

Math 1613 - Trigonometry

Quiz #14 - 2018.10.05

Solutions

Sketch the graph of the function $y = 2 \sec\left(\frac{1}{2}x - \frac{\pi}{6}\right) - 1$ over two periods.

In order to graph this secant function, we will first graph the cosine function $2 \cos\left(\frac{1}{2}x - \frac{\pi}{6}\right) - 1$. We find a single period by solving the inequality $0 \leq \frac{1}{2}x - \frac{\pi}{6} \leq 2\pi$ gives $\frac{\pi}{3} \leq x \leq \frac{13\pi}{3}$. The amplitude is 2, and the graph of cosine is moved down 1 unit. Once that is complete, we draw vertical lines at $x = 4\pi/3, 10\pi/3, 16\pi/3, 22\pi/3$, which is where secant will have its vertical asymptotes since this is where the cosine function crosses the middle of the box (vertically). After that, any place where the graph of the cosine function touches the top or bottom of the box will be a place where the secant and cosine graphs agree.

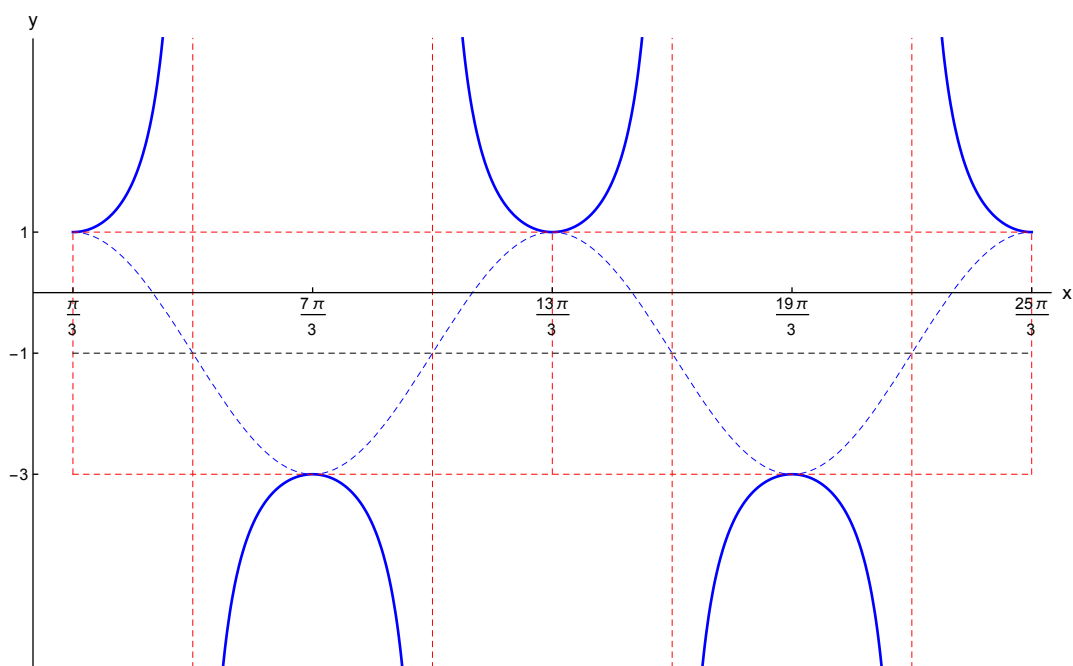


FIGURE 1. Graph of $y = 2 \sec(1/2x - \pi/6) - 1$ over two periods.