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.
Amplitude	
Phase shift	

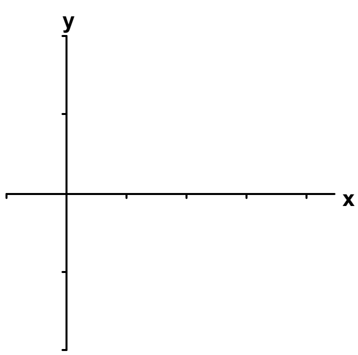
I. Basic Sine and Cosine Curves (Pages 299–300)

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

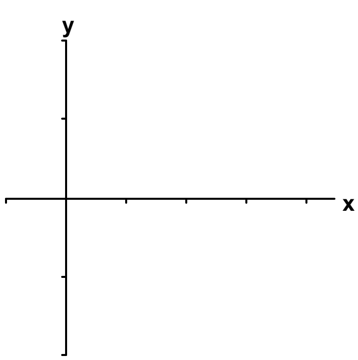
For $0 \le x \le 2p$, the sine function has its maximum point at ________________, its minimum point at ________________, and its intercepts at ____________________________________.

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

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



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



II. Amplitude and Period (Pages 301–302)

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

Example : 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 303–304)

What you should learn
How to sketch translations of the 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 : Find the amplitude, period, and phase shift of $y = 2\sin(x - p/4)$.

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

IV. Mathematical Modeling (Page 305)

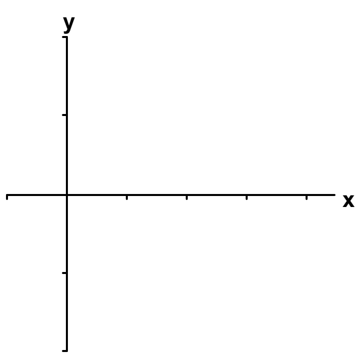
What you should learn
How to use sine and cosine functions to model real-life data

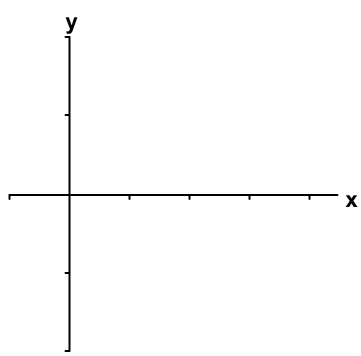
Describe a real-life situation which can be modeled by a sine or cosine function.

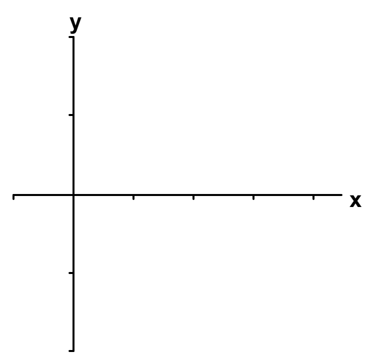
Example : Find a trigonometric function to model the data in the following table.

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

Additional notes







Homework Assignment

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