1. $f(x) = \frac{6}{x^3} - \frac{1}{2}x^2 - \sqrt[3]{x^4}$

$6x^{-3} - \frac{1}{2}x^2 - x^{\frac{4}{3}} \rightarrow -18x^{-4} - x - \frac{4}{3}x^{1/3}$.

$-\frac{18}{x^4} - x - \frac{4\sqrt[3]{x}}{3}$ ✓

2. $g(r) = -5\cot r$

$-5 \cdot -\csc^2 r$

$5\csc^2 r$ ✓

$\sin \rightarrow \cos$ $\quad \cos \rightarrow -\sin$

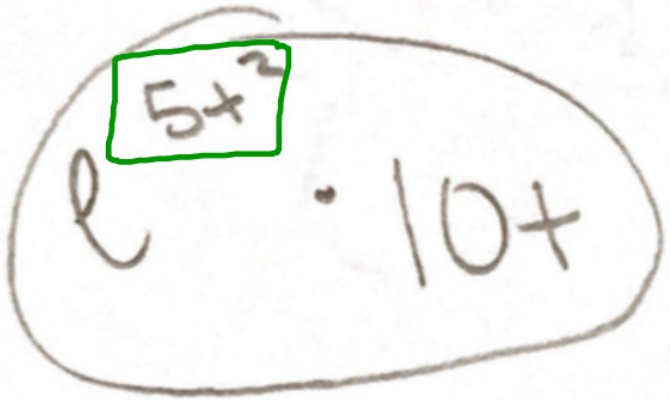
$\tan \rightarrow \sec^2$ $\quad \cot \rightarrow -\csc^2$

$\sec \rightarrow \sec \cdot \tan$ $\quad \csc \rightarrow -\csc \cdot \cot$

3. $y = x^2 - \sec x - \tan x$

$y' = 2x - \sec x \tan x - \sec^2 x$ ✓

4. $s(t) = e^{5t^2}$



$$\frac{d}{dx} e^{f(x)} = e^{f(x)} \cdot f'(x)$$

5. If $y = \ln(3x^2 - 2x)$, find $\frac{dy}{dx}|_{x=1}$

$\frac{1}{3x^2-2x} * 6x-2 \Rightarrow \frac{6x-2}{3x^2-2x} \Rightarrow \frac{4}{1} \Rightarrow 4$

$\frac{d}{dx} \ln(f(x)) = \frac{1}{f(x)} \cdot f'(x)$

6. Find the derivative of $y = \sqrt{3x}$ $= (3x)^{\frac{1}{2}}$ ✓

$\sqrt{3x} \neq 3x^{\frac{1}{2}}$

$y' = \frac{1}{2}(3x)^{-\frac{1}{2}} \cdot 3$ ✓

$y' = \boxed{\frac{3}{2(3x)^{\frac{1}{2}}}}$ ✓

$\frac{d}{dx}\left(f(x)\right)^n = n\left(f(x)\right)^{n-1} \cdot f'(x)$

7. Find $\frac{dy}{dx}$ if $y = (\ln x)^6$

$(u)^6 = 6(u)^5 \cdot \frac{1}{x}$

$6(\ln x)^5 \cdot \frac{1}{x} = \frac{6(\ln x)^5}{x}$

Let $f(x) = -x^3 - 3x$ and $g(x) = 2\cos x$

$-3x^2 - 3$ $\quad$ $-2\sin x$

8. If $h(x) = f(x)g(x)$, find $h'(x)$. [No need to simplify.]

$(-3x^2-3)(2\cos x) + (-x^3-3x)(-2\sin x)$ ✓

$f'(x)g(x) + f(x)g'(x)$

$g'(x)f(x) + g(x)f'(x)$

D-AD3

Let $f(x) = -x^3 - 3x$ and $g(x) = 2\cos x$

$f: -x^3 - 3x \qquad g: 2\cos x$

$f': -3x^2 - 3 \qquad g': 2 - \sin x$

9. If $p(x) = \frac{f(x)}{g(x)}$, find $p'(x)$ [No need to simplify]

$$\frac{(-3x^2 - 3)(2\cos x) - (x^3 - 3x)(-2\sin x)}{(2\cos x)^2}$$

$$\frac{f'g - fg'}{g^2}$$

10. Calculate the derivative of $y=(5x^2-3x+2)^{40}$

$40(5x^2-3x+2)^{39} \cdot (10x-3) \Rightarrow 40(10x-3)(5x^2-3x+2)^{39} = y'$

11. If $y=\sin^2(2x)$, find $\frac{dy}{dx}$.

$[\sin(2x)]^2$

$2(\sin(2x)) \cdot \cos(2x) \cdot 2$

$4(\sin(2x))(\cos(2x))$

Use the table to find $h'(3)$ if $h(x) = f(g(x))$.

$h'(x) = f'(g(x)) \cdot g'(x)$

$g(3) \quad g'(3)$

$f'(2) \quad -1$

$3/2 \cdot -1 = \boxed{-3/2}$ ✓

$f(x)g(x)$

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

. Write the equation of the line tangent to the curve $y = 2\tan x$ at the point where $x = \frac{\pi}{4}$

$y_1 - y = m(x - \pi/4)$ $\quad 2\tan\left(\frac{\pi}{4}\right) = 2$ $\quad y_1 - 2 = 4(x - \pi/4)$

(2) ✓

$2\sec^2 x = 2\sec^2(\pi/4) = 4$ ✓ ✓

$\sec^2\left(\frac{\pi}{4}\right)$

$\left[\sec\left(\frac{\pi}{4}\right)\right]^2$

$\left[\frac{1}{\cos(\pi/4)}\right]^2$

$\frac{1}{\cos(x)} = \sec(x)$

$\frac{1}{\sin(x)} = \csc(x)$

$\frac{1}{\tan(x)} = \cot(x)$

Use remaining time to...

a.) work on old hw you need completed in order to retake the skill(s) you need to retake
b.) work on the ungraded extra practice if desired (sol's online)
c.) work on the derivatives AP packet due Monday 11/6

Retakes available any DS (except Weds) and also Tues 4-5p

HW:
AP packet on derivative rules, due Monday, Nov 6