Name: _____

Instructor: _____

Math 10550, Practice Exam III

- The Honor Code is in effect for this examination. All work is to be your own.
- No calculators.
- The exam lasts for 1 hour and 15 minutes.
- Be sure that your name is on every page in case pages become detached.
- Be sure that you have all 12 problems.

Good Luck!

PLEASE MARK YOUR ANSWERS WITH AN X, not a circle!

1.	[a]	[b]	[c]	[d]	[e]
2.	[a]	[b]	[c]	[d]	[e]
3.	[a]	[b]	[c]	[d]	[e]
4.	[a]	[b]	[c]	[d]	[e]
5.	[a]	[b]	[c]	[d]	[e]
6.	[a]	[b]	[c]	[d]	[e]
7.	[a]	[b]	[c]	[d]	[e]
8.	[a]	[b]	[c]	[d]	[e]

DO NOT WRITE IN THIS BOX!

Total multiple choice: _____

9. _____

10. _____

11. _____

12. _____

Total: _____

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Multiple Choice Questions

1.(7 pts.) Solving the equation $3x - \cos x = 0$ using the Newton's method with initial approximation $x_1 = 0$, what is x_2?

(a) $1/3$ (b) $-1/3$ (c) 0 (d) $1/4$ (e) $1/2$

2.(7 pts.) A farmer has 4000 feet of fencing and wants to fence off a rectangular field that border a straight river. No fence is needed along the river. Find the dimension of this rectangle that will maximize the area.

(a) $1000ft \times 1000ft$

(b) $2000ft \times 1000ft$

(c) $1200ft \times 800ft$

(d) $2000ft \times 2000ft$

(e) $2000ft \times 500ft$

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3.(7 pts.) Calculate the following indefinite integral

$$\int \frac{x^2+1}{\sqrt{x}}dx =$$

(a) $\frac{2}{5}x^{5/2} + 2x^{1/2} + C$

(b) $\frac{\frac{1}{3}x^3 + x}{\frac{2}{3}x^{3/2}} + C$

(c) $\frac{2}{3}x^{5/2} - \frac{1}{2}x^{1/2} + C$

(d) $\frac{2}{5}x^{5/2} + 2x^{1/2}$

(e) $\frac{2}{3}x^{5/2} - \frac{1}{2}x^{1/2}$

4.(7 pts.) Calculate the following definite integral

$$\int_0^3 |x-1|dx =$$

(a) $\frac{3}{2}$ (b) $\frac{5}{2}$ (c) 1 (d) $\frac{9}{2}$ (e) -2

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5.(7 pts.) What is the indefinite integral

$$\int x\sqrt{x-1}dx = ?$$

(a) $\frac{2}{5}x^{5/2} + \frac{2}{3}x^{3/2}$

(b) $\frac{1}{3}(x-1)^3 - \frac{1}{2}(x-1)^2 + C$

(c) $\frac{2}{5}(x-1)^{5/2} + \frac{2}{3}(x-1)^{3/2} + C$

(d) $\frac{2}{5}x^{5/2} + \frac{2}{3}x^{3/2} + C$

(e) $\frac{2}{5}(x-1)^{5/2} + \frac{2}{3}(x-1)^{3/2}$

6.(7 pts.) The equation of the slant asymptote of the curve $y = \frac{3x^3 + 2x^2 + x + 3}{x^2 + 2x}$ is:

(a) $y = 0$

(b) $y = 3x + 1$

(c) $y = 3x - 2$

(d) $y = 3x + 2$

(e) $y = 3x - 4$

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7.(7 pts.) Evaluate the definite integral

$$\int_0^2 \sqrt{4-x^2}\,dx.$$

Hint: A definite integral represents an area.

(a) 8 (b) 2π (c) $-\frac{16}{3}$ (d) π (e) $\frac{16}{3}$

8.(7 pts.) Let $g(x) = \int_0^{x^3} \sqrt{1+\sin^2 t}\,dt$. Find $g'(x)$.

(a) $3x^2\sqrt{1+\sin^2 x}$

(b) $\sqrt{1+\sin^2 x^3}$

(c) $\dfrac{\sin x^3 \cdot \cos x^3}{\sqrt{1+\sin^2 x^3}}$

(d) $3x^2\sqrt{1+\sin^2 x^3}$

(e) $\sqrt{1+\sin^2 x}$

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Partial Credit

You must show your work on the partial credit problems to receive credit!

9.(11 pts.) Calculate the area bounded by the curves $y = x^2 + 2x + 3$ and $y = 2x + 4$.

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10.(11 pts.)

(a) Evaluate the definite integral $\int_0^2 x^2\,dx$ by the limit definition.

Hint: $1^2 + 2^2 + 3^2 + \cdots + n^2 = \sum_{i=1}^{n} i^2 = \dfrac{n(n+1)(2n+1)}{6}$

(b) Verify your result using the fundamental theorem of calculus.

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11.(11 pts.) Find the point on the line $3x + y = 9$ that is closest to the point $(1, -2)$.

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12.(11 pts.) If 1200 cm^2 of material is available to make a box with a square base and an open top, find the largest possible volume of the box.

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