Name: ____________________ **Instructor:** ____________________

Math 10-350, Calculus A
Fall Semester 2006
Exam 3
Tuesday, November 28: 8:00–9:15 a.m.

This Examination contains **16** problems, worth a total of **100** points, on **9** sheets of paper including the front cover. The first **12** problems (Section A) are multiple choice with no partial credit, and each is worth **5** points. Record your answers to these problems by placing an × through one letter for each problem below:

1.	a	b	•	d	e	7.	a	b	c	d	•
2.	•	b	c	d	e	8.	a	b	•	d	e
3.	a	b	c	•	e	9.	a	•	c	d	e
4.	a	b	•	d	e	10.	a	b	c	•	e
5.	a	b	c	d	•	11.	a	b	•	d	e
6.	a	b	•	d	e	12.	•	b	c	d	e

The last **4** problems (Section B) are partial credit problems worth **10** points each. For these problems, **show all your work** and **clearly mark your answers** on the page. Books and notes are not allowed. You may not use your calculator.

Sign the pledge: "On my honor, I have neither given nor received unauthorized aid on this Exam":

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GOOD LUCK!

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4.	a	b	c	d	e	10.	a	b	c	d	e
5.	a	b	c	d	e	11.	a	b	c	d	e
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Part A: Multiple Choice Problems

1. (5 pts.) Let x, y be positive numbers whose product is 100. The minimum of their sum $x + y$ is:

a) 50 b) 10 c) 20 d) 30 e) 40

2. (5 pts.) Compute the sum

$$\sum_{i=1}^{200} \frac{i+5}{100}.$$

a) 211 b) 201 c) 205 d) 206 e) 216

3. (5 pts.) Find the Riemann sum for $f(x) = 2 + x^2$, $0 \leq x \leq 3$, with three subintervals of equal length and using their right endpoints.

a) 25 b) 36 c) 2 d) 20 e) 15

4. (5 pts.) Find x_3 by completing two iterations of Newton's Method for the function $y = x^3$ using the initial value $x_1 = 3$.

a) $x_3 = \frac{5}{2}$ b) $x_3 = 10/3$ c) $x_3 = \frac{4}{3}$ d) $x_3 = 1$ e) $x_3 = 2$

5. (5 pts.) For the function $y = 2\sqrt{x}$ find the differential dy when $x = 4$ and $dx = 0.2$.

a) $dy = 0.2$ b) $dy = 0.3$ c) $dy = 0.4$

d) $dy = 0.5$ e) $dy = 0.1$

6. (5 pts.) The $\lim_{n\to\infty} \sum_{i=1}^{n} \frac{\pi}{3n} \sin\left(\frac{i\pi}{3n}\right)$ is equal to:

(a) $\int_0^{\frac{\pi}{3}} \cos x dx$ (b) $\int_0^{\frac{1}{3}} \cos x dx$ (c) $\int_0^{\frac{\pi}{3}} \sin x dx$

(d) $\int_0^{\frac{1}{3}} \sin x dx$ (e) $\int_0^{\frac{\pi}{3n}} \sin x dx$

7. (5 pts.) Compute the indefinite integral $\int \frac{1+u}{\sqrt{u}} du$.

(a) $\frac{1}{2}u^{\frac{1}{2}} + \frac{3}{2}u^{\frac{3}{2}} + C$
(b) $-\frac{1}{2}u^{-\frac{3}{2}} + \frac{1}{2}u^{-\frac{1}{2}} + C$
(c) $(1+u)^{\frac{1}{2}}2u + C$
(d) $(1+u)^2u^{\frac{1}{2}} + C$
(e) $2u^{\frac{1}{2}} + \frac{2}{3}u^{\frac{3}{2}} + C$.

8. (5 pts.) Compute the definite integral $\int_0^3 (6 + 6x - x^2)dx$.

a) 54 b) -12 c) 36 d) -18 e) 45

9. (5 pts.) Use differentials to approximate $\tan(0.1)$ recognizing that $\tan(0) = 0$.

a) 0.3 b) 0.1 c) 0 d) -0.1 e) 0.2

10. (5 pts.) Compute $\dfrac{d}{dx}\left(\displaystyle\int_0^{x^2} \sin^2 t dt\right)$.

a) $2x\cos(x^2)$ b) $2x\cos x\sin(x^2)$ c) $2x\cos(x^2)\sin(x^2)$

d) $2x\sin^2(x^2)$ e) $\sin^2(x^2)$

11. (5 pts.) Compute $\displaystyle\int_{-1}^{1} |x|dx$.

a) 2 b) -2 c) 1 d) 0 e) $\dfrac{1}{2}$

12. (5 pts.) Compute the area bounded by the graph of $y = x^2 - 1$, the x-axis, and the vertical lines $x = -1$, $x = 1$.

a) $\dfrac{4}{3}$ b) $-\dfrac{4}{3}$ c) $\dfrac{8}{3}$ d) $-\dfrac{8}{3}$ e) 0

Part B: Partial Credit Problems

Remember to show all your work.

13. (10 pts.) Compute the integral $\int_0^1 x^2 dx$ using the limit definition. You may use the formula $\sum_{i=1}^{n} i^2 = \frac{n(n+1)(2n+1)}{6}$.

Answer:

14. (10 pts.) Sketch the graph of the function $y = x^3 - 3x$.

15. (10 pts.) Find the point on the line $y = 4x + 8$ closest to the origin.

Answer:

16. (10 pts.) The acceleration function of a particle moving along a line is given by

$$a(t) = t + 4 \ ft/sec^2.$$

Find the position function $s(t)$ if the initial velocity is $v(0) = 2 \ ft/sec$ and the initial position is $s(0) = 0 \ ft$.

Answer: