

MTH 251 Second Exam Review Sheet
Spring 2009

Exam 2 Procedures

- You may use your graphing calculator for the exam.
- You must show all of your work for full credit.
- Academic integrity is expected.
- I will supply reference page 5 for your test, but you will not be allowed a note card.
- The exam covers §2.9 and §3.1 - 3.7.

Key Ideas

- Given a **graph** of either a function f or its derivative f' , be able to:
 - identify where the function is increasing/decreasing;
 - identify where the function is concave up/down;
 - identify local max/min; and,
 - graph either f' or f .
- Take derivatives using all of the techniques covered in class: Sum, Difference, Product Rule, Quotient Rule, logarithms, and the ever-popular Chain Rule.
- Implicit and Logarithmic differentiation.
- The first derivative tells you the slope plus

$$f'(x) > 0 \Leftrightarrow f \text{ is increasing} \quad f'(x) < 0 \Leftrightarrow f \text{ is decreasing}$$

- The second derivative tells you about concavity:

$$f''(x) > 0 \Leftrightarrow f \text{ is concave up} \quad f''(x) < 0 \Leftrightarrow f \text{ is concave down}$$

- Finding tangent lines to functions at specified points.

Practice Problems

- §2.9 #11,17,25
- §3.1 #19, 43, 49, 61
- §3.2 #21, 22 (just Tangent Line), 35
- §3.3 #3, 7, 8
- §3.4 #5, 9, 15, 39
- §3.5 #10, 17, 19, 31, 43 and review sheet from Tuesday's class
- §3.6 #8, 11, 17
- §3.7 #11, 14, 31, 33
- Workshop Problems

Chart of Trigonometric Functions

Degs	$\sin x$	$\cos x$	$\tan x$	$\csc x$	$\sec x$	$\cot x$	Rads
0°	0	1	0	und.	1	und.	0
30°	1/2	$\sqrt{3}/2$	$\sqrt{3}/3$	2	$2\sqrt{3}/3$	$\sqrt{3}$	$\pi/6$
45°	$\sqrt{2}/2$	$\sqrt{2}/2$	1	$\sqrt{2}$	$\sqrt{2}$	1	$\pi/4$
60°	$\sqrt{3}/2$	1/2	$\sqrt{3}$	$2\sqrt{3}/3$	2	$\sqrt{3}/3$	$\pi/3$
90°	1	0	und.	1	und.	0	$\pi/2$
120°	$\sqrt{3}/2$	-1/2	$-\sqrt{3}$	$2\sqrt{3}/3$	-2	$-\sqrt{3}/3$	$2\pi/3$
135°	$\sqrt{2}/2$	$-\sqrt{2}/2$	-1	$\sqrt{2}$	$-\sqrt{2}$	-1	$3\pi/4$
150°	1/2	$-\sqrt{3}/2$	$-\sqrt{3}/3$	2	$-2\sqrt{3}/3$	$-\sqrt{3}$	$5\pi/6$
180°	0	-1	0	und.	-1	und.	π
210°	-1/2	$-\sqrt{3}/2$	$\sqrt{3}/3$	-2	$-2\sqrt{3}/3$	$\sqrt{3}$	$7\pi/6$
225°	$-\sqrt{2}/2$	$-\sqrt{2}/2$	1	$-\sqrt{2}$	$-\sqrt{2}$	1	$5\pi/4$
240°	$-\sqrt{3}/2$	-1/2	$\sqrt{3}$	$-2\sqrt{3}/3$	-2	$\sqrt{3}/3$	$4\pi/3$
270°	-1	0	und.	-1	und.	0	$3\pi/2$
300°	$-\sqrt{3}/2$	1/2	$-\sqrt{3}$	$-2\sqrt{3}/3$	2	$-\sqrt{3}/3$	$5\pi/3$
315°	$-\sqrt{2}/2$	$\sqrt{2}/2$	-1	$-\sqrt{2}$	$\sqrt{2}$	-1	$7\pi/4$
330°	-1/2	$\sqrt{3}/2$	$-\sqrt{3}/3$	-2	$2\sqrt{3}/3$	$-\sqrt{3}$	$11\pi/6$
360°	0	1	0	und.	1	und.	2π