

MATH 151
Mrs. Bonny Tighe

EXAM III A

4.10-6.2
100 points

Name _____

Section _____ 5/8/06

1. Find $f(x)$. $f''(x) = \cos x + 2x - 1$, $f'(0) = 1$ and $f(0) = 4$

2. Approximate the area under the curve $f(x) = 3x + x^2$ 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.

3. Use the limit of sums definition of integration to evaluate the area given by

$$\int_0^4 (3 + 4x - x^2) dx \quad \text{using} \quad \sum_{i=1}^n c = cn \quad \sum_{i=1}^n i = \frac{n^2}{2} + \frac{n}{2} \quad \sum_{i=1}^n i^2 = \frac{2n^3}{6} + \frac{3n^2}{6} + \frac{n}{6}$$

4. A particle moves along a line with the velocity function $v(t) = 2 - t$. Find the total distance traveled by the particle during the time interval $[0,4]$.

5. Evaluate the indefinite integral, if it exists

a) $\int x \sqrt{2x^2 + 3} \, dx = \underline{\hspace{2cm}}$ b) $\int \frac{\sin 2\theta}{\cos^4 \theta} \, d\theta = \underline{\hspace{2cm}}$

6. Find the area bounded by the x-axis and the function on the given interval. Sketch the graph. $f(x) = \sin 2x$ on the interval $[\pi/6, \pi/3]$

7. a) Give the definite integral defined by $\lim_{n \rightarrow \infty} \sum_{i=1}^n \frac{4}{n} \left[3 \frac{4i}{n} - \frac{n}{4i} + \tan \frac{8i}{n} \right]$

b) The population of a new housing development starts with 10 occupied homes and increases at a rate of $h'(t)$ per month. What does $10 + \int_0^{24} h'(t) dt$ represent?

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.

$$x = 4y - y^2 \quad \text{and} \quad x = y^2 - 2y$$

9. Evaluate the definite integral, if it exists.

$$\int_1^2 \frac{x^3 + 1}{x^2} dx = \underline{\hspace{2cm}}$$

10. Find the volume of the solid obtained by rotating the region bounded by $y = 4x - x^2$ 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 $x = -1$. Sketch the region and a typical washer.

$$y^2 = x \text{ and } x = 2y$$