

Name:
 Teacher:
 Period:
 Due Date:

Power, Sum, Difference, Product and Quotient Rules!

1.) Differentiate: $\frac{d}{dx}[f(x) \cdot g(x)]$	2.) Differentiate: $\frac{d}{dx} \left[\frac{f(x)}{g(x)} \right]$
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For questions #3-11, which of the following can be evaluated using the power rule?

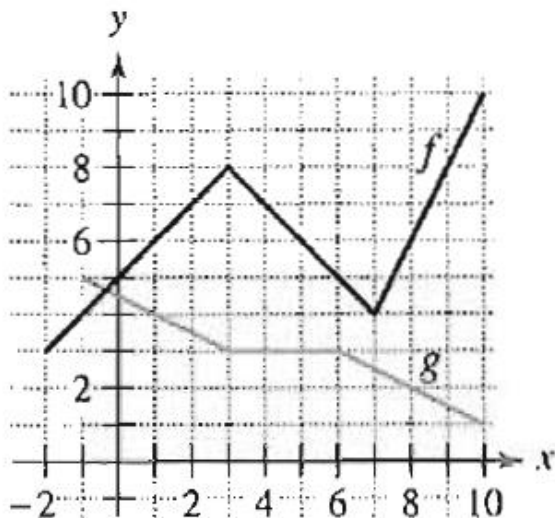
3.) $f(x) = 3x(6x - 5x^2)$	4.) $f(x) = \frac{x^3-6}{x^2}$	5.) $h(s) = \frac{s}{\sqrt{s}-1}$
6.) $g(t) = \frac{t^2+4}{5t-3}$	7.) $s(t) = t + \frac{1}{t^2}$	8.) $g(x) = (6x + 5)(x^3 - 2)$
9.) $f(x) = \frac{x^3+5x+3}{x^2-1}$	10.) $h(x) = \sqrt[4]{x} + \frac{1}{x^8}$	11.) $f(x) = \frac{4x-2x^4}{\sqrt{x}}$

12.) The table below represents selected values from twice differentiable functions $f(x)$ and $g(x)$. Let $h(x) = f(x)g(x)$ and $k(x) = \frac{f(x)}{g(x)}$

x	$f(x)$	$g(x)$	$f'(x)$	$g'(x)$
-2	5	-8	9	-10
1	2	1	-5	-6
3	6	2	-10	5
4	-7	-2	-6	5

- a. Evaluate $h'(1)$
- b. Evaluate $k'(-2)$
- c. Determine the equation of the line tangent to $k(x)$ at $x = 3$.
- d. Estimate the value of $h(4.001)$ using the line tangent to $h(x)$ at $x = 4$

13.) The functions $p(x) = f(x)g(x)$ and $q(x) = \frac{f(x)}{g(x)}$. Use the graphs of f and g below to evaluate the following.



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|---------|---------|
| $p'(1)$ | $q'(4)$ |
| $p'(7)$ | $q'(3)$ |

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21.) A ball is thrown straight down from the top of a 220-meter building with an initial velocity of -22 meters per second. What is its velocity after 3 seconds? What is its velocity after falling 108 meters?

22.) To estimate the height of a building, a stone is dropped from the top of the building into a pool of water at ground level. How high is the building if the space is seen 5.6 seconds after the stone is dropped?

23.) The figure shows the graphs of position, velocity and acceleration functions of a particle. Identify when the particle speeds up and slows down.

