

Mth 30, Homework 11 on sections 6.1, 6.2, 6.3

Due by Wed, Apr 29.

Please use lots of space and explain your answers, showing clearly any work you had to do. Each question is worth 3 points.

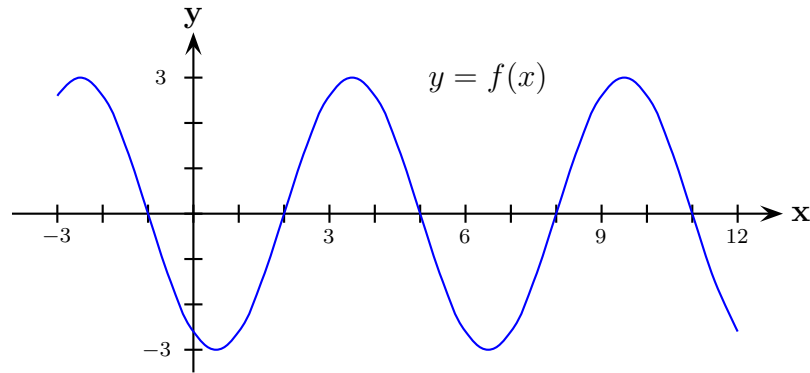
Section 6.1 Graphs of the Sine and Cosine Functions

- (1) Use the coordinates of points at the top, bottom, left and right of the unit circle to fill out this table – these are the quarter points:

t	$\cos t$	$\sin t$
0		
$\pi/2$		
π		
$3\pi/2$		
2π		

- (2) For the function $f(x) = 6 \sin(x)$:
- (a) Draw its graph carefully using the quarter points from question 1. Show at least two periods.
 - (b) Give its amplitude, period, y -intercept, domain and range.
- (3) Graph the function $g(x) = -2 \cos(x)$. Use the quarter points and show at least two periods.
- (4) For the function $h(x) = \cos(\pi x + \pi/2)$, find its
- (a) amplitude,
 - (b) period,
 - (c) phase shift, (you should get a negative number).
- (Hint: for $A \sin(Bx - C)$ and $A \cos(Bx - C)$, the amplitude is $|A|$, the period is $2\pi/|B|$ and the phase shift is C/B .)
- (5) Graph this same function $h(x) = \cos(\pi x + \pi/2)$, showing two periods. To get credit, do this carefully: label and number the axes, show where the quarter points are.
- (6) For the function $y = -4 \sin(3x - 2)$, find its
- (a) period,
 - (b) phase shift,
 - (c) amplitude.

- (7) For this graph of $f(x)$ related to the sine function, find its amplitude, period and phase shift. Then find A, B, C to write $f(x)$ in the form $A \sin(Bx - C)$.



(The *amplitude* is the height of the wave from the middle, the *period* is the length of the repeating part, and the *phase shift* is how far the usual sine is moved right.)

Section 6.2 Tangent graph

- (8) Draw a careful, detailed and neat graph of $y = \tan x$ showing at least two periods and indicating the vertical asymptotes.

Section 6.3 Inverse Trigonometric Functions

- (9) Carefully graph these two functions only on the domain indicated and check they are one-to-one there (and so have inverses):

(a) $y = \sin x$ just for $-\pi/2 \leq x \leq \pi/2$,

(b) $y = \cos x$ just for $0 \leq x \leq \pi$.

These graphs will be helpful for the next three questions.

- (10) Find the exact values of

(a) $\sin^{-1}(1/2)$

(b) $\sin^{-1}(\sqrt{3}/2)$

(c) $\sin^{-1}(-\sqrt{2}/2)$

(Use the special angles. Answers should be between $-\pi/2$ and $\pi/2$ for inverse sine.)

- (11) Find the exact values of

(a) $\cos^{-1}(0)$

(b) $\cos^{-1}(\sqrt{3}/2)$

(c) $\cos^{-1}(-1/2)$

(Answers should be between 0 and π for inverse cosine.)

- (12) Calculate: $\sin^{-1}(\cos(2\pi))$

(13) A right triangle has a base of length 5 and a hypotenuse of length 7. Draw this triangle. What is the size of the angle between the base and the hypotenuse? Give the answer in degrees.

(Hint: you'll need an inverse trig. function.)

If you're stuck on a question:

- Ask me about it after class.
- Come to my office hours: Mon 4:30 - 5:30, Wed 4:30 - 5:30 in CP 317.
- Go to the Math Tutorial Lab in person in CP 303 or online.