ESP
Kouba
Worksheet 9

1.) Integrate.

a.) $\int_1^3 \frac{x}{\sqrt{x^2+5}}\,dx$

b.) $\int_1^2 \frac{2x+1}{(x^2+x-1)^2}\,dx$

c.) $\int_1^3 \left(x-\frac{3}{x}\right)^5\left(1+\frac{3}{x^2}\right)dx$

d.) $\int_0^{\frac{\pi}{6}} \sec^2 x\,dx$

e.) $\int_0^{2\pi} \sin x\,dx$

f.) $\int_0^{2\pi} \sqrt{1-\cos^2 x}\,dx$

g.) $\int \sin^2 x\,dx$

h.) $\int \sin^2 x \cos x\,dx$

i.) $\int \sin^3 x\,dx$

j.) $\int (\sin x+\cos x)^2\,dx$

k.) $\int \frac{4}{1+x^2}\,dx$

l.) $\int \frac{1}{4+x^2}\,dx$

m.) $\int \frac{1}{x^2+6x+9}\,dx$

n.) $\int \frac{1}{x^2+6x+8}\,dx$

o.) $\int \frac{1}{x^2+6x+10}\,dx$

p.) $\int \frac{x+3}{x^2+6x+10}\,dx$

q.) $\int \frac{x}{x^2+6x+10}\,dx$

r.) $\int \sqrt{1+x}\,dx$

s.) $\int \sqrt{1+\sqrt{x}}\,dx$

t.) $\int \frac{1}{x+5}\,dx$

u.) $\int \frac{x}{x+5}\,dx$

v.) $\int \frac{x^2}{x+5}\,dx$

w.) $\int \frac{(x-1)(x+3)}{x+5}\,dx$

x.) $\int \frac{1}{x(x-1)}\,dx$

Y.) $\int \frac{1}{x^2(x-1)}\,dx$

Z.) $\int \frac{1}{x^3(x-1)}\,dx$

A.) $\int \frac{1}{x^2(x-1)^2}\,dx$

B.) $\int \frac{x+2}{x^2(x^2+1)}\,dx$

C.) $\int \frac{x^2}{x^3-1}\,dx$

D.) $\int \frac{x}{x^3-1}\,dx$

2.) Find the total area of the regions enclosed by the graphs of $Y = X(X-2)(1-X)$ and $Y = 0$.

3.) Let $f(x) = \frac{\sin x}{1+\cos x}$. Compute each of the following.

a.) $\int_0^{\frac{\pi}{2}} f'(x)\,dx$

b.) $\int_0^{\frac{\pi}{2}} f(x)\,dx$

c.) $\int_0^{\frac{\pi}{2}} f(x)\,f'(x)\,dx$

d.) $\int_0^{\frac{\pi}{2}} \frac{f'(x)}{1+f(x)}\,dx$

e.) $g'(x)$, where $g(x) = \int_0^{f(x)} f(t)\,dt$

4.) Determine if the following statement is true or false:

$$\int \frac{1-3x^2}{(x^2+1)^3}\,dx = \frac{x}{(x^2+1)^2} + C$$