Handout for MATH 1300 (Barsamian) Lecture L34 Wed Nov 4, 2026

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

Terminology of General Sinusoids

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

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

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

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

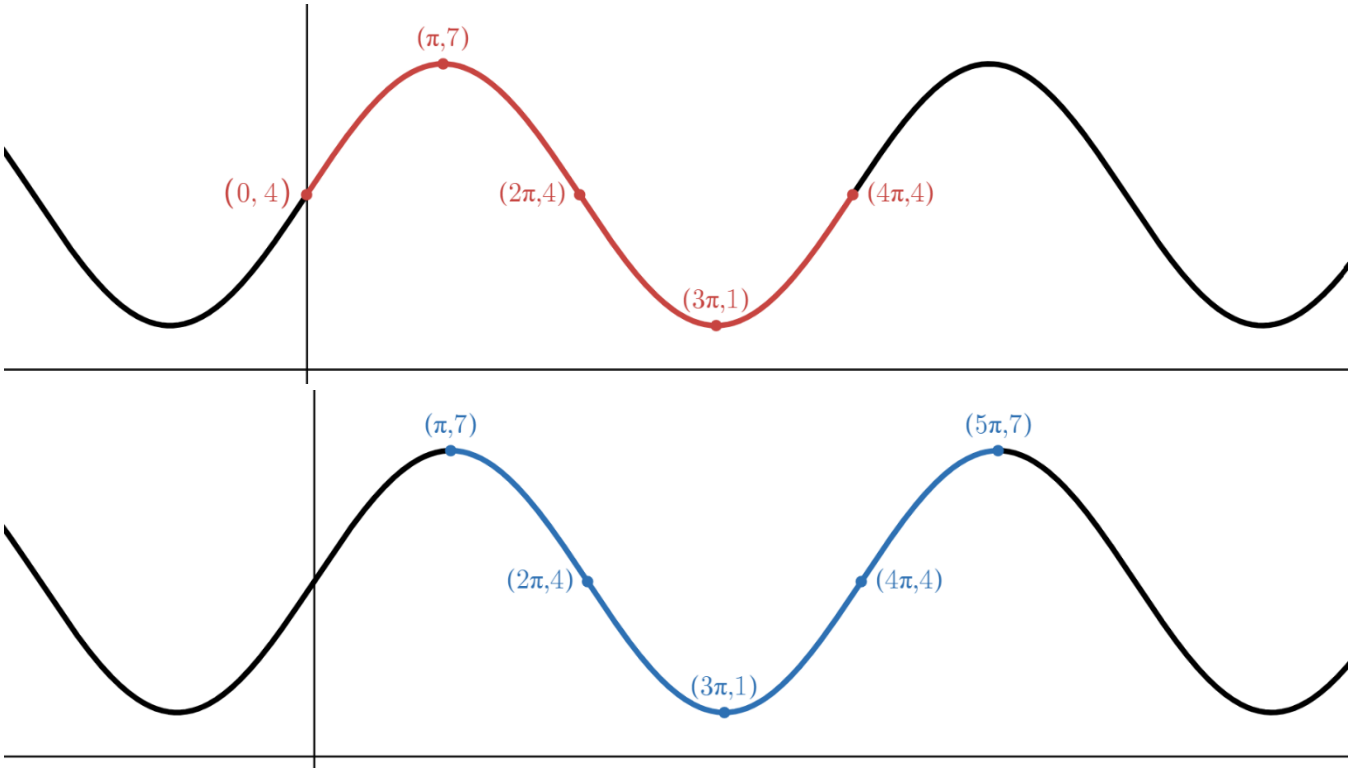
The ***vertical shift*** is D.

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] Any transformed sin function can also be expressed as a transformed cos



The graphs above are the same graph, but with different parts colored red or blue.

(a) The goal is to write a function of the form $y = A\sin(Bx - C) + D$ to describe the graph. For this, use the version with the red highlighted region.

i) Determine the amplitude A and the vertical shift D.

ii) Determine the period from the graph, and use that to determine B.

iii) Determine the phase shift from the graph, and use that to find C.

Use the A, B, C, D that you found to write the function $y = A\sin(Bx - C) + D$ for the graph.

(b) The goal now is to write a function of the form $y = A\cos(Bx - C) + D$ to describe the graph. For this, use the version with the blue region. Answer i, ii, iii again. Then use the A, B, C, D that you found to write the function $y = A\cos(Bx - C) + D$ for the graph.

[2] Graphing csc without technology The goal is to graph one period of $y = 5\csc\left(\frac{2}{3}x\right)$ by hand. We can approach this as a transformation problem, building a table around numbers that are convenient for the sin function. We will be importing the pink numbers that we have been using recently. But some of those pink numbers will not produce an output, so it is useful to insert some additional pink numbers that are also convenient for the sin function but that do produce an output. Once the table is complete, use its (input,output) columns to graph $y = 5\csc\left(\frac{2}{3}x\right)$. Label points with (x, y) coordinates and label asymptotes with line equations (exact values).

(input) x	$\frac{2}{3}x$	$\sin\left(\frac{2}{3}x\right)$	$\csc\left(\frac{2}{3}x\right)$	$y = 5\csc\left(\frac{2}{3}x\right)$ (the output)
	0			
	$\frac{\pi}{6}$			
	$\frac{\pi}{2}$			
	$\frac{5\pi}{6}$			
	π			
	$\frac{7\pi}{6}$			
	$\frac{3\pi}{2}$			
	$\frac{11\pi}{6}$			
	2π			