DERIVATIVE WORKSHEET

MATH 3 / FALL 2012

Level 0:

(a) $10x^9$

(b) $10^x \ln 10$

(c) $\dfrac{1}{x \ln 10}$

(d) $\cos x$

(e) $-\sin x$

(f) $\sec^2 x$

Level 1:

(a) $\dfrac{3}{2\sqrt{x}} \cdot \sec x + 3\sqrt{x} \cdot \sec x \cdot \tan x$

(b) $4(x^3 - 2^{2x-1} \ln 2)$

(c) $2\pi \left(-\csc(2\pi x) \cot(2\pi x) - 2\cos(4\pi x) + \frac{1}{2} \sec^2(\pi x) \right)$

(d) $4e^x \left(\ln x + \dfrac{1}{x} \right)$

(e) $3^x (9 \sec^2(3x) + \ln(27) \tan(3x))$

(f) $\dfrac{3}{2\sqrt{x}} + 6 \sin x + 2 \exp x$

Level 2:

(a) $\sqrt{x} \left(\dfrac{\sin x}{x} + 2\cos x \right) - \dfrac{20}{x^5}$

(b) $-\dfrac{3^x \ln(3^x) + 1}{x(3^x + \ln x)^2}$

(c) $\dfrac{9 \cos \ln x}{2\sqrt{x}} - \dfrac{9 \sin \ln x}{\sqrt{x}}$

(d) $\dfrac{2/3 \sqrt[3]{4x^2 - 4x + 1} + 5x^4}{\sqrt[3]{2x - 1} + x^5}$

(e) $3e^x + 4\cos x + 4 \sin x$

(f) $\dfrac{1}{2} \sqrt{\dfrac{2}{x+1}} - \ln(2) 2^{-x}$

Level 3:

(a) $e^{\sin(x)/\sqrt{x}} \dfrac{x\cos(x) - \sin(x)/2}{\sqrt{x^3}}$

(b) $3\csc(x^2)\sec^2(x) - 6x\csc(x^2)\cot(x^2)\tan(x)$

(c) $-2e\sec\left(e^{2x-x^2}\right)\tan\left(e^{2x-x^2}\right)\frac{x-1}{e^{(x-1)^2}}$

(d) $-3\csc^3(x^2-\cos x)\cot(x^2-\cos x)(2x+\sin x)$

(e) $-\sin\left(x^4 - 3\ln x + e^x\right)\left(4x^3 - 3/x + e^x\right)$

(f) $\dfrac{4}{x}\cos\left(x^2+\dfrac{1}{x^2}\right)\left(x^2-\dfrac{1}{x^2}\right)$

Level 4:

(a) $\ln(2)\ln(5)2^{e^{5^x}}e^{5^x}5^x$

(b) $-\ln(4)2^{\sin(\cos^2 x)}\cos(\cos^2 x)\sin(x)$

(c) $\exp x \cdot \sin\exp x \cdot \csc^2\cos\exp x$

(d) $-\sin\sec\tan x \cdot \sec\tan x \cdot \tan\tan x \cdot \sec^2 x$

(e) $\dfrac{e^{\frac{1}{2}\tan\ln x}\sec^2\ln x}{2x}$

(f) $\dfrac{\sec^2\sqrt{\sin x}\cdot\cos x}{4\sqrt{\sin x\cdot\tan\sqrt{\sin x}}}$