Handout for MATH 1300 (Barsamian) Lecture L33 Mon Nov 2, 2026

Section 4.5 and 4.6 Graphs of sin and cos and other trig functions

Terminology of General Sinusoids

For the function $y = A\sin(Bx - C) + D$, with $B > 0$

The ***amplitude*** is $|A|$.

The ***period*** is $\frac{2\pi}{B}$.

The ***phase shift*** is $\frac{C}{B}$.

The ***vertical shift*** is D.

One full cycle is given on the interval $0 \le Bx - C \le 2\pi$. That is, $\frac{C}{B} \le x \le \frac{C}{B} + \frac{2\pi}{B}$.

The domain is all real numbers.

The range is $[-|A| + D, |A| + D\ ]$.

[1] Find the period and amplitude of $y = 2\sin(6x)$ (exact values).

[2] Find the period, amplitude, and phase shift of $y = -\sin\left(3x - \frac{\pi}{4}\right) - 5$ (exact values)

[3] Elsa is tracking her height above the ground for a portion of a Ferris wheel ride. Her height above the ground is given by the function $y = 4\cos\left(\frac{\pi x}{6}\right) + 5$, where x is the time in seconds since the ride started and y is her height above the ground at time x.

(a) Sketch the graph of the function.

(b) What is the amplitude (in meters) of the graph?

(c) Which of the following statements about the amplitude is true?

1. The amplitude is the number of revolutions the Ferris wheel makes in one minute.
2. The amplitude is the number of seconds it takes for the Ferris wheel to make one revolution.
3. The amplitude is the number of meters from the center of to Ferris wheel to Elsa's highest position above ground.
4. The amplitude is the number of meters from the center of the Ferris wheel to the ground.

(d) How many revolutions does the Ferris wheel make in one minute?

(e) How many seconds does it take for the Ferris wheel to make one revolution?

[4] Graph of $y = \sec(x)$ and $y = \cot(x)$ by hand (no technology). Label famous points with their (x, y) coordinates and label asymptotes with their line equations (exact values). What are the domains and ranges of of $y = \sec(x)$ and $y = \cot(x)$?

[5] Graph one period of $y = \frac{2}{3}\sec\left(\frac{3}{2}x\right)$ by hand (no technology). Label famous points with their (x, y) coordinates and label asymptotes with their line equations (exact values).

[6] Graph one period of $y = -3\cot\left(\frac{3}{2}x\right)$ by hand (no technology). Label famous points with their (x, y) coordinates and label asymptotes with their line equations (exact values).