

MATH 114: EXAM I (FALL 2004)

Name..... Dis. Sec. ....

Score:

Problem 1.....

Problem 2.....

Problem 3.....

Problem 4.....

Total:.....

**Instruction:** Show all work. No work = no credit, even if you have a correct answer. References and calculator are not allowed.

**Problem 1 (15):** Let  $f(x) = -\frac{1}{3}x + 1$ ,  $g(x) = -2x^2 + 3x - 1$ .

1) Find the inverse function  $f^{-1}$ ;

2) Find the composite  $g \circ f^{-1}$  (Please simply the result);

3) Find the composite  $f^{-1} \circ g$  (Please simply the result).

**Problem 2 (10):** Find the domain of the function

$$f(x) = \sqrt{3 - x + \frac{8}{x-1}}$$

**Problem 3 (10):** Suppose that there are two objects A and B moving on a flat surface. Object A is moving west at speed 2 miles per minute, while object B is moving south at speed 1 miles per minute. Assume at time 9:55am, object B is to the north of object A at distance 250 miles. Find the time at which the two objects have minimal distance and the corresponding minimal distance.

**Problem 4 (15):** Consider the polynomial  $p(x) = x^3 + 3x^2 - 4$

1): Verify that  $x - 1$  is a factor of  $p(x)$  by the method of synthetic division;

2): Complete factor  $p(x)$  by the method of long division;

3): Sketch the graph of  $p(x)$ .