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ANGEMENT

MATH 222 — THE THIRD MIDTERM
December 1, 2004, 12:05–12:55am

Your Name:

Your TA: (circle one)

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Score

1:

2:

3:

4:

5:

Total:

1 (i) Find the general solution of $\frac{dy}{dx} = (\cos y)^2(2 - x)$.

(ii) Which solution satisfies $y(0) = \frac{\pi}{3}$?

2 (i) Find the solution of
$$\begin{cases} x \frac{dy}{dx} + 5y = 2 + x^2 \\ y(1) = B \end{cases}$$

(ii) For which value of B does the limit $\lim_{x \rightarrow 0} y(x)$ exist?

3 (i) Find the general solution of $5\frac{d^2y}{dx^2} + 8\frac{dy}{dx} + 5y = 0$.

(ii) For which solution(s) $y(x)$ of the equation in part (i), does the limit $\lim_{x \rightarrow \infty} y(x)$ exist?

Find the solution of
$$\begin{cases} \frac{d^2y}{dx^2} - 9y = 0 \\ y(0) = A, \quad y'(0) = 3 \end{cases}$$

(A is an unspecified constant.)

5 Find a particular solution of the equation

$$\frac{d^3y}{dx^3} - 5\frac{dy^2}{dx^2} + \frac{dy}{dx} + 3y = x + \cos x.$$