AP Calculus AB Name_____

Product and Quotient Rules

Date_____

Differentiate each function with respect to *x*.

1) $y = (-x^2 - 3)(x^5 + 1)$

2) $y = (-4x^2 - 1)(-4x^4 + 3x^2 - 2)$

3) $f(x) = \frac{2}{3x^4 + 5}$

4) $f(x) = \frac{3x^5 + 5x^3}{5x^4 + 2}$

5) Let f(x) = g(x)h(x), g(10) = −4, h(10) = 560, g′(10)=0, and h'(1) = 35. Find f'(10).

For each problem, you are given a table containing some values of differentiable functions $f(x)$, $g(x)$ and their derivatives. Use the table data and the rules of differentiation to solve each problem.

6)

x	$f(x)$	$f'(x)$	$g(x)$	$g'(x)$
1	3	-2	4	-2
2	1	0	2	$-\frac{3}{2}$
3	3	$\frac{3}{2}$	1	0
4	4	1	2	1

Part 1) Given $h_1(x) = f(x) + g(x)$, find $h_1'(2)$

Part 2) Given $h_2(x) = f(x) - g(x)$, find $h_2'(2)$

Part 3) Given $h_3(x) = f(x) \cdot g(x)$, find $h_3'(2)$

Part 4) Given $h_4(x) = \frac{f(x)}{g(x)}$, find $h_4'(3)$

7)

x	$f(x)$	$f'(x)$	$g(x)$	$g'(x)$
1	2	1	3	-2
2	3	1	1	$-\frac{1}{2}$
3	4	$-\frac{1}{2}$	2	1
4	2	-2	3	1

Part 1) Given $h_1(x) = f(x) + g(x)$, find $h_1'(2)$

Part 2) Given $h_2(x) = f(x) - g(x)$, find $h_2'(4)$

Part 3) Given $h_3(x) = f(x) \cdot g(x)$, find $h_3'(2)$

Part 4) Given $h_4(x) = \frac{f(x)}{g(x)}$, find $h_4'(1)$