The following questions help you think a little more about $\cos(x)$.
If $g(x) = \cos(x)$,

1. Use the definition of the derivative to show that $g'(x) = -\sin(x)$.
2. True of False: $g''(x) = -g(x)$. Explain your answer.
3. Graph $y = \cos(x)$ on $[-2\pi, 2\pi]$.
4. Why is $\cos(x)$ not invertible on $[-2\pi, 2\pi]$.?
5. What is the simplest domain on which $\cos(x)$ is invertible?
6. Let's call the inverse of $\cos(x)$ on that domain $\cos^{-1}(x)$, or $\arccos x$. What is the domain of $\cos^{-1}(x)$? The range?
7. What is $\cos(\cos^{-1} x)$? For which values of x is that true?
8. What is $\cos^{-1}(\cos x)$? For which values of x is that true?
9. Sketch a graph of $y = \cos^{-1} x$.