

Name: _____

Instructor: _____

Multiple Choice Questions

1.(7 pts.) Compute the derivative y' for the curve

$$\sin(x^2 + y) = x^2 + 2x + 3y$$

at the point $x = 0, y = 0$.

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

2.(7 pts.) If $f(x) = \sqrt{2x + 7}$, then $f'''(x) =$

- (a) $\frac{1}{\sqrt{2x + 7}}$ (b) $-\frac{3}{\sqrt{(2x + 7)^5}}$
(c) $\frac{3}{\sqrt{(2x + 7)^5}}$ (d) $-\frac{3}{8\sqrt{(2x + 7)^5}}$
(e) $\frac{3}{8\sqrt{(2x + 7)^5}}$

Name: _____

Instructor: _____

3.(7 pts.) If $f'(x) = \frac{(x-1)^2x}{(x+1)^3}$, find the local maxima and minima of $f(x)$ assuming that the domain of $f(x)$ is all $x \neq -1$. (Note: you are given f' , not f .)

- (a) f has a local minimum at $x = 0$; there is no local maximum
- (b) f has a local minimum at $x = 0$; f has local maxima at $x = 1$ and $x = -1$
- (c) There are no local minima or local maximum
- (d) f has a local minimum at $x = 0$; f has a local maximum at $x = 1$
- (e) f has a local minimum at $x = 1$; f has a local maximum at $x = -1$

4.(7 pts.) Evaluate $\lim_{x \rightarrow -\infty} \frac{\sqrt{4x^6 + 5}}{x^3 + 1}$.

- (a) 6
- (b) -2
- (c) 4
- (d) 3/2
- (e) 2

Name: _____

Instructor: _____

5.(7 pts.) How many inflection points does the curve $y = 4x^5 - 5x^4 - 12$ have?

- (a) 1 (b) 3 (c) 4 (d) 2 (e) None

6.(7 pts.) Suppose $f(x)$ is continuous and differentiable for all real numbers. If $-1 \leq f'(x) \leq 3$ and $f(5) = 6$, what is the largest $f(x)$ can be at $x = 1$?

- (a) -6 (b) 18 (c) 11 (d) 2 (e) 10

Name: _____

Instructor: _____

7.(7 pts.) Find the linearization $L(x)$ of the function $f(x) = (3x + 125)^{1/3}$ at $a = 0$

(a) $\frac{3}{25}(x - 1) + 5$ (b) $\frac{1}{25}x + 5$ (c) $\frac{1}{5}x + 5$

(d) $\frac{3}{25}x + \frac{1}{25}$ (e) $\frac{1}{25}x - 5$

8.(7 pts.) Use the linear approximation (or tangent line approximation) of $f(x) = \cos(x)$ at $x = \pi/2$ to find approximate value of $f(x)$ at $x = 3\pi/5$.

(a) $\frac{\pi}{10}$ (b) $\frac{\pi}{5}$ (c) $-\frac{1}{10}$

(d) $-\frac{\pi}{10}$ (e) $-\frac{1}{7}$

Name: _____

Instructor: _____

Partial Credit

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

9.(11 pts.) First answer the 8 questions below. Then use your answers to graph $y = x + 2 \cos x$ on the interval $[0, 2\pi]$. ($\sqrt{2} \approx 1.41, \sqrt{3} \approx 1.73$)

1a) $y' =$

1b) On what interval(s) is y decreasing?

1c) Give both coordinates of any local maxima.

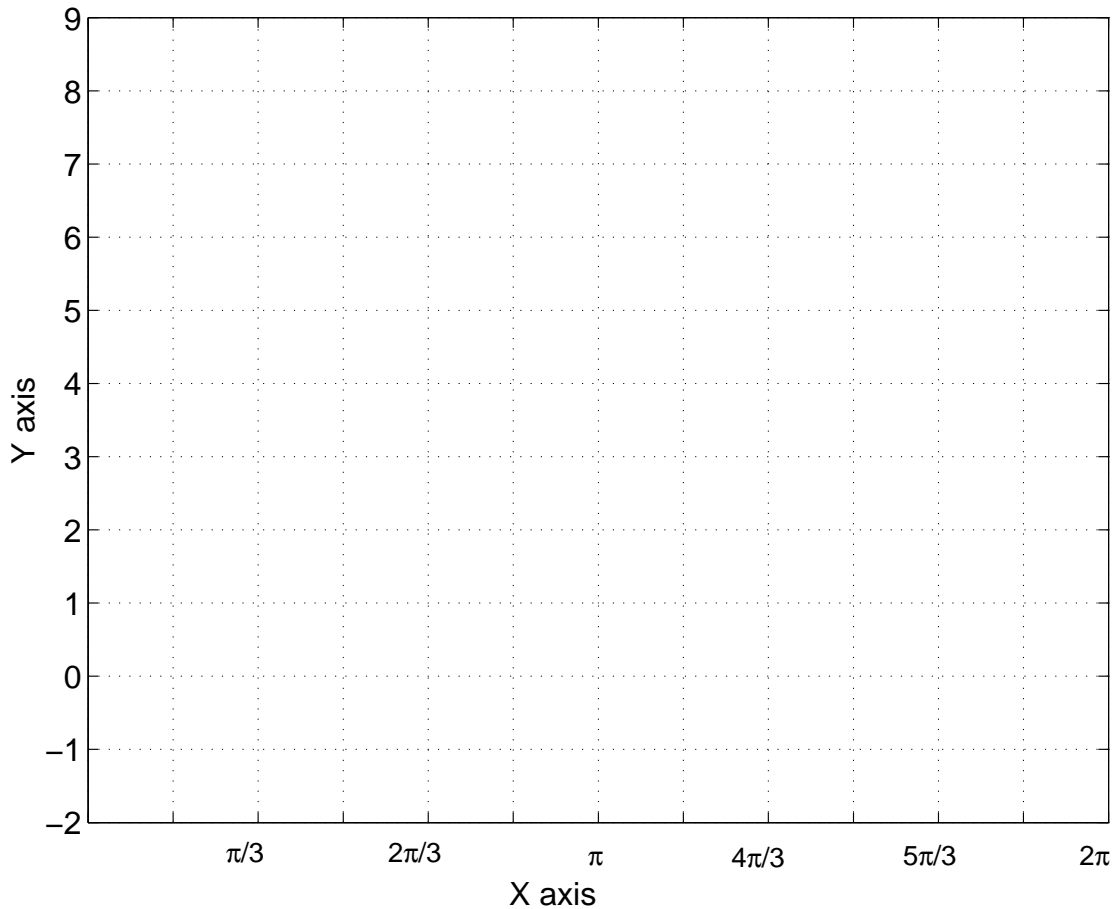
1d) Give both coordinates of any local minima.

2a) $y'' =$

2b) On what interval(s) is y concave down?

2c) Give both coordinates of any points of inflection.

2d) Give the slope of the tangent line at any points of inflection.



Name: _____

Instructor: _____

10.(11 pts.) Find the extreme values of $f(x) = 3|x| - x^2 - 2$ on $-1 \leq x \leq 2$.

Name: _____

Instructor: _____

11.(11 pts.) At noon ship A is 8km west from ship B . Ship A is sailing south at 4 km/h and ship B is sailing north at 2km/h . How fast is the distance between the ships changing at 1p.m. ?

Name: _____

Instructor: _____

12.(11 pts.) Show that

$$2x - \sin(x) + x^3 + 2 = 0$$

has one and exactly one solution. Identify the theorem(s) you are using.

Name: ANSWERS

Instructor: ANSWERS

Math 10550, Exam II
October 25, 2005

- 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.	<input type="checkbox"/> a	<input checked="" type="checkbox"/>	<input type="checkbox"/> c	<input type="checkbox"/> d	<input type="checkbox"/> e
2.	<input type="checkbox"/> a	<input type="checkbox"/> b	<input checked="" type="checkbox"/>	<input type="checkbox"/> d	<input type="checkbox"/> e
3.	<input checked="" type="checkbox"/>	<input type="checkbox"/> b	<input type="checkbox"/> c	<input type="checkbox"/> d	<input type="checkbox"/> e
4.	<input type="checkbox"/> a	<input checked="" type="checkbox"/>	<input type="checkbox"/> c	<input type="checkbox"/> d	<input type="checkbox"/> e
5.	<input checked="" type="checkbox"/>	<input type="checkbox"/> b	<input type="checkbox"/> c	<input type="checkbox"/> d	<input type="checkbox"/> e
6.	<input type="checkbox"/> a	<input type="checkbox"/> b	<input type="checkbox"/> c	<input type="checkbox"/> d	<input checked="" type="checkbox"/>
7.	<input type="checkbox"/> a	<input checked="" type="checkbox"/>	<input type="checkbox"/> c	<input type="checkbox"/> d	<input type="checkbox"/> e
8.	<input type="checkbox"/> a	<input type="checkbox"/> b	<input type="checkbox"/> c	<input checked="" type="checkbox"/>	<input type="checkbox"/> e

DO NOT WRITE IN THIS BOX!

Total multiple choice: _____

9. _____

10. _____

11. _____

12. _____

Total: _____