Thursday, December 13, 2018
7:04 PM

KEY

Precalc 4.6A: Graphing tan & cot functions

Obj: To graph tangent and cotangent functions

Hwk:

- 4.6A#7 – 10, 19, 20, 22, 23. Graph ONE full period. ID period, scale & 5 key elements.

4.5 – 4.6 Quiz Weds 12/19

Do Now:

1. Get out your HW
   - 4.6D: Graphing Secant & Cosecant WS
     - I am collecting (Is your name on it?)
   - Graphs of Tangent & Cotangent Functions WS
     - We need for today's lesson.

Sketching Tangent & Cotangent Curves

$y = a \tan(bx - c)$ $y = a \cot(bx - c)$

- Sketch one cycle (period) of the curve
  - Period $= \frac{\pi}{b}$
- Identify 5 key elements per cycle:
  - 2 asymptotes (at start & end of cycle)
  - 1 center point (between asymptotes)
  - 2 additional points midpoint between asymptote & center point $(\pm a)$
- Start by defining asymptotes.....
  - By defining cycle – asymptotes occur at start & end:
    - $bx - c = -\frac{\pi}{2}$ and $bx - c = \frac{\pi}{2}$ for tangent
    - $bx - c = 0$ and $bx - c = \pi$ for cotangent

Then, solve for x.

Sketching Tangent Curves

Graph $y = \tan\frac{x}{2}$

$a = 1 \quad b = \frac{1}{2}$

$\frac{\pi}{b}$ Per: $\frac{\pi}{\frac{1}{2}} = 2\pi$

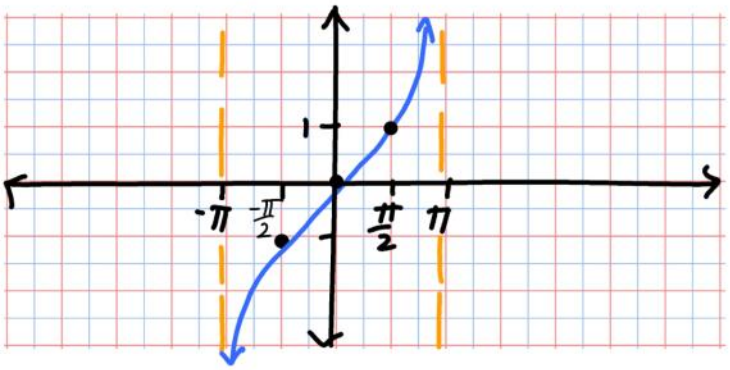
Amp: none

* Cycle: $(-\pi, \pi)$

Range: $(-\infty, \infty)$

Vert. shift: none

Horizontal shift: none



5 Key Elements: Asymptotes: $x = -\pi$, $x = \pi$

Points: $(-\frac{\pi}{2}, -1)$, $(0,0)$, $(\frac{\pi}{2}, 1)$

START! $bx - c = -\frac{\pi}{2}$

$2\left(\frac{x}{2}\right) = \left(-\frac{\pi}{2}\right)2$

$x = -\pi$

END: $bx - c = \frac{\pi}{2}$

$2\left(\frac{x}{2}\right) = \left(\frac{\pi}{2}\right)2$

$x = \pi$

Scale: $\frac{2\pi}{4} = \frac{\pi}{2}$

Graph $y = -3\tan 2x$ ↖ Reflect over x-Axis

$a = -3 \quad b = 2$

$\frac{\pi}{b}$ Per: $\frac{\pi}{2}$

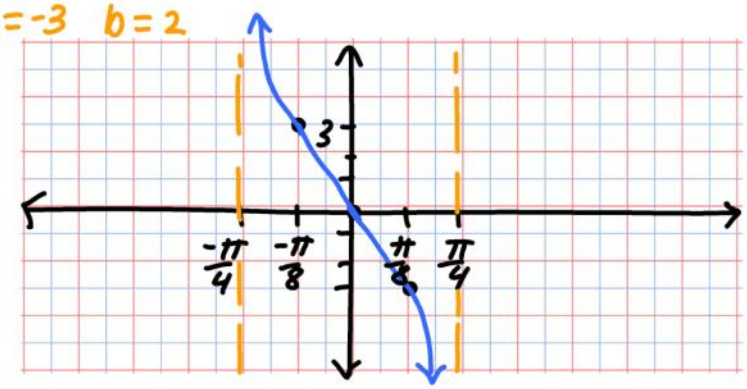
Amp: none

* Cycle: $(-\frac{\pi}{4}, \frac{\pi}{4})$

Range: $(-\infty, \infty)$

Vert. shift: none

Horizontal shift: none



5 Key Elements: Asymptotes: $x = -\frac{\pi}{4}$, $x = \frac{\pi}{4}$

Points: $(-\frac{\pi}{8}, 3)$, $(0,0)$, $(\frac{\pi}{8}, -3)$

START: $bx - c = -\frac{\pi}{2}$

$\frac{1}{2}(2x) = \left(-\frac{\pi}{2}\right)\frac{1}{2}$

$x = -\frac{\pi}{4}$

END: $bx - c = \frac{\pi}{2}$

$\frac{1}{2}(2x) = \left(\frac{\pi}{2}\right)\frac{1}{2}$

$x = \frac{\pi}{4}$

Scale: $\frac{\frac{\pi}{2}}{4} = \frac{\pi}{2} \cdot \frac{1}{4}$

$= \frac{\pi}{8}$

Sketching Cotangent Curves

* decreasing
* one cyle (0,π)

How is a cotangent curve different from tangent?

Graph $y = 2\cot\left(\frac{x}{4}\right)$

$a=2$ $b=\frac{1}{4}$

$\frac{\pi}{b}$ Per: $\frac{\pi}{1/4} = 4\pi$

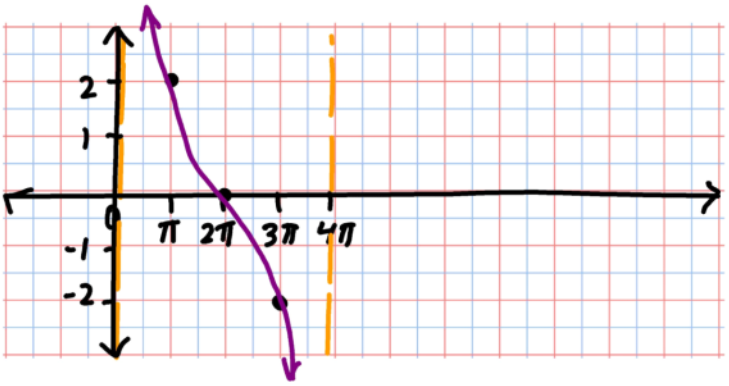
Amp: none

* Cycle: $(0, 4\pi)$

Range: $(-\infty, \infty)$

Vert. shift: none

Horizontal shift: none



Key Elements: Asymptotes: $x=0$, $x=4\pi$

Points: $(\pi, 2), (2\pi, 0), (3\pi, -2)$

* Start: $bx-c=0$ $\quad$ $bx-c=\pi$

$4\left(\frac{x}{4}\right)=(0)4$ $\quad$ $\frac{x}{4}=\pi$

$x=0$ $\quad$ $x=4\pi$

You try.....

Graph $f(x) = -3\cot(2x)$

↑ Reflect over x-Axis

$a=-3$ $b=2$ $c=0$ $d=0$

$\frac{\pi}{b}$ Per: $\frac{\pi}{2}$

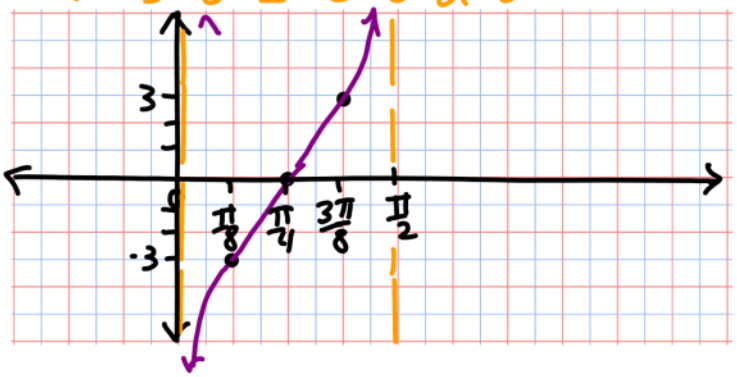
Amp: none

* Cycle: $(0, \frac{\pi}{2})$

Range: $(-\infty, \infty)$

Vert. shift: none

Horizontal shift: none



Key Elements: Asymptotes: $x=0$, $x=\frac{\pi}{2}$

Points: $(\frac{\pi}{8}, -3), (\frac{\pi}{4}, 0), (\frac{3\pi}{8}, 3)$

* START: $bx-c=0$ $\quad$ $bx-c=\pi$

$2x=0$ $\quad$ $2x=\pi$

$x=0$ $\quad$ $x=\frac{\pi}{2}$

$2\left(x-\frac{1}{4}\pi\right)$

You try.....

Graph $g(x)=3\tan\left(2x-\frac{\pi}{2}\right)$ $a=3$ $b=2$ $c=\frac{\pi}{2}$

$\frac{\pi}{b}$ Per: $\frac{\pi}{2}$

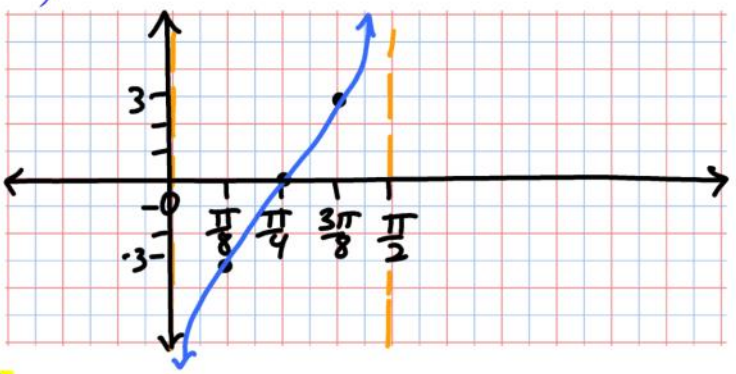
Amp: none

*Cycle: $(0, \frac{\pi}{2})$

Range: $(-\infty, \infty)$

Vert. shift: none

Horizontal shift: $\frac{\pi}{4}$ Right



Key Elements: Asymptotes: $x=0$, $x=\frac{\pi}{2}$

Points: $(\frac{\pi}{8}, -3), (\frac{\pi}{4}, 0), (\frac{3\pi}{8}, 3)$

scale: $\frac{\frac{\pi}{2}}{4} = \frac{\pi}{8}$

* START!

$bx-c=-\frac{\pi}{2}$

$2x-\frac{\pi}{2}=-\frac{\pi}{2}$

$2x=0$

$x=0$

END!

$bx-c=\frac{\pi}{2}$

$2x-\frac{\pi}{2}=\frac{\pi}{2}$

$2x=\pi$

$x=\frac{\pi}{2}$