Derivatives **Version E**
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 $g(x) = 2\,x^4 + 13\,x - 5$. Express your answer in terms of elementary functions.
2. Let $y = e^t + t^8 - 2\,t^{\frac{5}{2}}$. Find $\dfrac{dy}{dt}$. Express your answer in terms of elementary functions.
3. Let $y = \sin(t) + 3\,t^7$. Find $\dfrac{dy}{dt}$. Express your answer in terms of elementary functions.
4. Differentiate the function $g(x) = 7\,\sec(x) + e^x + 3\,x^6$. Express your answer in terms of elementary functions.
5. Differentiate the function $f(x) = \ln(6)\;x + \sqrt{3}$. Express your answer in terms of elementary functions.
6. Differentiate the function $f(x) = \left(3\,x^3 + 5\,x - 6\right)\left(5\,x^4 + 3\,x + 2\right)$. Express your answer in terms of elementary functions.
7. Let $y = \left(5 - 3\,t^{\frac{3}{2}}\right)\,e^t$. Find $\dfrac{dy}{dt}$. Express your answer in terms of elementary functions.
8. Differentiate the function $f(x) = 2\,e^x\,\cos(x)$. Express your answer in terms of elementary functions.
9. Differentiate the function $f(t) = 3\,t^2\,\ln(t)$. Express your answer in terms of elementary functions.
10. Differentiate the function $h(x) = \dfrac{e^x}{e^x - 3\,x^4 + 5}$. Express your answer in terms of elementary functions.
11. Differentiate the function $f(x) = \dfrac{3\,e^x}{\sec(x)}$. Express your answer in terms of elementary functions.
12. Differentiate the function $f(t) = \dfrac{8\,\cos(t)}{t^4}$. Express your answer in terms of elementary functions.
13. Let $y = \dfrac{4\,x^8}{\cos(x)}$. Find $\dfrac{dy}{dx}$. 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. $8\,x^3 + 13$
2. $e^t + 8\,t^7 - 5\,t^{\frac{3}{2}}$
3. $\cos(t) + 21\,t^6$
4. $7\,\sec(x)\,\tan(x) + e^x + 18\,x^5$
5. $\ln(6)$
6. $\left(9\,x^2 + 5\right)\left(5\,x^4 + 3\,x + 2\right) + \left(3\,x^3 + 5\,x - 6\right)\left(20\,x^3 + 3\right)$
7. $\left(5 - 3\,t^{\frac{3}{2}}\right)e^t - \dfrac{9\sqrt{t}\,e^t}{2}$
8. $2\,e^x\,\cos(x) - 2\,e^x\,\sin(x)$
9. $6\,t\,\ln(t) + 3\,t$
10. $\dfrac{e^x}{e^x - 3\,x^4 + 5} - \dfrac{e^x\left(e^x - 12\,x^3\right)}{\left(e^x - 3\,x^4 + 5\right)^2}$
11. $\dfrac{3\,e^x}{\sec(x)} - \dfrac{3\,e^x\,\tan(x)}{\sec(x)}$
12. $-\dfrac{8\,\sin(t)}{t^4} - \dfrac{32\,\cos(t)}{t^5}$
13. $\dfrac{4\,x^8\,\sin(x)}{\left(\cos(x)\right)^2} + \dfrac{32\,x^7}{\cos(x)}$