

**Instructions:**  $\implies$ 

If you do not read the instructions, then how will you know what to do? Read them now.

Be sure to enter all required information on the scantron.

Section number: 060

- This test is multiple-choice. You must mark your answer on the provided scantron. Before you begin, fill in all the required information on the scantron.
- Fill in the appropriate bubbles for your information and for your answers on the scantron very carefully.
- You may use one  $8.5 \times 11$  inch note sheet prepared in advance. You may write on both sides of your note sheet.
- Note sheets may not be shared. If you do not bring a note sheet you will have to do without any help notes.
- You may not use any books, notebooks, additional note sheets nor note cards.
- You are expected to have a simple scientific calculator available for use on this test. Calculators and other equipment may not be shared.
- You may use a simple graphics calculator but not a laptop computer nor any device capable of extensive symbolic manipulation (other than your own brain).

This document is a list of sample problems for test 1. It includes the actual test header so you can read the instructions in advance. The actual test may, however, be much longer or much shorter.

**Problem 1.** Given functions  $f$  and  $g$  defined by

$$f(x) = \frac{x^2 + 1}{x + 1} \quad \text{and} \quad g(x) = \frac{x + 2}{x^2 + 1}$$

compute the composition  $(f \circ g)(x) = f(g(x))$ .

- A.)  $\frac{x^4+3x^2+4x+5}{x^4+x^3+4x^2+x+3}$       B.)  $\frac{x^3+3x^2+5x+3}{x^4+3x^2+2x+2}$   
 C.)  $\frac{x+2}{x+1}$       D.)  $\frac{x^2+2}{3x^3+x^2+1}$       E.) None of the above.

← Write letter corresponding to your answer here and mark it on the scantron (Problem 1).

**Problem 2.** Given functions  $f$  and  $g$  defined by

$$f(x) = \frac{x^2 + 1}{x + 1} \quad \text{and} \quad g(x) = \frac{x + 2}{x^2 + 1}$$

compute the composition  $(g \circ f)(x) = g(f(x))$ .

- A.)  $\frac{x^4+3x^2+4x+5}{x^4+x^3+4x^2+x+3}$       B.)  $\frac{x^3+3x^2+5x+3}{x^4+3x^2+2x+2}$   
 C.)  $\frac{x+2}{x+1}$       D.)  $\frac{x^2+2}{3x^3+x^2+1}$       E.) None of the above.

← Write letter corresponding to your answer here and mark it on the scantron (Problem 2).

**Problem 3.** Compute the limit

$$\lim_{t \rightarrow 0} \frac{\sin(2t)}{\sin(t)}$$

is

- A.) 0    B.)  $1/2$   
C.) 1    D.) 2    E.) None of the above.

←Write letter corresponding to your answer here and mark it on the scantron (Problem 3).

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**Problem 4.** Compute the limit

$$\lim_{x \rightarrow \infty} 3x - \sqrt{9x^2 - 3x + 1}$$

- A.) 0    B.)  $1/2$   
C.)  $1/3$     D.)  $1/6$     E.) None of the above.

←Write letter corresponding to your answer here and mark it on the scantron (Problem 4).

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**Problem 5.** The equation  $x^5 - x^3 = 5 - x$  has a solution in the interval

- A.)  $[-1, 0]$     B.)  $[0, 1]$   
C.)  $[1, 2]$     D.)  $[2, 3]$     E.) None of the above.

←Write letter corresponding to your answer here and mark it on the scantron (Problem 5).

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**Problem 6.** Find the equation of the tangent line to the graph of  $y = x^2 + 2x$  at the point  $(2, 8)$ .

- A.)  $y = 6x + 8$     B.)  $y = 6x - 4$   
C.)  $y = 6x$     D.)  $y = 6x + 4$     E.) None of the above.

←Write letter corresponding to your answer here and mark it on the scantron (Problem 6).

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**Problem 7.** Find the slope of the tangent line to the graph of  $y = \sin(x)$  at  $x = \frac{1}{4}\pi$ .

- A.) 0    B.) 1  
C.)  $-\sqrt{2}/2$     D.)  $\sqrt{2}/2$     E.) None of the above.

←Write letter corresponding to your answer here and mark it on the scantron (Problem 7).

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**Problem 8.** Compute the limit

$$\lim_{x \rightarrow -1} \frac{x^3 + 1}{x + 1}$$

- A.) 0    B.) 1  
C.) 2    D.) 3    E.) None of the above.

←Write letter corresponding to your answer here and mark it on the scantron (Problem 8).

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**Problem 9.** If the function  $f$  is defined by  $f(x) = 1/x^2$  compute the derivative  $f'(x)$ .

- A.)  $\frac{2}{x^3}$       B.)  $-\frac{1}{x^3}$   
C.)  $-\frac{2}{x^3}$       D.)  $-\frac{2}{x}$       E.) None of the above.

← Write letter corresponding to your answer here and mark it on the scantron (Problem 9).

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**Problem 10.** Let  $f$  be a differentiable function and suppose  $f(1) = 0$ ,  $f(2) = 1$ ,  $f'(1) = 2$  and  $f'(2) = 3$ . Compute the limit

$$\lim_{x \rightarrow 1} \frac{f(x)}{x - 1}.$$

- A.) 0      B.) 1  
C.) 2      D.) 3      E.) None of the above.

← Write letter corresponding to your answer here and mark it on the scantron (Problem 10).

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Use this page and the backs of all the pages for scratch work.