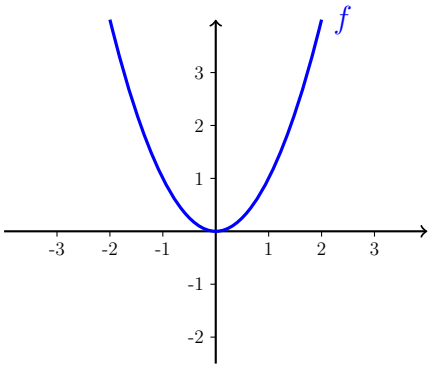
Homework 10 - Math 105 **Name:** _____

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

1. The graph of $f(x)$ is shown below. Use the graph to sketch $f(x+3)-2$. Hint: Use the values of $f(x)$ that you know to make a table of values of $f(x+3)-2$.



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2. Compute the inverse of the function $f(x) = \sqrt{x+4}$. Draw a graph showing both $f(x)$ and $f^{-1}(x)$.

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3. Find the inverse of $g(x) = \dfrac{1}{x+2}$.

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4. The function $A(r) = \pi r^2$ computes the area of a circle of radius r. What is the inverse of this function, and what does it compute?

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5. What is the domain of the function $h(x) = \sqrt{6x - x^2}$?

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6. A bakery sells cupcakes. They estimate that they will sell 1000 cupcakes if they charge \$1 per cupcake. For every dollar the price increases, they will sell 200 fewer cupcakes. Find formulas for the quantity of cupcakes $Q(p)$ they will sell, and for the total revenue they will earn $R(p)$, both as functions of the price p of a cupcake.

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7. The area of one rain forest is decreasing by 4% per year.
   (a) Express this information as a function $f(x)$ that inputs the current area of the rain forest x and returns the area of the rain forest in the following year.

   (b) What does the function $f(f(x))$ represent about the rain forest?

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8. A store can produce souvenir T-shirts at a cost of \$2 each. They need to choose a price for the shirts. If they sell the shirts for \$5 each, they will sell $4,000$ shirts. If they raise the price, then for each \$1 increase in price, 400 fewer shirts will be sold. Using the variable p to represent the price that the store charges, find each of the following functions:
   (a) Quantity of shirts sold: $Q(p)$

   (b) Revenue (total money they get from selling shirts): $R(p)$

   (c) Cost (total money they spend to make the shirts): $C(p)$

   (d) Profit (revenue minus cost): $P(p)$
