Department of Mathematics
MTH 207 (Calculus and Computational Method I) - Winter 18

Midterm Test

1. **Date** : Feb. 28th, 2018 (Wednesday)
2. **Time** : 08:15 - 09:45 (90 minutes)
3. **Covering Material** : Sections 1.2 - 1.6, 2.1, 2.3 - 2.8
4. The use of notes, individual formula sheets, books or calculators is not allowed.
5. Bring Ryerson picture ID.
6. **Classroom**: Students must take the test in her/his own assigned classroom.

Section Last Name	1	2	3	4	5 A-K	5 L-Z	6
Classroom	VIC 205	EPH 204	KHW 057	TRS 1149	TRS 1149	TRS 3149	TRS 3149

7. **Practice test : (Warning -** This is not a sample test. Problems on the midterm may or may not be similar to these problems. These problems are just intended to focus of your study of the topics to appear on the midterm) .

   Part A. Multiple Choice (Only one answer is correct in each case.)

   (a)

$$\sin^{-1}\left(\sin\left(2018+\frac{3}{4}\right)\pi\right)$$

   equals

   A) 2018π
   B) $(2018+\frac{3}{4})\pi$
   C) $\frac{3}{4}\pi$
   D) $-\frac{1}{4}\pi$
   E) none of these.

   Only the answer in the box will be marked.——————→ ☐)

   (b)

$$\lim_{x\to\infty}(2x-\sqrt{4x^2+5})$$

   equals

   A) -5 B) 5 (C) ∞ (D) 0 (E) none of these.

   Only the answer in the box will be marked.——————→ ☐)

(c) The function $f(x) = \dfrac{x^2 + x - 12}{x^2 - 9}$ has vertical asymptote(s) at :

A) $x = 3$. B) $x = -3$. C) $x = 3$ and $x = -3$. D) $x = 9$. E) None of the above.

Only the answer in the box will be marked. ——————→ [ ]

(d) Suppose that $\lim_{x\to 1} f(x) = 3$ and $\lim_{x\to 1} g(x) = 4$. If a is a number and

$$\lim_{x\to 1}(af(x) - 2g(x)) = \lim_{x\to 1}(f(x) + 3ag(x)),$$

then a equals

A) $-\dfrac{9}{11}$ B) $-\dfrac{7}{9}$ C) $-\dfrac{11}{9}$ D) 5 E) none of these.

Only the answer in the box will be marked. ——————→ [ ]

Part B. Full Answer

(e) Let a be a real number and suppose that

$$f(x) = \begin{cases} 2ax + 5, & \text{if } x > 2 \\ x^2 - ax + 6a, & \text{if } x \le 2 \end{cases}$$

For which value(s) of a, if any, will f be continuous at $x = 2$? **Justify your answer.**

(f) Find any horizontal asymptotes for

$$y = \frac{x^2}{3x^2 + \sqrt{x^4 + 2013}}.$$

(g) Evaluate the limit or explain why it does not exist.

$$\lim_{x\to \frac{1}{2}} \frac{2x^2 - x}{|x - \frac{1}{2}|}$$

(h) i. Find the domain of the function $y = \dfrac{9 - \sqrt{9 - x^2}}{\ln(x - 1)}$.

ii. Evaluate the limit or explain why it does not exist.

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

(i) Use shifts and scalings to transform the graph of $f(x) = \sqrt{x}$ into the graph of $g(x) = 3\sqrt{x - 1} - 5$. Sketch the graph of $g(x)$ and indentify x-intercept and/or $y-$intercept, if exists.

(j) Prove that $\dfrac{\sin 3x - \sin x}{\cos 3x + \cos x} = \tan x$.