Name: *Caleb McWhorter — Solutions* **Quiz 5**
MAT 295 **Fall 2016**

Problem 1: Evaluate the following derivatives [you do not need to simplify but you do need to show your work]:

(a) $\dfrac{d}{dx}(x^\pi - x + 1)\,e^x = (\pi x^{\pi-1} - 1)e^x + (x^\pi - x + 1)e^x$

(b) $\dfrac{d}{dx}\left(\dfrac{x^3 - x + 2}{x^2 - 5x + 1}\right) = \dfrac{(x^2 - 5x + 1)(3x^2 - 1) - (2x - 5)(x^3 - x + 2)}{(x^2 - 5x + 1)^2}$

(c) $\dfrac{d}{dx}(3 - 2x^2)^{12} = 12(3 - 2x^2)^{11} \cdot (-4x)$

Problem 2: Evaluate the following derivatives [you do not need to simplify but you do need to show your work]:

(a) $\dfrac{d}{dx}\, x^3\, 7^x \arctan x = 3x^2 7^x \arctan x + x^3 7^x \ln 7 \arctan x + \dfrac{x^3 7^x}{1 + x^2}$

(b) $\dfrac{d}{dx}\left(\dfrac{\cot x \ln x}{\log_5 x}\right) = = \dfrac{\log_5 x\left(-\csc^2 x \ln x + \dfrac{\cot x}{x}\right) - \dfrac{1}{x \ln 5}\cot x \ln x}{(\log_5 x)^2}$

(c) $\dfrac{d}{dx}\, \cos^2(\ln(1 - 2x)) = 2\cos(\ln(1 - 2x)) \cdot -\sin(\ln(1 - 2x)) \cdot \dfrac{1}{1 - 2x} \cdot -2$

Problem 3: Evaluate the following derivative [you do not need to simplify but you do need to show your work]:

$$\frac{d}{dx}\left(\frac{5^{2x}\csc(7x)}{\sin^2(e^x)\arcsin(3x+1)}\right)=$$

$$\frac{\sin^2(e^x)\arcsin(3x+1)(5^{2x}\ln 5\cdot 2\csc(7x)+5^{2x}\cdot -\csc(7x)\cot(7x)7)-\left(2\sin(e^x)\cos(e^x)e^x\arcsin(3x+1)+\frac{3\sin^2 e^x}{\sqrt{1-(3x+1)^2}}\right)5^{2x}\csc 7x}{\sin^4(e^x)\arcsin^2(3x+1)}$$