

Name: ANSWERSInstructions: 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 $\frac{f(2+h)-f(2)}{h} =$ 8

5. Odd, Even or neither?

(a) $\frac{1}{x^4 - 3x^3}$: Neither (b) $\frac{2x^4 - 3x^2}{-3x^6 + x^{12}}$: Even (c) $\frac{3x^3 - 7x^5}{5x^7 + 2x^9}$: Even

Bonus:

1. Describe the following for a function
- $f(x)$
- :

(a) $f(x)$ is increasing: If $x_2 > x_1$, then $f(x_2) > f(x_1)$ (f goes up as you move from left to right)(b) $f(x)$ is concave down: $f'' < 0$ (the slope of f is decreasing)

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

 $g(x)$ is obtained by stretching f vertically by a factor of 2 then shifting 4 units down.