PILOT LEARNING
CALCULUS II ENGINEERING
PROBLEM-SET 2
FALL 2019

(1) Evaluate the following integrals
(a)
$$\int \frac{dx}{\sin x}$$
(b)
$$\int \frac{dx}{x\sqrt{4x^2+1}}$$
(c)
$$\int \frac{dx}{x^3+1}$$
(d)
$$\int \frac{1-x+2x^2-x^3}{x(x^2+1)^2}dx$$
(2) For which values of p does the integral
$$\int_0^\infty \frac{1}{x(ln(x))^p}dx$$
converge?
(3) Let $A = \{(x,y)|x \geq 1, \frac{1}{x} \geq y \geq 0\}$. Is the area of A finite? What about the volume of the solid obtained by rotating A about the x axis?
(4) Match the following differential equations and possible solutions. (Note: The given functions may satisfy more than one equation or none, and some equations may have more than one solution.)

a. $y'' = y$	I. $y = \cos x$
b. $y' = -y$	II. $y = \cos(-x)$
c. $y' = 1/y$	III. $y = x^2$
d. $y'' = -y$	IV. $y = e^x + e^{-x}$
e. $x^2y'' - 2y = 0$	V. $y = \sqrt{2x}$