Derivatives **Version D**
Rensselaer Calculus Skills Practice Page

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

---

1. Differentiate the function $g(x) = 4\,x^3 + 17\,x - 5$. Express your answer in terms of elementary functions.
2. Let $y = -e^t + t^5 - 2\,t^{\frac{4}{3}}$. Find $\dfrac{dy}{dt}$. Express your answer in terms of elementary functions.
3. Let $y = \sec(t) + 3\,t^6$. Find $\dfrac{dy}{dt}$. Express your answer in terms of elementary functions.
4. Differentiate the function $g(x) = 7\,\cos(x) + e^x + 3\,x^3$. Express your answer in terms of elementary functions.
5. Differentiate the function $f(x) = \ln(6)\,x + \ln(4)$. Express your answer in terms of elementary functions.
6. Differentiate the function $f(x) = \left(5\,x^3 + 3\,x^2 - 6\right)\left(5\,x^5 + 3\,x + 2\right)$. Express your answer in terms of elementary functions.
7. Let $y = \left(3 - 2\,t^{\frac{3}{2}}\right)\,e^t$. Find $\dfrac{dy}{dt}$. Express your answer in terms of elementary functions.
8. Differentiate the function $f(x) = -5\,e^x\,\sec(x)$. Express your answer in terms of elementary functions.
9. Differentiate the function $f(t) = 8\,t^2\,\ln(t)$. Express your answer in terms of elementary functions.
10. Differentiate the function $h(x) = \dfrac{e^x}{e^x + 8\,x^4 + 3}$. Express your answer in terms of elementary functions.
11. Differentiate the function $f(t) = \dfrac{8\,e^t}{\cos(t)}$. Express your answer in terms of elementary functions.
12. Differentiate the function $f(x) = \dfrac{8\,\sin(x)}{x^4}$. Express your answer in terms of elementary functions.
13. Let $y = \dfrac{4\,t^5}{\sec(t)}$. Find $\dfrac{dy}{dt}$. Express your answer in terms of elementary functions.

Derivatives **Version D**

Answer Key Rensselaer Calculus Skills Practice Page, Fall 2007

---

1. $12\,x^2 + 17$
2. $-e^t + 5\,t^4 - \dfrac{8\,t^{\frac{1}{3}}}{3}$
3. $\sec(t)\,\tan(t) + 18\,t^5$
4. $-7\,\sin(x) + e^x + 9\,x^2$
5. $\ln(6)$
6. $\left(15\,x^2 + 6\,x\right)\,\left(5\,x^5 + 3\,x + 2\right) + \left(5\,x^3 + 3\,x^2 - 6\right)\,\left(25\,x^4 + 3\right)$
7. $\left(3 - 2\,t^{\frac{3}{2}}\right)\,e^t - 3\,\sqrt{t}\,e^t$
8. $-5\,e^x\,\sec(x)\,\tan(x) - 5\,e^x\,\sec(x)$
9. $16\,t\,\ln(t) + 8\,t$
10. $\dfrac{e^x}{e^x + 8\,x^4 + 3} - \dfrac{e^x\,\left(e^x + 32\,x^3\right)}{\left(e^x + 8\,x^4 + 3\right)^2}$
11. $\dfrac{8\,e^t\,\sin(t)}{(\cos(t))^2} + \dfrac{8\,e^t}{\cos(t)}$
12. $\dfrac{8\,\cos(x)}{x^4} - \dfrac{32\,\sin(x)}{x^5}$
13. $\dfrac{20\,t^4}{\sec(t)} - \dfrac{4\,t^5\,\tan(t)}{\sec(t)}$