Homework 9 - Math 105 **Name:** _____

Do not use a calculator unless it says **(Calc)** *next to the problem.*

1. If $f(x) = 5 + x$ and $g(x) = \sqrt{x}$, then what are $f(g(4))$ and $g(f(4))$?

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2. Suppose $f(x) = x^2 - 4$ and $g(x) = 2 - 3x$. What is the distance between $f(3)$ and $g(3)$?

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3. **(Calc)** The function $f(x) = \frac{1}{2}\left(x + \frac{5}{x}\right)$ can be used to calculate the square root of 5. Use a calculator to find $f(2)$, $f(f(2))$, $f(f(f(2)))$ and $f(f(f(f(2))))$. How close is the last result to $\sqrt{5}$?

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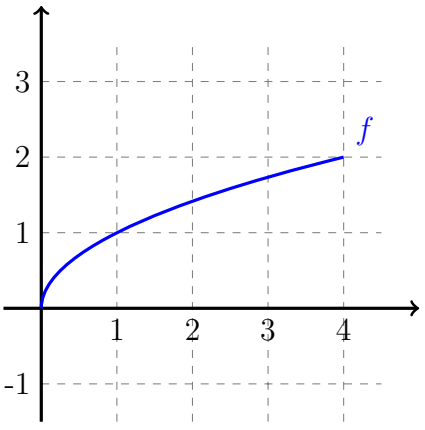
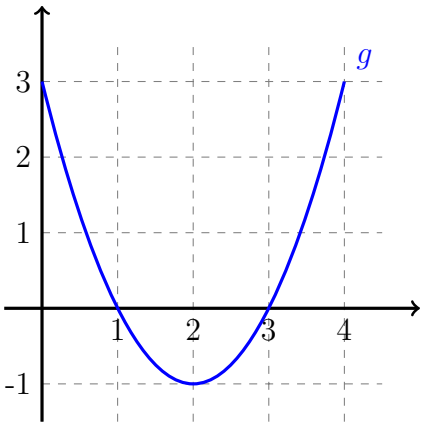
4. The following graphs show two different functions $f(x)$ and $g(x)$.





Use the graphs to evaluate $g(f(4))$, $g(g(0))$, and $f(g(1))$.

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5. Sketch a graph of the function $f(x) = \dfrac{6}{|x|}$ by plotting the y-values at $x = \pm 1$, ± 2, and ± 3 and then filling in the rest of the graph.

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6. The amount of garbage produced by a city is given by $G = g(p)$ where G is measured in tons per week and p is measured in thousands of people. The city of Tola has a population of 40,000 people and produces 13 tons of garbage each week. Use the function g to re-write this information using function notation.

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7. The inverse of the function g in the last problem would be written g^{-1}. Explain what the information $g^{-1}(5) = 18$ would tell us about a city.

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8. Suppose that $f(x)$ is a linear function such that $5 = f(1)$ and $3 = f(2)$. Find the formula for $f(x)$ and graph the function.
