GATEWAY EXAM

FUNCTIONS (flavor B) – HELP SHEET

The Gateway Room, Fowler 301, is staffed for tutoring and retakes, Monday through Thursday, 12:30-1:30. If you can't make it any of those times, contact Professor Lawrence for an appointment (Fowler 324, x2647, DonL@oxy.edu).

(1) and **(2)** Plug numbers and expressions into a given function.

Example: Let $f(x)=\sqrt{x^2+x}$. Then $f(-2)=\sqrt{(-2)^2-2}=\sqrt{2}$, and $f(3+h)=\sqrt{(3+h)^2+(3+h)}$. The key is: whatever is inside the parentheses in the problem, replaces every x in the original definition of the function – so –2 replaced both x's, and (3+h) replaced both x's. Do *not* take the original function definition and try to plug it into something else. For example, if $g(x)=3x^2$, then $g(2x)$ is $3(2x)^2$, ***not*** $2(3x^2)$.

Exercises: Find $f(3)$ and $g(-1+h)$.

(3) Given a function definition written out in words, rewrite the definition using math notation.

Example: "Square the input, then add 5" becomes $f(x)=x^2+5$. Notice that the word "input" becomes x. You have to look carefully at the order of operations being suggested by the description. The function described above is ***not*** $(x+5)^2$.

Exercises: Subtract the input from six, then take the reciprocal of the result.

Take the square root of the input, and double the result.

(4) Write, in interval notation, the domain of the given function. For most "simple" functions, there are only two things not allowed in the domain: zero in denominators, and negative numbers inside square roots (more generally, even roots).

Examples: (a) $f(x)=\dfrac{4x}{x-47}$ The denominator can't be zero, so $x-47\neq 0$, or $x\neq 47$. In interval notation, the domain is $(-\infty,47)\cup(47,\infty)$.

(b) $g(x)=\sqrt{2x-5}$ To avoid negative numbers in the root, solve the inequality $2x-5\geq 0$, to get $x\geq\frac{5}{2}$, or a domain of $[\frac{5}{2},\infty)$.

Exercises: $h(x)=\dfrac{4+x}{x(x+1)}$ $j(x)=\dfrac{1}{\sqrt{x-3}}$

(5) Given a table of values for two functions, do a computation.

Examples: $2f(0)+3g(2)=2(3)+3(2)=12$, and $f(g(1))=f(3)=0$.

x	f(x)	g(x)
0	3	1
1	2	3
2	1	2
3	0	2

Exercises: Find $g(f(2))$ and $[f(0)]^2-2[g(1)]^2$.

In problems (6) through (10), you will be asked to read various pieces of information from a graph. For the examples, the top graph was used. For the exercises, answer the same questions for the bottom graph.

(6) What is the domain of the function? Write your answer in interval notation.

$(-\infty,1)\cup[2,4]$

(7) What is the range of the function? Write your answer in interval notation.

$[-2,0.5]\cup(1,\infty)$

(8) What is the approximate value of $f(3)$?

-1

(9) For what approximate value(s) of x is $f(x)=-0.5$?

2.5

(10) What is the approximate value of $(f(2))^2+f((2)^2)$?

-1.75