Calculus I, Fall 2014

# Quiz 2

Oct 16, 2014

Show all details.

1. Evaluate $\dfrac{d^4}{dx^4}\big(x^4\cos(x-1)\big)|_{x=1}$.
2. Find the derivative of $y=\tan(\exp(\sqrt{x^2+1}))$. Need not simplify your final expression.
3. Suppose we know that $\frac{d}{dx}x^n = nx^{n-1}$ for all integers $n$. Show that, based on this fact, we can derive the same for $n=q/p$ where $p,q$ are integers and $p\neq 0$.
4. Use implicit differentiation (and not other methods) to find $dy/dx$ and $d^2y/dx^2$ at $(1,1)$ where $y(x)$ is implicitly given by $x^4+y^4=2$.
5. True or False? (prove it if true, correct it if false).

   If $f$, $g$ and $h$ are differentiable functions on $R$ and $f(g(x))=h(x)$. Let $\frac{d}{dx}f(x)=f_1(x)$, $\frac{d}{dx}g(x)=g_1(x)$, $\frac{d}{dx}h(x)=h_1(x)$. Then $f_1(x)\cdot g_1(x)=h_1(x)$.

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3. Suppose we know that $\frac{d}{dx}x^n = nx^{n-1}$ for all integers $n$. Show that this is also true for $n=q/p$ where $p,q$ are integers and $p\neq 0$.
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