Lesson Plans - Feb. 25

Review

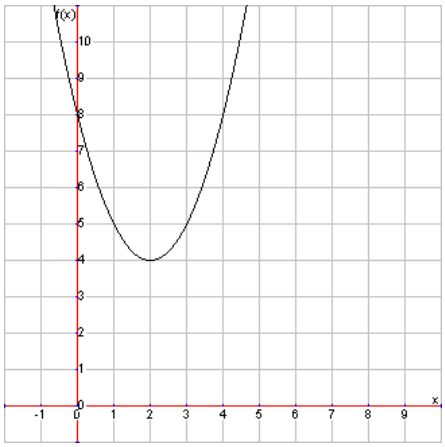
1. Consider the interval of radians: $[3.15, 4.71]$ and fill in each blank with one of the following:

$$\begin{array}{lll} \sin x & \_\_\_\_\_ & 0 \\ \cos x & \_\_\_\_\_ & 0 \\ \tan x & \_\_\_\_\_ & 0 \end{array}$$

2. Graph the following function on your calculator

$$f(x) = (x-2)^2 + 4.$$

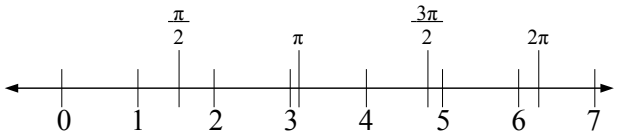
State the domain and range of this function. Does it have a maximum or minimum value? If so, find it.
Answer. The graph of the function is:



The domain of a function is the set of all possible input values. Since we can validly put any number into f, the domain of this function is $(-\infty, \infty)$, or all real numbers.
The range of a function is the set of all possible output values. We can see that the function values do not go below 4, but go up to ∞, so the range of this function is $[4, \infty)$.
The minimum value of this function is 4.

Section 3.3: Graphs of Sine and Cosine from the Unit Circle

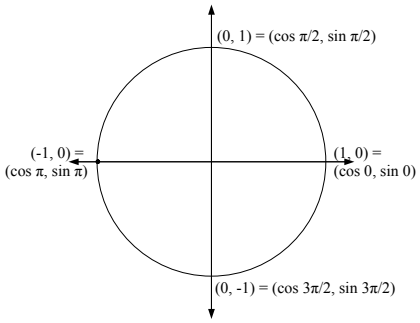
1. Let us start by placing some important values on the number line.



2. Remember that the points on the unit circle can be expressed as

$$(h, v) = (\cos x, \sin x),$$

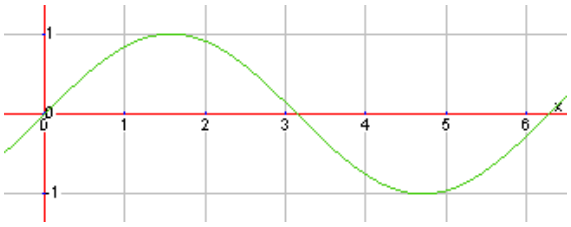
where x is the central angle in standard position which has (h, v) on its terminal side. Consider the points on the unit circle correspond to the **quadrantal** angles. We can see the following:



3. We can see that the following points are on the graph of $y = \sin x$.

x	$\sin x$
0	0
$\frac{\pi}{2}$	1
π	0
$\frac{3\pi}{2}$	-1
2π	0

Using this, we can sketch a graph of $y = \sin x$.



Note that the five points in the table show the high point and low point of the graph, and also span a full period. These are the important points of the graph - get to know them well.

(a) What is the domain of this function?
Domain: $(-\infty, \infty)$

(b) What is the range of this function?
Range: $[-1, 1]$

(c) What are the minimum and maximum values of this function?
Respectively, -1 and 1.

(d) What are three $x-$values such that the function attains a maximum?
$x = \frac{\pi}{2}, \frac{5\pi}{2}, \frac{9\pi}{2}$

Homework
Read pages 149-152 in the book, and do the following problems:
Section 3.3: #1, 2, 3W, 4, 5, 7, 8