# MATH 1A − QUIZ 4

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Name:_____

**Instructions:** You have 20 minutes to take this quiz, for a total of 10 points. **Make sure to show your work!** May your luck be differentiable everywhere!

(1) *(3 points)* Using the **definition** of the derivative, calculate the derivative of $f(x) = \cos(x)$. You may use any limits laws we talked about in section.

**Hint:** $\cos(A + B) = \cos(A)\cos(B) - \sin(A)\sin(B)$

(2) *(1 point)* Is the function $f(x) = \sqrt{x}$ differentiable at $0$ (from the right)? Explain.

**Note:** I want a mathematical explanation (i.e. a calculation!) (you get $0$ points for drawing a graph or giving me the general formula for $f'(x)$)

*Date*: Friday, September 27th, 2013.

(3) *(2 points; 1 point each)* Evaluate the following limits:

**Note:** Again, $-\infty$ points for using l'Hopital's rule!

(a) $\lim_{x\to-\infty} \frac{\sqrt{x^6+x^2+1}}{x^3}$

(b) $\lim_{x\to\infty} \frac{(\ln(x))^2-1}{(\ln(x))^2-3}$

**Note:** From now on, you're allowed to use differentiation formulas!

(4) *(1 point)* Find $f'(x)$, where $f(x) = \frac{e^x}{\cos(x)}$

(5) *(3 points)* Find the equation of the tangent line to $f(x) = \sqrt{x}$ whose $x-$ intercept is $-4$