Function Practice

Math 130 *Kovitz* Spring 2015

1. For each example: Decide whether the relation depicted is a function. If it turns out to be a function find $f(1/3)$.

   - The line $x = 3$.
   - The relation defined by the equation $y^2 = 9$.
   - The relation defined by the equation $y = 1/x$.
   - The relation defined by the euqation $|x| = |y|$. (What is its graph?)
   - A relation whose graph is a semicircle.
   - The relation defined over the positive integers greater than or equal to 10 that yields the second digit.
   - The relation defined over all real numbers that relates the number to its closest integer or integers. (What is y when: $x = 3.2$? $x = 6.5$?)

2. Give an example of an equation in closed form that does not represent a function.

3. May the x-axis be considered a function of x?

   If so: What is its equation? What is $f(x)$? What is $f(1/3)$?

4. Will two functions be equal (the same function) if they have:

   (a) exactly the same graph?
   (b) the same solution set?
   (c) different domains but the same formula?
   (d) the same domain and formulas that turn out to be equivalent over that domain?

5. Why is its unnecessary to specify the domain when a relation is defined by its solution set or by its graph?

6. For each example: decide whether the two functions are the same function.

   - $f(x) = \dfrac{x^2}{x}$ and $g(x) = x$.
   - $f(x) = \sqrt{x^2 - 22x + 121}$ and $g(x) = x - 11$.
   - The function defined by the formula $y = \dfrac{1}{x^2}$ and the function defined by the formula $x = \pm\dfrac{1}{\sqrt{y}}$.
   - The function $y = x^2$ defined when $x \geq y$ and the functon $y = x^2$ on the domain $[0, 1]$.
   - $y = x$ and $y = (\sqrt{x})^2$, each over its maximum domain, considering the real numbers only.

7. Consider the functions $f(x) = (x - 1)^3$ and $g(x) = x - 1$, each defined only over the domain $\{0, 1, 2\}$.

   Do they have same fomula? Do they have the same domain? Are they the same function? Why?