**Warm-up:** Find the equation of the curve below. It shows the AC current from a household outlet.

\[ i = A \cos(\beta t) \]

\[ A = 5 \]

\[ \beta = \frac{2\pi}{P} = \frac{1}{60} \]

\[ \beta = 120\pi \]

\[ i = 5 \cos(120\pi t) \]

\[ \text{Graph 1 period} \]
a) \( y = \tan x = \frac{\sin x}{\cos x} \)

The domain of \( y = \tan x \) is all reals except odd multiples
\( \frac{\pi}{2} \).

\[ x = \frac{\pi}{2}, \frac{3\pi}{2}, \frac{5\pi}{2}, \ldots \]

Notes
1. \( D = \{ x \mid x \neq (2k-1)\frac{\pi}{2} \} \) where \( k \) is integer
2. \( R = (-\infty, \infty) \)
b) \( y = \cot x = \frac{\cos x}{\sin x} \)

\[
\begin{align*}
\frac{\pi}{4} & : 1 \\
\frac{\pi}{2} & : 0 \\
\frac{3\pi}{4} & : -1
\end{align*}
\]
Notes

1) \( D = \{ x | x \neq k\pi \} \) where \( k \) an integer
2) \( R = (-\infty, \infty) \)
3) \( p = \pi \)
4) odd

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Note: \( y = A \tan Bx \), then \( p = \frac{\pi}{B} \)

\[ y = \sec x = \frac{1}{\cos x} \]

Helper: \( y = \cos x \)
Notes:
1. $D$: same as tangent
2. $R$: \( \{ x \mid x \leq -1 \text{ or } x \geq 1 \} \) or \((-\infty, -1] \cup [1, \infty)\) \text{ set builder notation}
3. $\text{even}$
4. $p = 2\pi$

\[ d) \quad v = \frac{c}{c x} = \frac{1}{x} \]
d) \( y = \csc x = \frac{1}{\sin x} \)

*helper: \( y = \sin x \)*)

\[
\begin{array}{c}
\text{Notes:} \\
\text{1. D: same as } y = \cot x \\
\text{2. R: same as } y = \sec x \\
\text{3. } P = 2\pi \\
\text{4. odd}
\end{array}
\]

(\( \text{ex} \)) Graph / full period
a) \( y = 3 \tan(2x) \)

\[ \rho = \frac{\pi}{2} \]

\[ \frac{\pi}{r} \]

\[ x = -\frac{\pi}{4} \]

\[ x = \frac{\pi}{4} \]

\[ x = \left( \frac{\pi}{4} \right) \]

\[ x = \left( \frac{\pi}{4} \right) \]

b) \( y = -3 \csc(\pi x) \)

helper: \( y = -3 \sin(\pi x) \)
\[ \rho = \frac{2\pi}{\pi} = 2 \]
\[ \text{Amp} = |1-3| = 3 \]