

Name: ANSWERS

Instructions: No calculators! Answer all problems in the space provided! Do your rough work on scrap paper.

1. Find the domains of the following functions in interval notation:

(a)  $f(x) = \frac{2x+1}{x^2-x-2}$  D:  $(-\infty, -1) \cup (-1, 2) \cup (2, \infty)$   $g(x) = \frac{\sqrt{3-x}}{\sqrt{1-x^2}}$  D:  $(-1, 1)$

2. For  $f(x) = \sqrt{x}$ , find and simplify the difference quotient:  $\frac{1}{\sqrt{x+h} + \sqrt{x}}$  OR  $\frac{1}{\sqrt{b} + \sqrt{a}}$

3. For  $f(x) = \frac{1}{x}$ , compute  $\frac{f(b)-f(a)}{b-a}$  if  $a = 1$  and  $b = 2$ :  $\frac{f(b)-f(a)}{b-a} =$   $-\frac{1}{2}$

4. Let  $f(x) = 2x^2 + 1$ , compute  $\frac{f(2+h)-f(2)}{h} =$   $2h+8$

Bonus:

1. Describe what it means for a function  $f(x)$  to be increasing:  $f$  goes up as you move from left to right. OR if  $x_2 > x_1$ , then  $f(x_2) > f(x_1)$ .

2. Suppose you have a function  $f(x)$ , how does the graph of  $g(x) = 2f(x) - 4$  relate to the graph of  $f(x)$ ?

$g$  is obtained by stretching  $f$  vertically by a factor of 2 and then shifting it down 4 units.