

ESP
Kouba
Worksheet 15

1.) Determine whether the following improper integrals are convergent or divergent. Evaluate those that converge.

a.) $\int_1^{\infty} \frac{1}{x^2} dx$

b.) $\int_0^1 \frac{1}{x^2} dx$

c.) $\int_0^{\infty} e^{-x} dx$

d.) $\int_0^{\infty} \frac{1}{1+x^2} dx$

e.) $\int_1^3 \frac{1}{x-1} dx$

f.) $\int_3^{\infty} \frac{1}{x+1} dx$

g.) $\int_0^1 \frac{x}{\sqrt{1-x^2}} dx$

h.) $\int_1^{\infty} \frac{x}{\sqrt{x^2-1}} dx$

i.) $\int_0^1 \ln x dx$

j.) $\int_1^e \frac{1}{x \ln x} dx$

k.) $\int_0^{\infty} \arctan x dx$

l.) $\int_{-\infty}^{\infty} \frac{1}{x^2+2x+1} dx$

m.) $\int_{-\infty}^{\infty} \frac{1}{x^2+2x+2} dx$

n.) $\int_0^3 \frac{1}{x^2-3x+2} dx$

o.) $\int_2^{\infty} \frac{\sin x}{x^2} dx$

p.) $\int_1^{\infty} \frac{\cos x}{x} dx$

q.) $\int_0^{\infty} \cos^2 3x dx$

r.) $\int_1^{\infty} x e^{-x} dx$

2.) The region bounded by the graphs of $y=0$ and $y=\sqrt{1-x^2}$ is revolved about the line $x=4$. Set up but do not evaluate the

integrals representing the volume of the resulting solid using

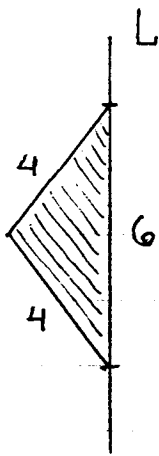
- a.) the shell method.
- b.) the disc method.

3.) A flat, circular disc of radius three feet has variable density. Find the mass of the disc if the density

a.) x ft. from the center of the disc is given by x^3 kg./ft.²

b.) x ft. from a fixed diameter of the disc is given by x^3 kg./ft.²

4.)



The given triangular plate with sides 4, 4, and 6 ft. is revolving around axis L , completing 10 revolutions per minute. Compute the kinetic energy of this moving plate if the density is constant

and the total mass of the plate is 75 kg.