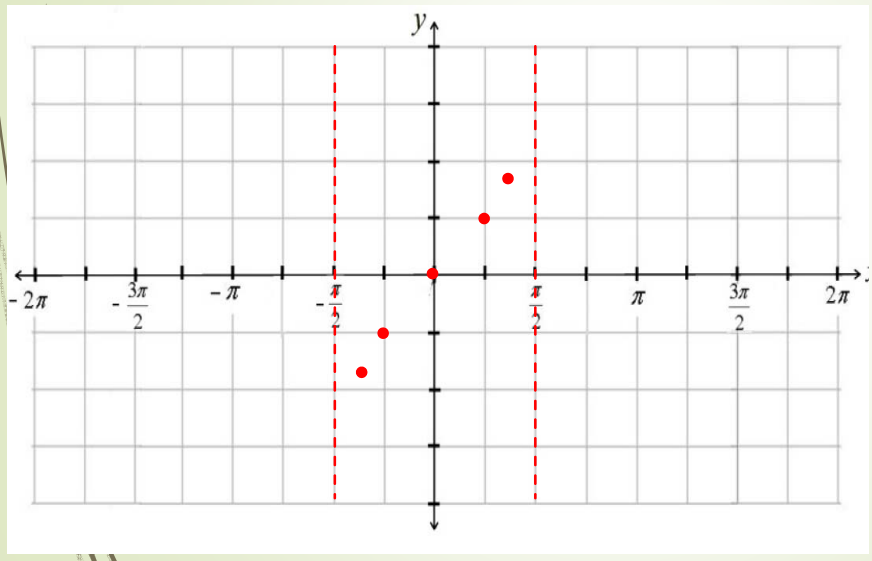
13-6: The Tangent Curve

CP Algebra 2

Mr. Gallo

The Graph of $y = \tan(\theta)$



θ	$\tan(\theta)$
$-\pi/2$	Undefined
$-\pi/3$	-1.73
$-\pi/4$	-1
0	0
$\pi/4$	1
$\pi/3$	1.73
$\pi/2$	Undefined

The Graph of $y = \tan(\theta)$

- What is the period of the tangent function?

  The graph of $y = \tan(\theta)$ is defined between $-\pi/2$ and $\pi/2$, so the period is π.

- The breaks in the graph are referred to as **asymptotes.** An asymptote will appear every time tangent is undefined. An asymptote is defined as:

  A line which a graph approaches as x or y increases in absolute value. The equation is undefined at this point.

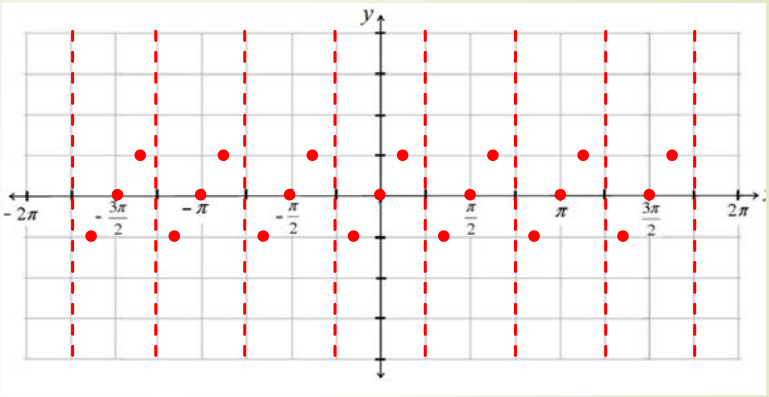
Graphing a Tangent Function

The full tangent function is $\boldsymbol{y = a \tan b\theta}$.

- The Period of a Tangent Function is $\frac{\pi}{b}$
- One cycle occurs between $-\frac{\pi}{2b}$ to $\frac{\pi}{2b}$
- Asymptotes occur at the start and end of each cycle
- The *a* value marks half way between an asymptote and the zero for each cycle.

Graph $y = \tan(2\theta)$

θ	$\tan(\theta)$
$-\pi/8$	-1
0	0
$\pi/8$	1

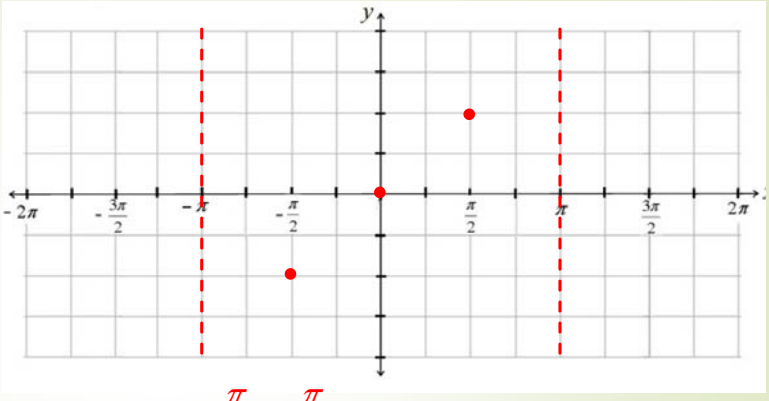


a. Find the period of the function: $\frac{\pi}{b} = \frac{\pi}{2}$

b. Determine where the asymptotes are for one cycle using $-\frac{\pi}{2b}$ and $\frac{\pi}{2b}$ $-\frac{\pi}{2b} = -\frac{\pi}{2(2)} = -\frac{\pi}{4}$ $\frac{\pi}{2b} = \frac{\pi}{2(2)} = \frac{\pi}{4}$

Graph $y = 2\tan(1/2\,\theta)$

θ	$\tan(\theta)$
$-\pi/2$	-2
0	0
$\pi/2$	2



a. Find the period of the function: $\frac{\pi}{b} = \frac{\pi}{1/2} = 2\pi$

b. Determine where the asymptotes are for one cycle using $-\frac{\pi}{2b}$ and $\frac{\pi}{2b}$ $-\frac{\pi}{2b} = -\frac{\pi}{2\left(\frac{1}{2}\right)} = -\pi$ $\frac{\pi}{2b} = \frac{\pi}{2\left(\frac{1}{2}\right)} = \pi$

Homework: p. 872 #18-28, 30-32