Course Number

Instructor

Date

Section 4.5 Graphs of Sine and Cosine Functions

Objective: In this lesson you learned how to sketch the graphs of sine and cosine functions and translations of these functions.

Important Vocabulary Define each term or concept.

Sine curve

Amplitude

Phase shift

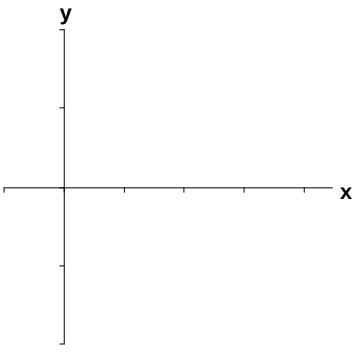
What you should learn
How to sketch the graphs of basic sine and cosine functions

I. Basic Sine and Cosine Curves (Pages 323–324)

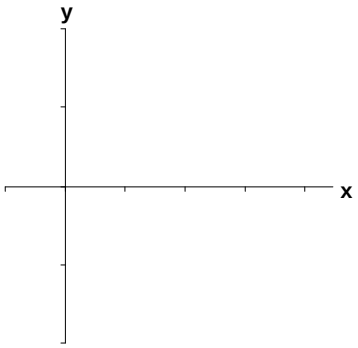
For $0 \le x \le 2p$, the sine function has its maximum point at _____, its minimum point at _____, and its intercepts at _____.

For $0 \le x \le 2p$, the cosine function has its maximum points at _____, its minimum point at _____, and its intercepts at _____.

Example 1: Sketch the basic sine curve on the interval $[0, 2p]$.



Example 2: Sketch the basic cosine curve on the interval $[0, 2p]$.



II. Amplitude and Period of Sine and Cosine Curves
(Pages 325–326)

What you should learn
How to use amplitude and period to help sketch the graphs of sine and cosine functions

The constant factor a in $y = a \sin x$ acts as . . .

If $|a| > 1$, the basic sine curve is _____. If $|a| < 1$, the basic sine curve is _____. The result is that the graph of $y = a \sin x$ ranges between _____ instead of between – 1 and 1. The absolute value of a is the _____ of the function $y = a \sin x$.

The graph of $y = 0.5 \sin x$ is a(n) _____ in the x-axis of the graph of $y = -0.5 \sin x$.

Let b be a positive real number. The **period** of $y = a \sin bx$ and $y = a \cos bx$ is _____. If $0 < b < 1$, the period of $y = a \sin bx$ is _____ than $2p$ and represents a _____ of the graph of $y = a \sin bx$. If $b > 1$, the period of $y = a \sin bx$ is _____ than $2p$ and represents a _____ of the graph of $y = a \sin bx$.

Example 3: Find the amplitude and the period of $y = -4\cos 3x$.

Example 4: Find the five key points (intercepts, maximum points, and minimum points) of the graph of $y = -4\cos 3x$.

III. Translations of Sine and Cosine Curves (Pages 327–328)

What you should learn
How to sketch translations of graphs of sine and cosine functions

The constant c in the general equations $y = a\sin(bx - c)$ and $y = a\cos(bx - c)$ creates . . .

Comparing $y = a\sin bx$ with $y = a\sin(bx - c)$, the graph of $y = a\sin(bx - c)$ completes one cycle from _____ to _____. By solving for x, the interval for one cycle is found to be _____ to _____. This implies that the graph of $y = a\sin(bx - c)$ is the graph of $y = a\sin bx$ shifted by the amount _____.

The period of the graph of $y = a\cos(bx - c)$ is _____.

Example 5: Find the amplitude, period, and phase shift of $y = 2\sin(x - p/4)$.

Example 6: Find the five key points (intercepts, maximum points, and minimum points) of the graph of $y = 2\sin(x - p/4)$.

The constant d in the equation $y = d + a\sin(bx - c)$ causes a(n) _____. For $d > 0$, the shift is _____. For $d < 0$, the shift is _____.

The graph oscillates about _____.

IV. Mathematical Modeling (Page 329)

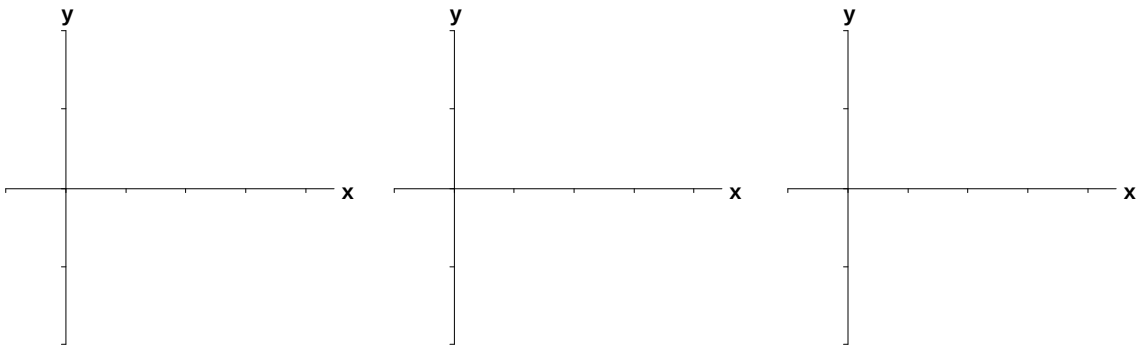
What you should learn
How to use sine and cosine functions to model real-life data

Describe a real-life situation which can be modeled by a sine or cosine function.

Example 7: Find a trigonometric function to model the data in the following table.

x	0	$p/2$	p	$3p/2$	$2p$
y	2	4	2	0	2

Additional notes



Homework Assignment

Page(s)

Exercises