Chapter 3.8: Graphs of the Trigonometric Functions

Expected Skills:

- Be able to graph the trigonometric functions.

Practice Problems:

1. Sketch the given function on the interval $[-2\pi, 2\pi]$. Label all asymptotes, intercepts with the coordinate axes, and local extrema.

   (a) $y = \sin x$

   (b) $y = \cos x$

   (c) $y = \tan x$

   (d) $y = \cot x$

   (e) $y = \sec x$

   (f) $y = \csc x$

2. Sketch each of the following functions on the interval $[0, 2\pi]$. Label all asymptotes, intercepts with the coordinate axes, and local extrema. Also, determine the period.

   (a) $y = \cos(3x)$

   (b) $y = 3\sin\left(\frac{x}{2}\right)$

   (c) $y = \frac{1}{2}\tan(x)$

   (d) $y = \tan\left(\frac{x}{2}\right)$

3. Sketch the region in the xy-plane which is enclosed by $y = \sin x$ and $y = 2 - \sin x$ for $\frac{\pi}{2} \leq x \leq \frac{5\pi}{2}$.

4. Sketch the region in the xy-plane which is enclosed by $y = \sec x$ and $y = \frac{1}{2}$ for $-\frac{\pi}{4} \leq x \leq \frac{\pi}{4}$.

5. Sketch $f(x) = \sin^2(x)$ on the interval $[0, 2\pi]$. Label all asymptotes, intercepts with the coordinate axes, and local extrema.

   Hint: $f'(x) = 2\sin x \cos x$ and $f''(x) = 4\cos^2 x - 2$