AP Calculus AB
Wednesday, September 18, 2013

Please check your HW answers with someone

$y = \frac{4x^2 - 5x + 6}{3}$

$y = \frac{4x^2}{3} - \frac{5x}{3} + 2$

$y' = \frac{8}{3}x - \frac{5}{3}$

hump day!!

11. $y = \frac{x^3 - 3x^2 + 10x - 5}{x^2}$

$y = x - 3 + 10x^{-1} - 5x^{-2}$

$y' = 1 - 10x^{-2} + 10x^{-3}$

$y' = 1 - \frac{10}{x^2} + \frac{10}{x^3}$

(4e) $y = -\frac{5}{3}x^{-3}$

$y' = 5x^{-4}$

$y' = \frac{5}{x^4}$

(4f) $y = \frac{-5}{27}x^{-3}$

$y' = \frac{5}{9}x^{-4}$

$y' = \frac{5}{9x^4}$

5d) $y = 6\sqrt{x}\left(\sqrt[3]{x} - 2x + 6\right)$

$y = 6x^{1/2}\left(x^{1/3} - 2x^1 + 6\right)$

$y = 6x^{5/6} - 12x^{3/2} + 36x^{\frac{1}{2}}$

$y' = 5x^{-1/6} - 18x^{1/2} + 18x^{-1/2}$

$y' = \frac{5}{\sqrt[6]{x}} - 18\sqrt{x} + \frac{18}{\sqrt{x}}$

$f(x) = (x^2 - 1)(x + 2)$

$f(x) = x^3 + 2x^2 - x - 2$

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

$y = \left(\sqrt{x} + 3x^2 - 4x^{1/2} - 5x^{2/3}\right)(x - 7.2)^4$

With our knowledge right now, we would have to expand this. "YUCK," says Jake. Let's learn another way to do this!

2. $f(x) = \frac{1}{x} - \frac{3}{x^2} + \frac{4}{x^3}$

$f(x) = 1x^{-1} - 3x^{-2} + 4x^{-3}$

$f'(x) = -1x^{-2} + 6x^{-3} - 12x^{-4}$

$f'(x) = \frac{-1}{x^2} + \frac{6}{x^3} - \frac{12}{x^4}$

$f'(1) = \frac{-1}{1^2} + \frac{6}{1^3} - \frac{12}{1^4}$

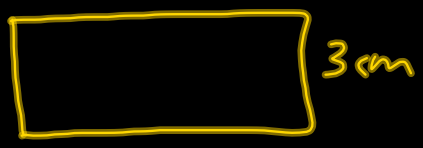
$f'(1) = -1 + 6 - 12$

$f'(1) = -7$

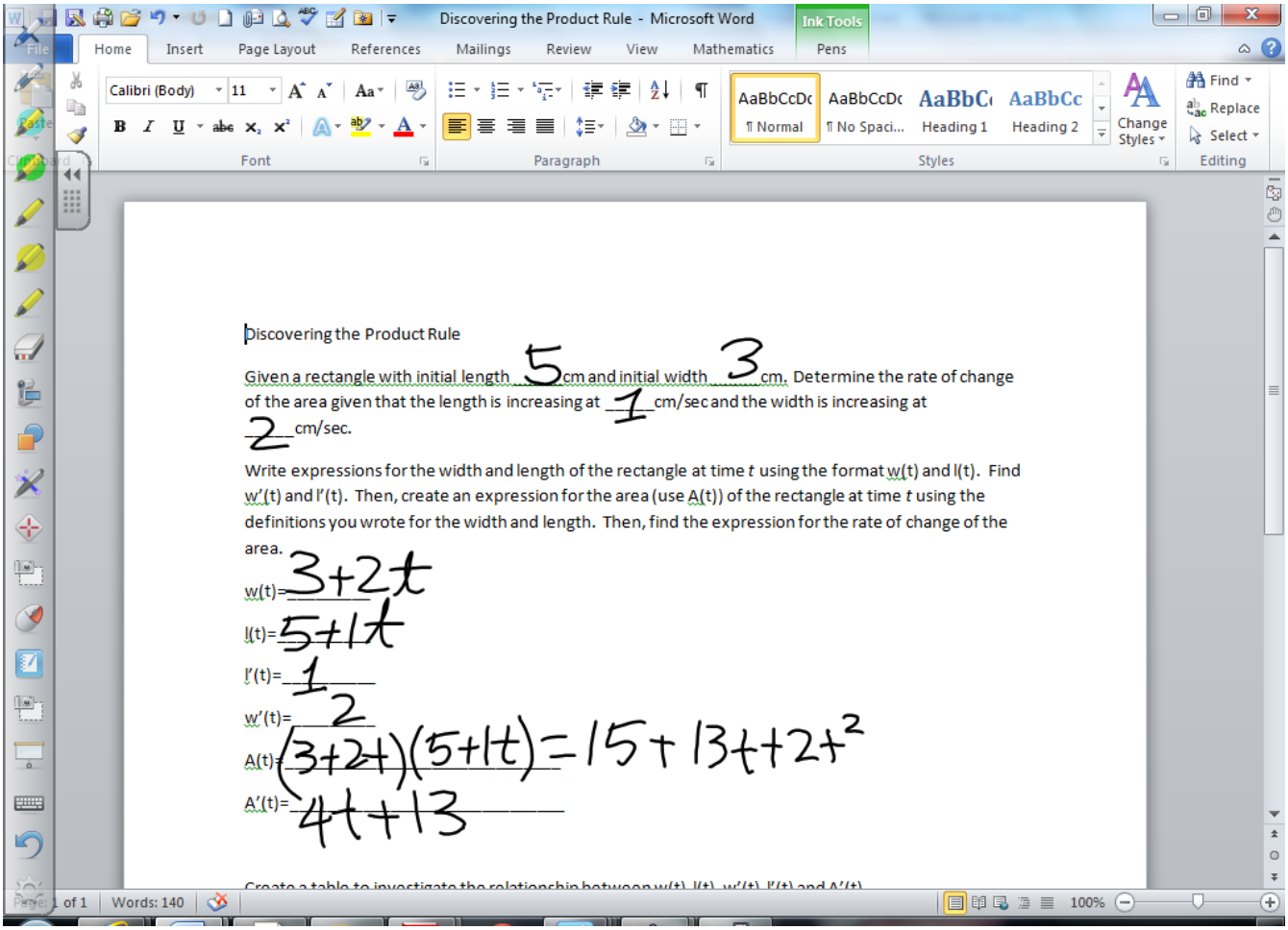
This means the slope of $f(x)$ at $x = 1$ is -7.

Discovering the Product Rule

Given a rectangle with initial length 5 cm and initial width 3 cm. Determine the rate of change of the area given that the length is increasing at 1 cm/sec and the width is increasing at 2 cm/sec.



t	Length, cm	Width, cm	Area, cm^2
0	5	3	15
1	6	5	30
2	7	7	49
3	8	9	72
t	$5+1t$	$3+2t$	$(5+1t)(3+2t)$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Discovering the Product Rule
Given a rectangle with initial length 5 cm and initial width 3 cm. Determine the rate of change of the area given that the length is increasing at 1 cm/sec and the width is increasing at 2 cm/sec.
Write expressions for the width and length of the rectangle at time t using the format w(t) and l(t). Find w'(t) and l'(t). Then, create an expression for the area (use A(t)) of the rectangle at time t using the definitions you wrote for the width and length. Then, find the expression for the rate of change of the area.
w(t)= 3+2t
l(t)= 5+1t
l'(t)= 1
w'(t)= 2
A(t)= (3+2t)(5+1t)=15+13t+2t²
A'(t)= 4t+13
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