Name_____ Period_____ Score_____

AP Calculus AB   **Chapter 4 More Derivatives Review**

1. Given $y = \frac{1}{2}(2x + 5)^3$. Determine $\frac{dy}{dx}$.

 (A) $\frac{3}{2}(2x + 5)^3$ (B) $3(2x + 5)^2$ (C) $3(2x + 5)$

 (D) $\frac{3}{2}(2x + 5)$ (E) $6(2x + 5)$

2. If $v(t) = \ln(t^2 + t + 1)$, then $v'(1) =$

 (A) $\frac{1}{3}$ (B) $-\frac{2}{3}$ (C) 1 (D) $\frac{4}{3}$ (E) 3

3. Selected function and derivative values for the differentiable functions $f(x)$ and $g(x)$ are given in the table below.

x	$f(x)$	$g(x)$	$f'(x)$	$g'(x)$
0	$1/2$	-2	$3/2$	-1
1	$1/3$	1	$5/3$	$2/3$
2	1	$-1/2$	$1/4$	-4
3	-1	2	0	-3
4	3	$-1/3$	$-4/5$	$-1/3$

 If $p(x) = g(x) \cdot f(x) - g(2x - 3)$, then $p'(3) =$

4. Find the **second** derivative of $f(x)$ if $f(x) = (2x^2 + 5)^3$

Use the given information about differentiable functions $f(x)$ and $g(x)$ at $x = 1$ and $x = 2$ for problem 5.

x	$f(x)$	$g(x)$	$f'(x)$	$g'(x)$
1	3	2	12	-8
2	$\sqrt{7}$	π	-9	10

5. Find $\dfrac{d}{dx}\{f(g(x))\}$ at $x = 1$

For problems 6 – 11, find the derivative. Do not leave negative or rational exponents in your answer.

6. $s(x) = \sqrt{\dfrac{4+x}{5-x}}$

7. $y = \cos\left(\dfrac{1}{2}x\right) - \tan^2(2x)$

8. $y = e^{5x-3} \cdot x^4$

9. $y = \sin^{-1}(2 - x)$

10. $y = 13^{-2x}$

11. $y = \log_4(3x + 2)$

12. Let g be the function defined by $g(x) = x^5 + x$. If $f(x) = g^{-1}(x)$ and $g(1) = 2$, what is the value of $f'(2)$?

13. If $\tan(x^2 y) = 2x$, then $\dfrac{dy}{dx} =$

14. If $x^2 + xy = 10$, then when $x = 2$, $\dfrac{dy}{dx} =$

15. What is the slope of the line tangent to the curve defined by $x^4 - 3x^2 y^2 + 4y^2 = 5$ at the point $(1,2)$?

16. Given the circle: $x^2 + y^2 = 100$

a) Find where the graph has horizontal tangents.

b) Find $\dfrac{d^2y}{dx^2}$ evaluated at $(-6,8)$.