{3\pi}{8}$

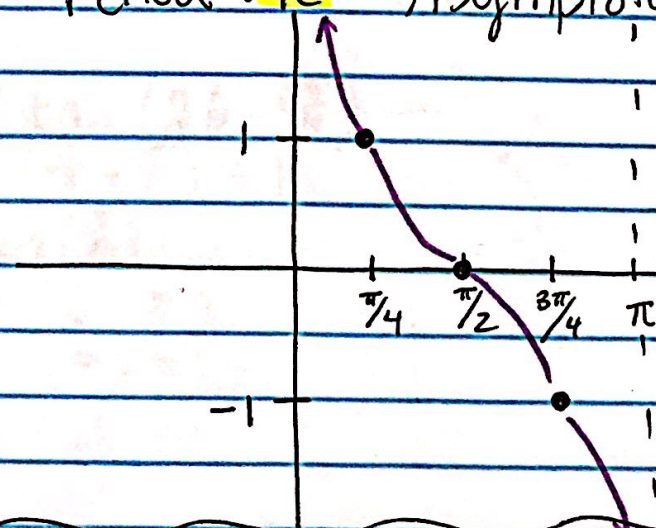
x	y
$-\frac{\pi}{8}$	und
0	-2
$\frac{\pi}{8}$	1
$\frac{\pi}{4}$	4
$\frac{3\pi}{8}$	und



Domain: $x \neq -\frac{\pi}{8} \pm \frac{\pi}{2}n$
 Range: \mathbb{R}

$y = \cot x$ Period: π Asymptotes: $x=0$ + $x=\pi$

x	y
0	und
$\frac{\pi}{4}$	1
$\frac{\pi}{2}$	0
$\frac{3\pi}{4}$	-1
π	und



Domain: $x \neq 0^+ - \pi n$
 Range: \mathbb{R}

$y = a \cdot \cot(bx + c) + d$

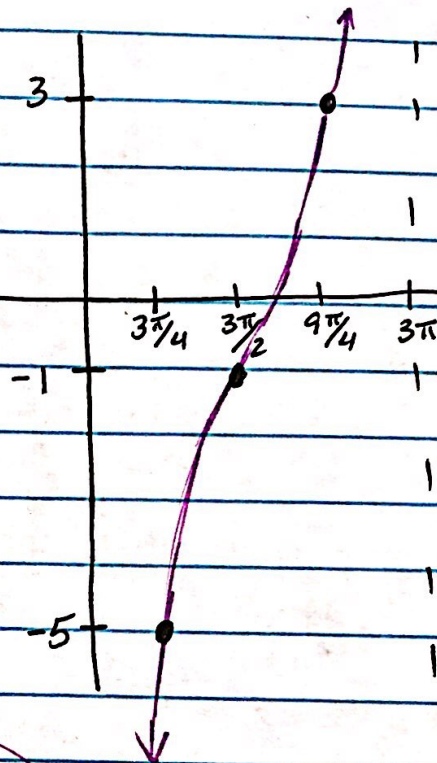
Per: $\frac{\pi}{b}$ Asy: $bx + c = 0$ and $bx + c = \pi$

Domain: $x \neq \text{any asymptote} \pm \text{period} \cdot n$

$$y = -4 \cot\left(\frac{x}{3}\right) - 1$$

Period : $\frac{\pi}{\frac{1}{3}} = 3\pi$ Asy : $\frac{x}{3} = 0$ and $\frac{x}{3} = \pi$
 $x = 0$ and $x = 3\pi$

x	y
0	und
$3\pi/4$	-5
$3\pi/2$	-1
$9\pi/4$	3
3π	und



Domain : $x \neq 0 \pm 3\pi n$

Range : \mathbb{R}

Assignment

- ① $y = 2 + 3 \tan\left(2\theta - \frac{3\pi}{4}\right)$
- ② $y = -\cot\left(\frac{\theta}{3} + \frac{\pi}{6}\right) + 1$
- ③ $y = -2 \tan\left(\frac{\theta}{4}\right)$
- ④ $y = 4 \cot(\theta - \pi)$
- ⑤ $y = \tan(3\theta + \pi) - 2$
- ⑥ $y = 3 \cot(6\theta) - 5$