

MATH 161

MIDTERM EXAM 1

October 5, 2004

8:00-9:15 am

NAME: _____

U.R. ID Number: _____

Circle Section: Dean Heap Milinovich Neisendorfer

- No calculators, notes, or books
- Please show all your work.
- Clearly indicate your final answer.

QUESTION	VALUE	SCORE
1.	10	
2.	7	
3.	15	
4.	20	
5.	25	
6.	15	
7.	8	
TOTAL	100	

1. (10 pts)

(a) Solve $-3 \leq 1 - 2x < 5$

(b) Solve $|x + 2| \geq 4$

2. (7 pts) Find an equation of a line through the point $(-1, -2)$ that is perpendicular to the line $2x + 5y + 8 = 0$.

3. (15 pts) Graph the following functions on the same coordinate system. Clearly label the graphs.

(a) $f(x) = \sin x$, $0 \leq x \leq 2\pi$

(b) $g(x) = 2 \sin x$, $0 \leq x \leq 2\pi$

(c) $h(x) = 3 + \sin x$, $0 \leq x \leq 2\pi$

4. (20 pts) Let $f(x) = x^3 + 1$, $g(x) = \ln x$, and $h(x) = e^{2x}$.

(a) Find $(fh)(z)$.

(b) Find $(g \circ h)(x)$.

(c) Find $f^{-1}(x)$.

(d) Solve $g(x^2) = 10$.

5. (25 pts) Evaluate the following limits. Your answer should be a real number, ∞ , or $-\infty$, or d.n.e. (does not exist).

(a) $\lim_{x \rightarrow 2} \frac{x^2 + 5}{x^3 - 2}$

(b) $\lim_{x \rightarrow 3} \frac{x^2 - 9}{x^2 + x - 12}$

(c) $\lim_{x \rightarrow 1^+} \frac{x^2 + 4}{x^2 - 1}$

(d) $\lim_{x \rightarrow \infty} \frac{3x^2 - x + 1}{6x^2 + 4x + 7}$

(e) $\lim_{x \rightarrow 0} \frac{|x|}{x}$

6. (15 pts) Let $f(x) = \begin{cases} x + 2 & , x \leq -1 \\ x^2 & , -1 < x < 1 \\ 3 & , x = 1 \\ 2x - 1 & , x > 1 \end{cases}$

(a) Sketch the graph of $f(x)$.

(b) Is $f(x)$ continuous at -1 ? Explain.

(c) Is $f(x)$ continuous at 1 ? Explain.

7. (8 pts) Let $f(x) = \frac{3x + 5}{x - 4}$. Find all vertical and horizontal asymptotes of $f(x)$.