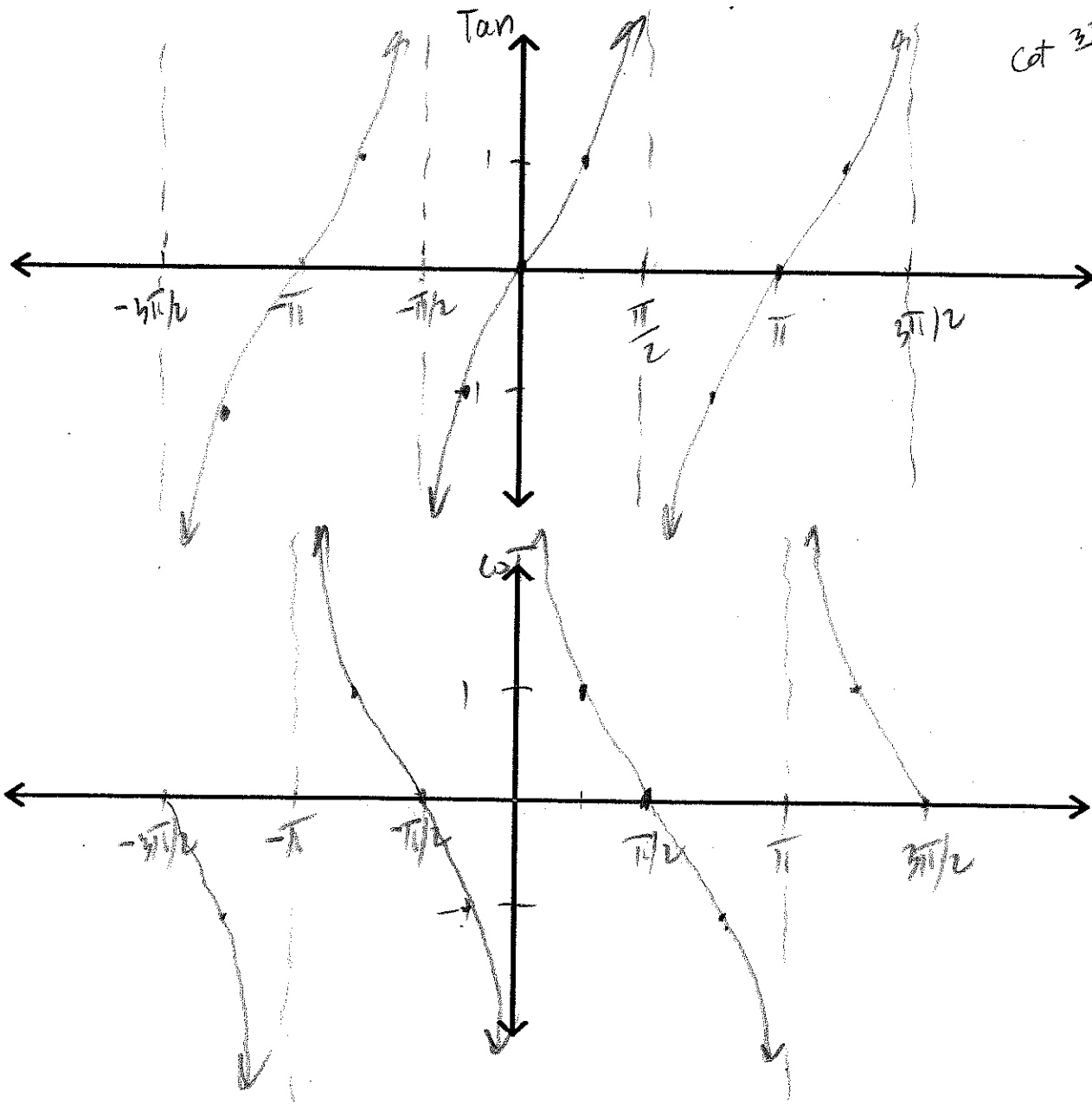
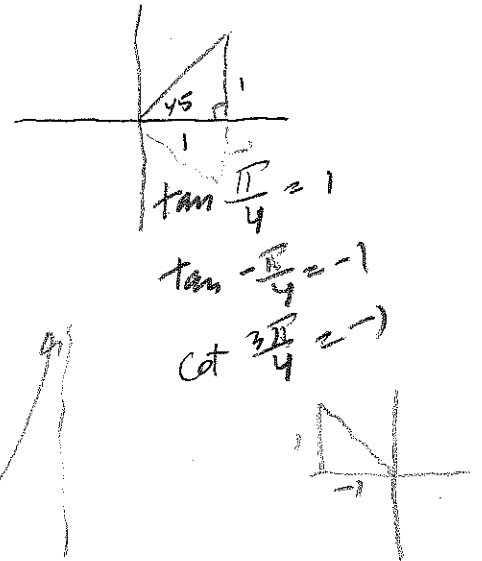


Section 4.6 (Day 2) – Graphs of Tangent & Cotangent Functions

Where do they come from?? Let's look back at that chart from 4.4:

θ	$\sin\theta$	$\cos\theta$	$\tan\theta$	$\cot\theta$
0°	0	1	0	und
90°	1	0	und	0
180°	0	-1	0	und
270°	-1	0	und	0



Section 4.6 (Day 2) – Graphs of Tangent & Cotangent Functions

How to graph tangent and cotangent

The biggest thing to remember here is that both these functions have π as their default period instead of 2π . So graph the asymptotes first, and then the rest of the function. Essentially you are just graphing a curve like $y = x^3$ a bunch of times.

Examples:

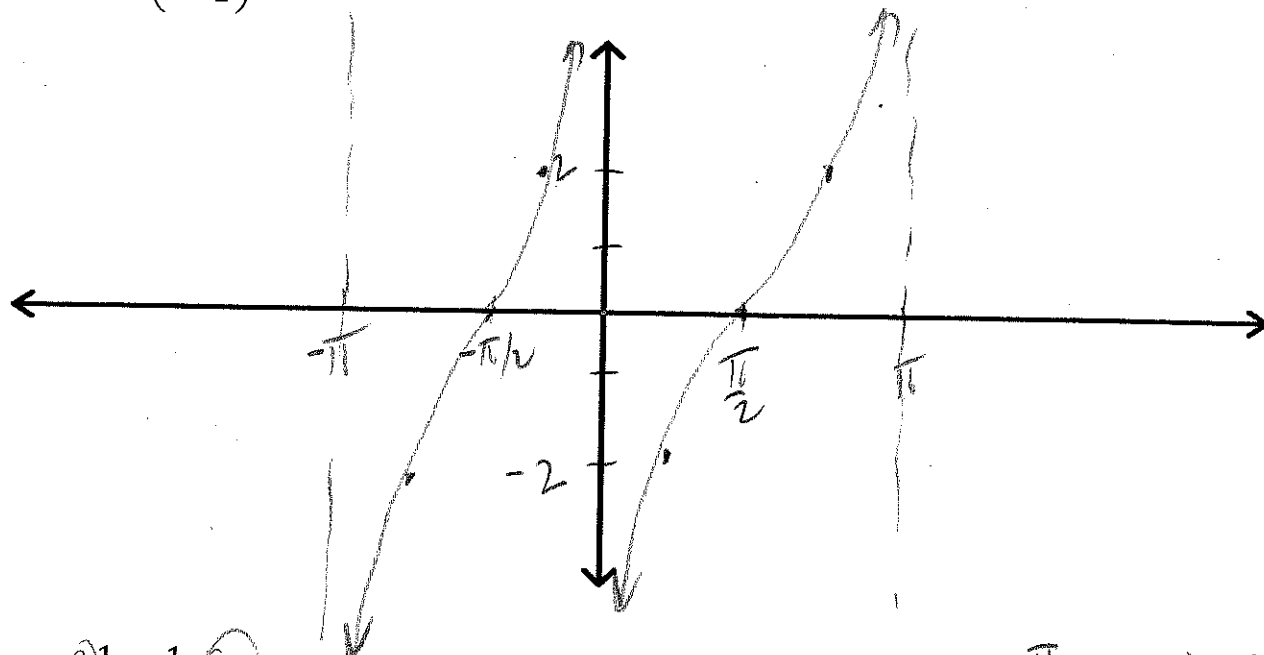
1) $y = 2 \tan\left(x - \frac{\pi}{2}\right)$

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

$$x = \pi$$

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

$$x = 0$$



2) $y = -\frac{1}{3} \tan\left(\frac{1}{2}x + 1\right)$

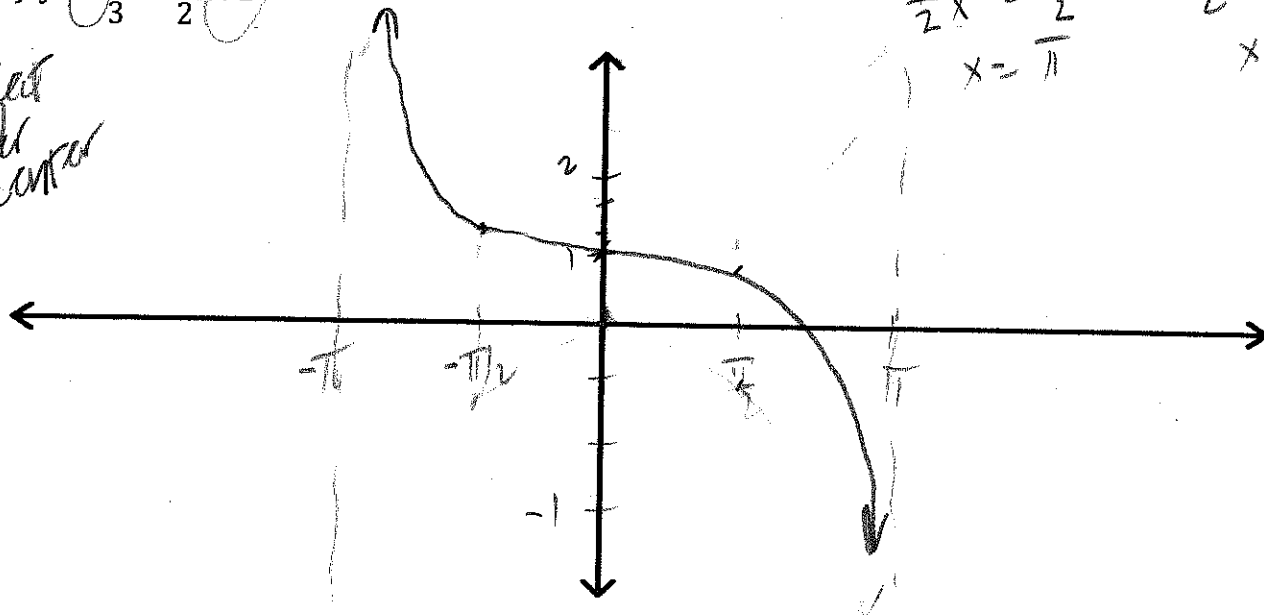
Reflect
over
center

$$\frac{1}{2}x = \frac{\pi}{2}$$

$$x = \pi$$

$$\frac{1}{2}x = -\frac{\pi}{2}$$

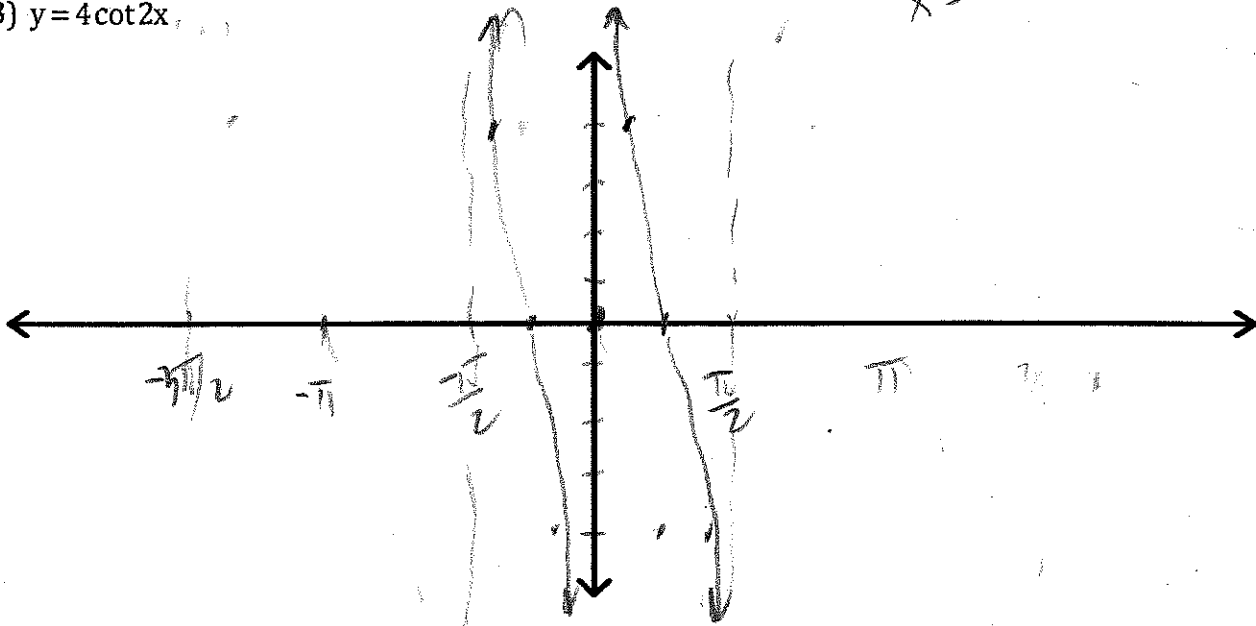
$$x = -\pi$$



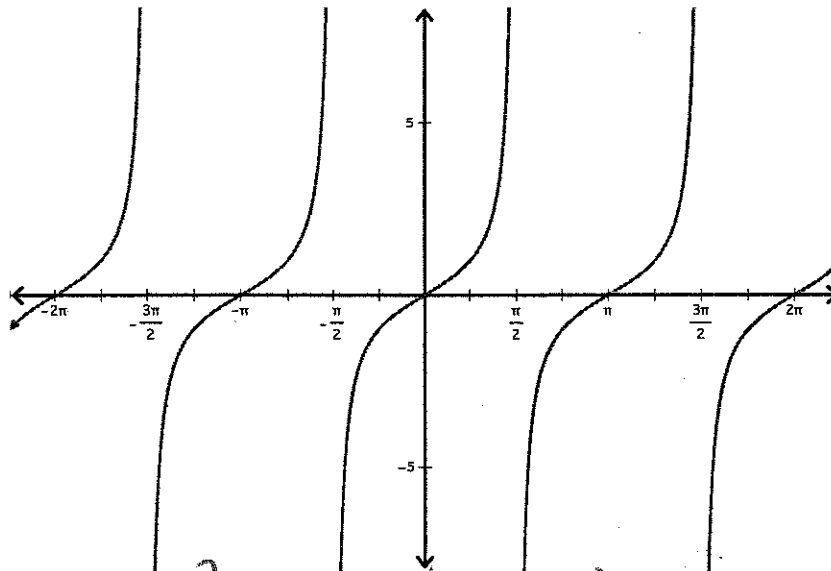
Section 4.6 (Day 2) – Graphs of Tangent & Cotangent Functions

3) $y = 4 \cot 2x$

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



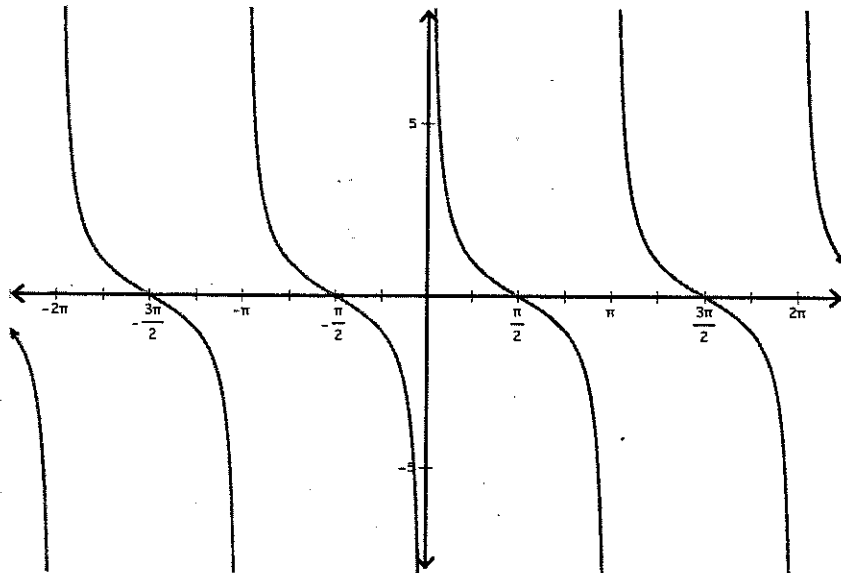
Tangent Curve



- Domain: $\left\{ x \neq \frac{\pi}{2} + n\pi \right\}$ Range: $(-\infty, \infty)$ Period: π
- Symmetric with respect to the: *origin* so is and *odd function* ($\tan(-x) = -\tan x$)
- Zeros: $n\pi$ $(-\pi, 0, \pi, \dots)$
- Max: ∞ Min: $-\infty$

Section 4.6 (Day 2) – Graphs of Tangent & Cotangent Functions

Cotangent Curve



- Domain: all $x \neq n\pi$ Range: $(-\infty, \infty)$ Period: π
- Symmetric with respect to the: *origin* so is and *odd function* ($\cot(-x) = -\cot x$)
- Zeros: $-\frac{\pi}{2}, \frac{\pi}{2}, \dots$
- Max: ∞ Min: $-\infty$