

Department of Mathematics
MTH 140 (Calculus I) - Fall 2011

Test #1

1. **Date** : Sep. 30, 2011 (Friday)
2. **Time** : 16:15-17:45 (90 minutes)
3. **Covering Material** : Section 1.1-6, Appendix D, 2.1-3 and 2.5.
4. The use of notes, formula sheets, books or calculators is not allowed.
5. Bring picture ID.
6. **Classroom** : Students must take the test in her/his own section's classroom.

(a) Dr. C. Kim	Section	1	2	3	4	5
	Classroom	ENGLG14	KHE127	KHE129	KHE221	KHE321A

(b) Dr. S. Ferrando	Section	6	7	8	9
	Classroom	ENG101	ENG102	ENG105	ENG106

(c) Dr. G. Ord	Section	10	11	12	13	14
	Classroom	ENGLG02	ENGLG04	ENGLG05	ENGLG06	ENGLG11

(d) Dr. P. Oliveras	Section	15	16	17	18
	Classroom	ENG103 (Upper Right)	ENG103 (Lower Right)	ENG103 (Upper Left)	ENG103 (Lower Left)

(e) Dr. N. Jung	Section	19	20	21	22	23
	Classroom	KHE321C	KHS239	KHS251	KHS369	ARC108

7. **Last year's test** :

1. (3 pts.) (multiple-choice question) Find the exact value of the expression

$$\tan \left(\cos^{-1} \left(-\frac{1}{3} \right) \right)$$

Select the correct answer.

- A)** $2\sqrt{2}$ **B)** $-2\sqrt{2}$ **C)** 0 **D)** 1 **E)** None of these

Write the (capital) letter of the answer in this box \longrightarrow 1.)

2. (7 pts.) If $\tan(\alpha) = -2/3$ and $\alpha \in (\pi/2, \pi)$, find $\sin(2\alpha)$.

3. (3 pts.) (multiple-choice question) Given that $\lim_{x \rightarrow 0} \frac{f(x)}{x} = 3$. Find the limit $\lim_{x \rightarrow 1} \frac{f(x^3 - 1)}{x - 1}$.

Select the correct answer.

- A) 1 B) 3 C) 6 D) 9 E) None of these

Write the (capital) letter of the answer in this box \longrightarrow 3.

4. (7 pts.) Find a formula for the inverse function of $f(x) = 2 \ln(x + 2) - \ln(x + 1)$, where $x > 0$.

5. (3 pts.) (multiple-choice question) Find the limit

$$\lim_{x \rightarrow 3^-} \frac{x^2 - 9}{|x - 3|}$$

Select the correct answer.

- A) 6 B) -6 C) ∞ D) Does not exist E) None of these

Write the letter(capital) of the answer in this box \longrightarrow 5.

6. (7 pts.) Evaluate the following limit. If the limit does not exist, explain why.

$$\lim_{x \rightarrow 4} \frac{64 - x^3}{\sqrt{x} - 2}$$

7. (3 pts.) (multiple-choice question) Determine where $f(x)$ is discontinuous.

$$f(x) = \begin{cases} \sqrt{-x} & \text{if } x < 0; \\ 2 + x & \text{if } 0 \leq x < 1; \\ 4 - x & \text{if } 1 \leq x < 4; \\ 16 - x^2 & \text{if } x > 4. \end{cases}$$

Select the correct answer.

- A) 0 and 4 B) 0 and 1 C) 1 and 4 D) 1 E) None of these

Write the (capital) letter of the answer in this box \longrightarrow 7.

8. (7 pts.) Find the domain of the function $f(x) = \frac{\ln(x(2-x))}{\sin^{-1}(1-x^2) + \pi/6}$.

9. (3 pts.)(multiple-choice question) Find the equations of all horizontal and vertical asymptotes of the following function:

$$f(x) = \frac{x^2 - 1}{x^2 + 4x + 3}$$

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Select the correct answer.

A) $y = 1$ B) $y = 1$ and $x = -3$ C) $x = -1$ and $x = -3$

D) $x = -1$, $x = -3$, and $y = 1$ E) None of these

Write the (capital) letter of the answer in this box \longrightarrow 9.

10. (7 pts.) Find the following limit.

$$\lim_{x \rightarrow -\infty} \left(\sqrt{x^2 + 2x - 1} + x \right)$$