QUIZ 3 - MATH 111 Friday, February 4

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Read each problem **very carefully** before starting to solve it. Each problem is worth around 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. [2 points] If $f(x) = x^2 + 7$ and $g(x) = \sqrt{x+2}$, find, showing all steps:

   $(f \circ g)(x) =$

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2. [2 points] If f and g are given by the following table

x	0	1	2	3	4	5	6	7	8	9
$f(x)$	7	6	5	8	4	0	2	1	9	3
$g(x)$	9	5	6	2	1	8	7	3	4	0

   find the following, showing all steps:

   $(f \circ g)(8) =$

   $(g \circ f)(3) =$

   $(f \circ f)(1) =$

   $(g \circ g)(6) =$

3. [5 points] Consider $f(x) = \dfrac{1}{x-4}$ and $g(x) = \dfrac{1}{3x+5}$.

(a) Find the domains $\mathrm{Dom}(f)$ and $\mathrm{Dom}(g)$.

(b) Give the conditions that should hold for x to be in the domain of $f \circ g$. (You do not have to solve those; just write them down).

(c) Use the conditions you wrote in Part (b) to find $\mathrm{Dom}(f \circ g)$.

4. [5 points] Starting with the function $f(x)$, we perform a series of transformations given below in algebraic form.

   (a) In the parentheses on the right explain which transformation is performed at each step in geometric form (as in the slides and as done in class).

$$
\begin{aligned}
f(x) &\longrightarrow f(x+2) && (\quad) \\
&\longrightarrow f(-x+2) && (\quad) \\
&\longrightarrow 2f(-x+2) && (\quad) \\
&\longrightarrow 2f(-x+2)+3 && (\quad)
\end{aligned}
$$

   (b) If the graph of $y = f(x)$ is the one shown below, sketch the graph of $g(x) = 2f(-x+2)+3$ on the same system of axes.