

Name: _____

Student Number: _____

MATHEMATICS 1K03E
Summer Session #1, 2008
PRACTICE TEST ONLY! - Solutions on last page

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TERM TEST
EVENING CLASS
DURATION OF TEST: 50 min
MCMASTER UNIVERSITY TERM TEST

Thursday, May 22, 2008

THIS TEST INCLUDES 7 PAGES AND 10 QUESTIONS. YOU ARE RESPONSIBLE FOR ENSURING YOUR COPY OF THE TEST IS COMPLETE. BRING ANY DISCREPANCY TO THE ATTENTION OF YOUR INVIGILATOR.

Instructions:

1. Only the Casio FX-991 calculator is allowed to be used on this test.
 2. Make sure your name and student number at the top of each page.
 3. In part A, PRINT the letter corresponding to the answer of your choice on page 2, in the box beside the corresponding question number below.
 4. **A blank answer is an automatic zero for any question** in part A, even if the correct solution is circled on the question itself.
 5. Incorrect or multiple answers for part A are also worth zero marks. No negative marks or part marks will be assigned.
 6. In part B, provide complete solutions on this exam paper in the space provided below each question. Part marks are available.
 7. Each question in part A is worth 1 mark, and in part B each question is worth 3 marks.
 8. Rough work paper will be provided upon request. All rough work must be handed in with the test, but any solutions written on the rough paper will **NOT** be graded.
 9. *Good Luck!*
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Name: _____

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Grade/Answer Chart**Part A**

<i>Question</i>	<i>Ans.</i>	<i>Question</i>	<i>Ans.</i>
#1		#5	
#2		#6	
#3		#7	
#4		#8	

Total Grade Part A: _____/8

Part B

<i>Question</i>	<i>Grade</i>
#9	
#10	

Total Part B: _____/6

Net Grade :

_____ /14

Name: _____

Student Number: _____

Part A**Remember:** Write the letter of your selection in the chart on Page #21. Evaluate $f'(0)$ for the function:

$$f(x) = (x^2 + 2x + 1)(x^{4/3} + 2)$$

- a) 4 b) $-\frac{5}{3}$ c) $\frac{2}{3}$ d) 2 e) -1
-

2. Compute the indicated value of the given function:

$$h(t) = (t^2 - 13)^{-3/2}, \quad h(7)$$

- a) $-\frac{39}{2}$ b) $\frac{1}{216}$ c) -52 d) 1 e) 7
-

3. Which type of functions are the following:

$$g(x) = \sqrt{1-x} \quad h(x) = x^2 - 2$$

- a) $g(x)$ is rational, $h(x)$ is a polynomial b) $g(x)$ is a power function, $h(x)$ is rational
 c) $g(x)$ is algebraic, $h(x)$ is a polynomial d) $g(x)$ is a polynomial, $h(x)$ is rational
 e) Both functions are polynomials

Name: _____

Student Number: _____

Remember: Write the letter of your selection in the chart on Page #2

4. Evaluate the given limit:

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

- a) $\frac{1}{3}$ b) -2 c) DNE d) $-\frac{1}{6}$ e) $\frac{2}{9}$
-

5. Evaluate the limit:

$$\lim_{x \rightarrow -\infty} \frac{x^2 - 3x + 2}{2x^2 - 3x + 7}$$

- a) $\frac{1}{2}$ b) -2 c) 0 d) -3 e) ∞
-

6. Evaluate the limit:

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

- a) 1 b) $\frac{1}{2}$ c) $\frac{1}{4}$ d) $-\infty$ e) DNE

Name: _____

Student Number: _____

Remember: Write the letter of your selection in the chart on Page #2

7. Which of the following is the equation of a line passing through the points (1,2) and (2,5)?

a) $y = \frac{1}{3}x + 2$ b) $y = 3x - 8$ c) $y = 3x + 5$ d) $y = 3x - 1$ e) $y = x + 2$

8. Which of the following statements hold true for all real x in the domain of the function:

$$f(x) = \frac{x}{\sqrt{x-1}}$$

a) $x > 1$ b) $x > 0$ c) $x < 1$ d) $x \geq 0$ and $x \neq 1$ e) $0 \leq x < 1$

Name: _____ Student Number: _____

Part B**Remember:** In this section, you need to include full solutions to get full marks.

9. a) State the definition of the derivative of a function $f(x)$.

b) Use this definition to evaluate $f'(2)$, where:

$$f(x) = \frac{1}{x}$$

(In other words, evaluate $f'(2)$ from first principles.)

Name: _____ Student Number: _____

Remember: In this section, you need to include full solutions to get full marks.

10. Evaluate the expression $\frac{d^2y}{dx^2}$, for the function:

$$y = x^{3/2} - 2x + 7$$

THE END

Disclaimer: The following solutions are most likely correct. In the event of a discrepancy, please inform the professor as soon as possible!

Solutions

Multiple choice answers: (One mark each)

1. a) 2. b) 3. c) 4. d) 5. a) 6. c) 7. d) 8. a)

Long Answers: (Three marks each)

9. part a)

The standard form of the definition of the derivative, given in this course is:

$$f'(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$$

part b)

Since we know that :

So we can use this with the definition to get:

$$\begin{aligned} f'(x) &= \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} = \lim_{h \rightarrow 0} \frac{\frac{1}{x+h} - \frac{1}{x}}{h} = \lim_{h \rightarrow 0} \frac{\frac{x - (x+h)}{(x+h)x}}{h} = \lim_{h \rightarrow 0} \frac{-h}{(x+h)x} \\ &= \lim_{h \rightarrow 0} \frac{-1}{(x+h)x} = \frac{-1}{(x+0)x} = -\frac{1}{x^2} \end{aligned}$$

10.

$$\begin{aligned} y &= x^{3/2} - 2x + 7 \Rightarrow y' = \frac{d}{dx}(x^{3/2}) + \frac{d}{dx}(-2x) + \frac{d}{dx}(7) \\ &= \frac{d}{dx}(x^{3/2}) - 2 \frac{d}{dx}(x) + \frac{d}{dx}(7) \\ &= \frac{3}{2}x^{1/2} - 2 \cdot 1 + 0 = \frac{3}{2}\sqrt{x} - 2 = y' \end{aligned}$$

$$\begin{aligned} y' &= \frac{3}{2}\sqrt{x} - 2 \Rightarrow y'' = \frac{d}{dx}\left(\frac{3}{2}\sqrt{x}\right) + \frac{d}{dx}(-2) \\ &= \frac{3}{2} \frac{d}{dx}(x^{1/2}) + 0 = \frac{3}{2} \cdot \frac{1}{2}(x^{-1/2}) \\ &= \frac{3}{4\sqrt{x}} = y'' \end{aligned}$$