October 7

Find the Derivative of each function:

$f(x) = (4x + 7)^5 \Rightarrow f'(x) = 5(4x+7)^4(4)$

$g(x) = \cos(x^2 - 9x)$ $g'(x) = -\sin(x^2-9x)(2x-9)$

$h(x) = \ln(8x^3 + 4)$ $h'(x)\left(\frac{1}{8x^3+4}\right)(24x^2)$

October 7

Students will verbally explain how to evaluate indefinite integrals

(using the words: antiderivative, constant, substitution...)

u-substitution

$$\int 3(x^2+7)^2(2x)\,dx$$

① pick u (most of the time pick the "inside" function)

$u = x^2+7$

② find the differentials of both sides

$u = x^2+7$

$du = 2x\,dx$

③ solve for dx

$\frac{du}{2x} = \frac{2x\,dx}{2x}$

$\frac{du}{2x} = dx$

④ substitute

$\int 3(x^2+7)^2(2x)\,dx$

$\int 3(u)^2(2x)\left(\frac{du}{2x}\right)$

⑤ simplify + integrate

$\int 3u^2\,du = \frac{3u^3}{3} + C = u^3 + C$

⑥ substitute for u

$u^3 + C$

$(x^2+7)^3 + C$

$$\int \frac{\ln x}{3x}\,dx$$

$u = \ln x$

$du = \frac{1}{x}\,dx$

$x\,du = dx$

$\int \frac{u}{3x} \cdot x\,du$

$\int \frac{u}{3}\,du$

$= \frac{1}{3}\int u\,du$

$= \frac{1}{3}\left(\frac{u^2}{2}\right) + C$

$= \frac{u^2}{6} + C$

$= \frac{(\ln x)^2}{6} + C$

$u = 3x$

$du = 3\,dx$

$\frac{du}{3} = dx$

$\int \frac{\ln x}{u}\,\frac{du}{3}$

$\int \frac{\ln x}{3u}\,du$

try again

$\int \tan x \, dx$

$$= \int \frac{\sin x}{\cos x} \, dx$$

$u = \sin x$

$du = \cos x \, dx$

$\frac{du}{\cos x} = dx$

$$\int \frac{u}{\cos x} \cdot \frac{du}{\cos x} = \int \frac{u}{\cos^2 x} \, du$$

Try Again...

$$= \int \frac{\sin x}{\cos x} \, dx$$

$u = \cos x$

$du = -\sin x \, dx$

$\frac{du}{-\sin x} = dx$

$$\int \frac{\sin x}{u} \cdot \frac{du}{-\sin x}$$

$$= \int \frac{1}{-u} \, du = -\int \frac{1}{u} \, du$$

$$= -\ln|u| + C$$

$$= -\ln|\cos x| + C$$

$$\int \tan x \, dx = \ln|\sec x|$$

$$= \ln\left|\frac{1}{\cos x}\right| = \ln\left|(\cos x)^{-1}\right|$$

$$= -\ln|\cos x|$$

$$\int \frac{x\cos(x^2+3)}{\sqrt{\sin(x^2+3)}}\,dx = ?$$

Set 10:

Pg 281 #9 - 28

Set 11:

Pg 333 #3-72 (multiples of 3)