# CALCULUS
# Chain Rule problems
# OLD2

**0380-1.** Write $\tan\left(x^3\right)$ as a composite $f(g(x))$. State explicitly what the function $f$ is, and what the expression $g(x)$ is.

**0380-2.** Compute $\dfrac{d}{dx}\left[\tan\left(x^3\right)\right]$.

**0380-3.** Write $\tan^3 x$ as a composite $f(g(x))$. State explicitly what the function $f$ is, and what the expression $g(x)$ is.

**0380-4.** Compute $\dfrac{d}{dx}\left[\tan^3 x\right]$.

0380-5. Compute $\dfrac{d}{dx}\left[\left(x^4 - 7x^2 + 5\right)^{250}\right]$.

0380-6. Compute $\dfrac{d}{dx}\left[\sqrt[3]{x^5 - 4x^2 + 5}\right]$.

0380-7. Compute $\dfrac{d}{dx}\left[(3x - 2)^{510}(-3x + 4)^{50}\right]$.

0380-8. Compute $\dfrac{d}{dx}\left[\sin\left(4x^{25} - 2x^{12} + 8\right)\right]$.

0380-9. Compute $\dfrac{d}{dx}\left[\left(e^{2x-5}\right)\left(\sec x\right)\right]$.

0380-10. Compute $\dfrac{d}{dx}\left[e^{\csc(\pi x)}\right]$.

0380-11. Compute $\dfrac{d}{dx}\left[\sin\left(\sec^2\left(x^6\right)\right)\right]$.

0380-12.

Compute $\dfrac{d}{dx}\left[\cot\left(\sqrt[5]{\sin\left(\cos\left(x^3+1\right)\right)}\right)\right]$.

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0380-13. Suppose $f(1) = 3$, $f'(1) = 4$,
$g(3) = 5$ and $g'(3) = 6$.
Let $h(x) = g(f(x))$.
a. Compute $h(1)$.     b. Compute $h'(1)$.

0380-14. Let $f : \mathbb{R} \to \mathbb{R}$ be a differentiable function.

a. Compute $\dfrac{d}{dx}\left[\tan\left(f(x)\right)\right]$.

b. Compute $\dfrac{d}{dx}\left[f\left(\tan x\right)\right]$.

c. Compute $\dfrac{d}{dx}\left[f\left(e^{2x}\right)\right]$.

d. Compute $\dfrac{d}{dx}\left[e^{2[f(x)]}\right]$.