Write your name on the line: Key Period:

AP Calculus AB: 3.11 Chain Rule

1. Find the instantaneous rate of change of each of the following functions.

a) $y = 5(2x^3 - 5x)^2$

$y' = 10(2x^3-5x)^1 \cdot (6x^2-5)$

$= 120x^5 - 400x^3 + 250x$

b) $y = \sqrt[3]{4-7x^2} = (4-7x^2)^{1/3}$

$y' = \dfrac{-14x}{3\sqrt[3]{(4-7x^2)^2}}$

c) $y = \dfrac{3}{(5x^2-2x+7)^4} = 3(5x^2-2x+7)^{-4}$

$y' = \dfrac{-120x+24}{(5x^2-2x+7)^5}$

d) $y = sin(e^{-x})$

$y' = \dfrac{-\cos(e^{-x})}{e^x}$

2. Find $\frac{dy}{dx}$ of $y = \sqrt{(8x^2 - 5x)^3}$

$y' = \dfrac{(48x-15)\sqrt{8x^2-5x}}{2}$

3. If $f(x) = sec(3x)$, find $f'(\frac{\pi}{4})$

$f'(x) = 3\sec(3x)\tan(3x)$

$f'(\frac{\pi}{4}) = 3\sqrt{2}$

4. $\lim_{h\to 0} \dfrac{\tan(\frac{\pi}{6}+h) - \tan(\frac{\pi}{6})}{h}$ *(Hint: notice the problem is asking you to find the derivative at a point)*

$f(x) = \tan(x)$

we need to find $f'(\pi/6)$

$f'(\pi/6) = \frac{4}{3}$