

Group: _____ Present: _____

1. “Horizontal shift” identities.

Graph $y = \sin x$ and $y = \cos x$ on the same axes.

Predict a shift for $y = \cos x$ to superimpose it on the graph of $y = \sin x$.

Shift = _____

Formula of shifted function: $y = \cos(x \text{_____})$.

Now graph your new function. Does it work?

Conclusion: $\sin x = \cos(x \text{_____})$

Likewise $y = \sin x$ can be shifted _____ to superimpose it on $y = \cos x$.

Formula of shifted function: $y = \sin(x \text{_____})$. Graph it to check!

Conclusion: $\cos x = \sin(x \text{_____})$

2. Let's solve a trigonometric equation three different ways.

Solve: $2 \cos(2x) = 1$ for $0 \leq x \leq \frac{\pi}{2}$.

1. Algebraically (get exact solution):

$x = \text{_____}$

2. Graphically (get approximate solution):

$x \approx \text{_____}$

3. By calculator (use $\cos^{-1}$):

$x \approx \text{_____}$

3. Find the equation of a cosine curve $f(t) = a \cos(bt + c) + d$ with period 24, minimum value 48, maximum value 72, and maximum value occurring at $t = 15$.

Find d :

Find a :

Find b :

Find c :

Equation is: $f(t) = \underline{\hspace{1cm}} \cos(\underline{\hspace{1cm}} t \underline{\hspace{1cm}}) + \underline{\hspace{1cm}}$

What is $f(0)$? $f(0) =$ _____

Suppose now that this function represents average temperature t hours after midnight at a certain time of the year. At what time(s) of the day is the average temperature equal to 66° ?

Times: _____