MATH 151 **EXAM III** Name _____

Mrs. Bonny Tighe 4.10-6.2

100 points Section _____ 5/8/06

1. Find the area bounded by the x-axis and the function on the given interval. Sketch the graph. $f(x) = \cos 2x$ *on the* int*erval* $[\pi/6, \pi/4]$

2. a) Give the definite integral defined by $\lim_{n\to\infty} \sum_{i=1}^{n} \frac{2}{n}\left[3\frac{2i}{n} - \frac{n}{2i} + \sin\frac{4i}{n}\right]$

b) The population of a new housing development starts with 5 occupied homes and increases at a rate of $h'(t)$ per month. What does $5 + \int_0^{18} h'(t)dt$ represent?

3. Use the limit of sums definition of integration to evaluate the area given by $\int_{-1}^{1}(4+2x-x^2)dx$ using $\sum_{i=1}^{n} c = cn$ $\sum_{i=1}^{n} i = \frac{n^2}{2}+\frac{n}{2}$ $\sum_{i=1}^{n} i^2 = \frac{2n^3}{6}+\frac{3n^2}{6}+\frac{n}{6}$

4. A particle moves along a line with the velocity function $v(t)=3-t$. Find the total distance traveled by the particle during the time interval [0,5].

5. Find f(x). $f''(x) = \sin x + 4x - 1$, $f'(0)=1$ and $f(0)=4$

6. Approximate the area under the curve $f(x) = x + 2x^2$ on the interval $1 \leq x \leq 3$ with four subintervals, n = 4, taking the sample points to be the right endpoints, then the left endpoints.

7. Evaluate the indefinite integral, if it exists

a) $\int x^2 \sqrt{x^3 + 4}\ dx$ = _____ b) $\int \tan^2 \theta\ d\theta$ = _____

8. Sketch the region enclosed by the given curves, decide whether to integrate with respect to x or y, and find the area bounded by the two graphs. Sketch the graph.

$x = 6y - y^2$ *and* $x = y^2 - 2y$

9. Evaluate the definite integral, it if exists. $\int_1^2 \frac{x^4+3}{x^2} dx =$ _____

10. Find the volume of the solid obtained by rotating the region bounded by $y = 6x - x^2$ *and the* $x-axis$ about the x-axis. Sketch the region and a typical disc.

11. Find the volume of the solid obtained by rotation the region bounded by the two given curves about the line x = 2. Sketch the region and a typical washer.

$y^2 = x$ *and* $x = y$