

MATH141(0332/0342) Calculus II Fall 2009

Worksheet 5, Section 7.5-7.8

Name: _____

1. (4 points) Evaluate the following integral.

$$(1) \int \frac{1}{x^2 + 4x + 7}$$

$$(2) \int \frac{1}{x\sqrt{4x^4 - 25}}$$

2. (6 points) Find the limits of the following.

$$(1) \lim_{x \rightarrow \infty} x \sin \frac{1}{x}$$

$$(2) \lim_{x \rightarrow 1} \left(1 - \frac{1}{x^2}\right)^{x^2}$$

$$(3) \lim_{x \rightarrow \infty} \frac{x^{40}}{e^{40x}}$$

3. (6 points) Consider the differential equation

$$\frac{dy}{dt} + 5y = 13e^{-3t}$$

(1) Find b such that $y = be^{-3t}$ is a solution.

(2) Find the general solution of this differential equation.

4. (4 points) Find the solution of the following differential equation.

$$(1) \frac{1 + e^x}{1 - e^{-y}} dy + e^{x+y} dx = 0$$

$$(2) \cos(x) \frac{dy}{dx} + y = 1 \quad \text{for } 0 < x < \pi/2; y(\pi/4) = 2$$

$$(3) \frac{y^2}{x^2 + y^2} + \frac{2xy}{x^2 + y^2} \frac{dy}{dx} = 0$$