NAME Key JULY 3, 2018

**Instructions:** *Include all relevant work to get full credit.*

**Quiz #6 (odd numbers) and #7 (even numbers)**

Determine the derivative of the following functions (*You don't have to simplify*):

**1.** $f(x) = (2x^3 - 3x + 10)^5$ $\Rightarrow f'(x) = 5(2x^3-3x+10)^4 \cdot (6x^2-3)$ [2]

**2.** $g(x) = (x^3 - 3x)^5(5 - x^2)^4$ [2]

$\Rightarrow g'(x) = (x^3-3x)^5\, 4(5-x^2)^3(-2x) + 5(x^3-3x)^4(3x^2-3)(5-x^2)^4$

**3.** $h(x) = \dfrac{2x^5}{3 - x^2}$ [2]

$$\Rightarrow h'(x) = \frac{(3-x^2)\,10x^4 - 2x^5(-2x)}{(3-x^2)^2}$$

**4.** $y = \dfrac{\sqrt[3]{3 - 2x}}{\sqrt{4 - 3x^2}}$ [2]

$$\Rightarrow \frac{dy}{dx} = \frac{\sqrt{4-3x^2}\left(\frac{1}{3}\right)(3-2x)^{-2/3}(-2) - \sqrt[3]{3-2x}\left(\frac{1}{2}\right)(4-3x^2)^{-1/2}(-6x)}{(4-3x^2)}$$

**5.** $f(\theta) = \cos(\theta^2)$ $\rightarrow f'(\theta) = -\sin(\theta^2) * 2\theta$ [2]

**6.** $f(\theta) = \sin^2(\theta^2)$ $\rightarrow f'(\theta) = 2[\sin(\theta^2)]^1 \cdot \cos(\theta^2) \cdot 2\theta$ [2]

**7.** $f(\theta) = e^{4\theta}\tan(2\theta)$ [2]

$\rightarrow f'(\theta) = e^{4\theta}\sec^2(2\theta)\cdot 2 + e^{4\theta}(4)\tan(2\theta)$

**8.** $f(\theta) = \left(\dfrac{e^{4\theta}}{\sec\theta}\right)^5$ [2]

$$\rightarrow f'(\theta) = 5\left[\frac{e^{4\theta}}{\sec\theta}\right]^4 * \left[\frac{\sec\theta\, e^{4\theta}\cdot 4 - e^{4\theta}\sec\theta\tan\theta}{\sec^2\theta}\right]$$

**9.** $f(t) = e^{(2t^3)}5^{4t}$ [2]

$\rightarrow f'(t) = e^{2t^3}\,5^{4t}(4)\ln 5 + e^{2t^3}(6t^2)5^{4t}$

**10.** $f(t) = \dfrac{e^{(3t)}\sin(4t)}{2t^3}$ [2]

$$\rightarrow f'(t) = \frac{2t^3\left[e^{3t}\cos(4t)4 + e^{3t}(3)\sin(4t)\right] - 6t^2e^{3t}\sin(4t)}{(2t^3)^2}$$