Chain Rule **Version D**
Rensselaer Calculus Skills Practice Page

No calculators will be allowed and no partial credit will be given.

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1. Differentiate the function $f(x) = \left(2\,x^3 - 7\,x + 11\right)^4$. Express your answer in terms of elementary functions.
2. Let $y = \left(x^6 + 2\right)^{\frac{4}{5}}$. Find $\dfrac{dy}{dx}$. Express your answer in terms of elementary functions.
3. Let $z = (\cos(t))^5$. Find $\dfrac{dz}{dt}$. Express your answer in terms of elementary functions.
4. Differentiate the function $g(x) = \sqrt{6\,e^{2\,x} + 2}$. Express your answer in terms of elementary functions.
5. Differentiate the function $f(x) = \dfrac{4}{(\ln(x))^3}$. Express your answer in terms of elementary functions.
6. Let $y = -\dfrac{3}{(\ln(x))^{\frac{1}{4}}}$. Find $\dfrac{dy}{dx}$. Express your answer in terms of elementary functions.
7. Let $y = -2\,\ln\left(e^t + 3\right)$. Find $\dfrac{dy}{dt}$. Express your answer in terms of elementary functions.
8. Differentiate the function $g(x) = e^{-4\,x}\,\cos(3\,x)$. Express your answer in terms of elementary functions.

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Answer Key Rensselaer Calculus Skills Practice Page, Fall 2007

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1. $4\left(6x^2-7\right)\left(2x^3-7x+11\right)^3$
2. $\dfrac{24x^5}{5\left(x^6+2\right)^{\frac{1}{5}}}$
3. $-5\left(\cos\left(t\right)\right)^4\sin\left(t\right)$
4. $\dfrac{6e^{2x}}{\sqrt{6e^{2x}+2}}$
5. $-\dfrac{12}{x\left(\ln\left(x\right)\right)^4}$
6. $\dfrac{3}{4x\left(\ln\left(x\right)\right)^{\frac{5}{4}}}$
7. $-\dfrac{2e^t}{e^t+3}$
8. $-3e^{-4x}\sin\left(3x\right)-4e^{-4x}\cos\left(3x\right)$