Occidental College Department of Mathematics
Gateway – Derivatives (practice)

Course: _____ Date: _____ Name: SOLUTIONS

The Gateway room, Fowler 301, is staffed Monday through Thursday, 12:30-1:30, for retakes and tutoring. If you can't make it any of those times, contact Professor Lawrence for an appointment (Fowler 324, x2647, DonL@oxy.edu).

Find the derivative of the following functions. You DO NOT need to simplify your results!

1. $y = 7^x$ $\quad \frac{dy}{dx} = 7^x \ln 7$

2. $y = (3 - 5x^3)^4$ $\quad \frac{dy}{dx} = 4(3-5x^3)^3(-15x^2)$

3. $y = \sin(\ln(3x))$ $\quad \frac{dy}{dx} = \cos(\ln(3x)) \cdot \frac{1}{3x} \cdot 3$

4. $f(x) = e^{\cos(x)}$ $\quad f'(x) = e^{\cos(x)}(-\sin x)$

5. $y = 3x^{-5} + \cos(\pi)$ $\quad \frac{dy}{dx} = -15x^{-6}$

3. $k(x) = \dfrac{x^3 - 2x^2}{\cos(x)}$

$k'(x) = \dfrac{(\cos x)(3x^2 - 4x) - (x^3 - 2x^2)}{\cos^2 x}$

7. $y = \sin\left(x^3 3^x\right)$

$\dfrac{dy}{dx} = \cos(x^3 \cdot 3^x) \cdot (x^3 \cdot 3^x \ln 3 + 3x$

3. $p(x) = \ln(6x^2)$

$p'(x) = \dfrac{1}{6x^2} \cdot 12x$

1. $y = x^{\frac{1}{2}} \cos(x)$

$\dfrac{dy}{dx} = \dfrac{1}{2} x^{-1/2} \cdot \cos x + x^{\frac{1}{2}} (-\sin x,$

0. $y = 5x^2 - 2x^3 + 5$

$\dfrac{dy}{dx} = 10x - 6x^2$