**Practice Quiz Derivatives 2018** Name_____

*Introduction to Calculus*

**Find the derivative of each function. Simplify each answer.**

1) $y(x) = x^4 - 6\sin(x) + 8(7)^x$

$y'(x) = 4x^3 - 6\cos(x) + 8(\ln 7)(7^x)$

2) $g(x) = e^x \cos(x)$

$g'(x) = e^x(\cos(x)) + e^x(-\sin(x))$

$g'(x) = e^x\cos(x) - e^x\sin(x)$

OR $g'(x) = e^x((\cos(x) - \sin(x))$

3) $J(x) = \frac{1}{2}(6)^{8x-1}$

$J'(x) = \frac{1}{2}(\ln 6)6^{8x-1} \cdot 8$

$J'(x) = 4(\ln 6)6^{8x-1}$

4) $f(x) = \frac{1}{\sqrt{2x-1}}$

$f'(x) = \frac{-\frac{1}{2}(2x-1)^{-1/2} \cdot 2}{(\sqrt{2x-1})^2}$

$f'(x) = \frac{-1}{(2x-1)^{3/2}}$

5) $y = \frac{5x^{2/3}}{7} = \frac{5}{7}x^{2/3}$

$y' = \frac{10}{21}x^{-1/3}$

OR $y' = \frac{10}{21x^{1/3}}$

6) $f(x) = 2\sqrt{10x}$ (Careful: Use chain rule!)

$f'(x) = 2 \cdot \frac{1}{2}(10x)^{-1/2} \cdot 10$

$f'(x) = \frac{10}{(10x)^{1/2}}$

7) $f(x) = \frac{-3}{2x^4} = \frac{-3}{2}x^{-4}$

$f'(x) = 6x^{-5}$

$f'(x) = \frac{6}{x^5}$

8) $f(x)=\dfrac{(7x^2-x+5)^4}{2}$ $= \frac{1}{2}(7x^2-x+5)^4$

$f'(x)=2(7x^2-x+5)^3(14x-1)$

9) $f(x)=\tan^4(3x-1)$ $=(\tan(3x-1))^4$

$f'(x)=4(\tan(3x-1))^3(\sec^2(3x-1))(3)$

$f'(x)=12\cdot\tan^3(3x-1)\cdot\sec^2(3x-1)$

10) $y(x)=\dfrac{(2)^{3x}}{(6-2x)^3}$ $y'(x)=\dfrac{(\ln 2)2^{3x}\cdot 3\cdot(6-2x)^3-2^{3x}\cdot 3(6-2x)^2(-2)}{(6-2x)^6}$

$y'(x)=\dfrac{(3)(2^{3x})(6-2x)^2[(\ln 2)(6-2x)+2]}{(6-2x)^{6\,4}}$

$y'(x)=\dfrac{(3)(2^{3x})[(\ln 2)(6-2x)+2]}{(6-2x)^4}$

**Find the derivative of each function. Do NOT simplify answers.**

11) $f(x) = 2x^3(6x^3 - x)^3$

$f'(x) = 6x^2(6x^3 - x)^3 + 2x^3 \cdot 3(6x^3 - x)^2(18x^2 - 1)$

12) $f(x) = \dfrac{(5x^6 - 8)^4}{5^{3x-2}}$

$f'(x) = \dfrac{4(5x^6 - 8)^3(30x^5)(5^{3x-2}) - (5x^6 - 8)^4(\ln 5)(5^{3x-2})(3)}{(5^{3x-2})^2}$

13) $f(x) = \left(\dfrac{\sin x}{9x^2 + 1}\right)^{12}$

$f'(x) = 12\left(\dfrac{\sin x}{9x^2 + 1}\right)^{11}\left(\dfrac{\cos x \cdot (9x^2 + 1) - \sin x(18x)}{(9x^2 + 1)^2}\right)$

14) $f(x) = \cos(3x) \cdot (4x-1)^6 \cdot (2^x)$

a b c

$f'(x) = \underbrace{-\sin(3x)(3)}_{a'}\underbrace{(4x-1)^6}_{b}\underbrace{(2^x)}_{c} +$

$\underbrace{\cos(3x)}_{a}\cdot\underbrace{6(4x-1)^5(4)}_{b'}\cdot\underbrace{(2^x)}_{c} +$

$\underbrace{\cos(3x)}_{a}\underbrace{(4x-1)^6}_{b}\underbrace{(\ln 2)2^x}_{c'}$