Math 1151, Chain Rule Activity, Fall 2014 Name KEY

Instructions: Use the chain rule (possibly more than once) to find the derivative of the following composite functions.

1. $h(x) = \sec^3(x^2)$

$$h'(x) = 3\sec^2 x^2 \cdot \sec(x^2)\tan(x^2)\,2x$$
$$= 6x\sec^3(x^2)\tan(x^2)$$

2. $f(x) = \cos\left(\sqrt{\sin(\tan \pi x)}\right)$

$$f'(x) = \sin\left(\sqrt{\sin(\tan \pi x)}\right)\frac{1}{2}\cdot\frac{1}{\sqrt{\sin(\tan \pi x)}}\cdot\cos(\tan \pi x)\cdot\sec^2 \pi x\cdot\pi$$

3. $g(x) = \ln^5(\ln(x\cos(x)))$

$$g'(x) = 5\ln^4(\ln(x\cos(x)))\cdot\frac{1}{\ln(x\cos x)}\cdot\frac{1}{x\cos x}\cdot(\cos x + x(-\sin x))$$

4. $p(x) = e^{e^{x^2+5}}$

$$p'(x) = e^{e^{x^2+5}}\cdot e^{x^2+5}\cdot 2x$$

5. $q(t) = 3^{\sin^2\left(\frac{t}{4}\right)}$

$$q'(t) = (\ln 3)\,3^{\sin^2(t/4)}\cdot 2\sin(t/4)\cos(t/4)\cdot\frac{1}{4}$$

6. $r(x) = (8x^3 + e^{x^3})^{\frac{4}{7}}$

$$r'(x) = \frac{4}{7}(8x^3 + e^{x^3})^{-3/7}(24x^2 + 3x^2e^{x^3})$$