AP Calculus
Assignment #14A: Product and Quotient Rule Practice

Name_____

1. Suppose *f* and *g* are differentiable functions with the values shown in the table below. For each of the following functions *h,* find *h'*(2).

x	*f*(*x*)	*g*(*x*)	*f'*(*x*)	*g'*(*x*)
2	3	4	5	-2

(a) $h(x) = f(x) + g(x)$

(b) $h(x) = f(x)g(x)$

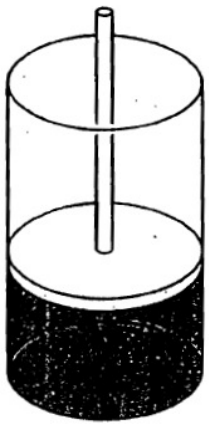
(c) $h(x) = \dfrac{f(x)}{g(x)}$

2. Given $H(3) = 1 \quad F(3) = 5 \quad H'(3) = 3 \quad F'(3) = 4$
Find
(a) $G'(3)$ if $G(z) = F(z) \cdot H(z)$
(b) $G'(3)$ if $G(w) = \dfrac{F(w)}{H(w)}$

3. If the gas in a cylinder is maintained at a constant temperature, *T*, the pressure *P* is related to the volume *V* by the formula:

$$P = \frac{nRT}{V - nb} - \frac{an^2}{V^2}$$ in which *a, b, n*, and *R* are constants.

Find $\dfrac{dP}{dV}$.



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Two functions, f and g, are continuous and differentiable for all real numbers. Some values of the functions and their derivatives are shown in this table:

x	0	1	2	3	4
$f(x)$	$\frac{1}{2}$	$\frac{1}{3}$	1	-1	3
$g(x)$	-2	1	$-\frac{1}{2}$	2	$-\frac{1}{3}$
$f'(x)$	$\frac{3}{2}$	$\frac{5}{3}$	$\frac{1}{4}$	0	$-\frac{4}{5}$
$g'(x)$	-1	$\frac{2}{3}$	-4	-3	$-\frac{1}{3}$

Based on that delightful table, find the following derivatives:

$\frac{d}{dx}\left(f(x)+g(x)\right)$, evaluated at $x = 4$

$\frac{d}{dx}\left(f(x)g(x)\right)$, evaluated at $x = 1$

$\frac{d}{dx}\left(\frac{f(x)}{g(x)}\right)$, evaluated at $x = 0$

From: http://www.calculus-help.com/probs2002/5problem5.html

Area The length of a rectangle is given by $2t + 1$ and its height is $\sqrt{t}$, where t is time in seconds and the dimensions are in centimeters. Find the rate of change of the area with respect to time.