Name:_____

**MATH 150: QUIZ 4 (2.1–2.2)**

1. Determine whether the equation $y = x^2 - 2x$ defines $y$ as a function of $x$.

   Yes No

2. Find the domain of the function $f(x) = \sqrt{x+4}$.

3. Let $g(x) = 2x - 3$. What is the range of $g$?

4. Is the point $(3, 6)$ on the graph of

$$f(x) = \frac{2x}{x-2}?$$

5. Sketch a graph of an equation that is NOT the graph of a function. Briefly explain why it is not the graph of a function.

## Solutions

1. Yes. Notice that for each value for $x$, there is exactly one corresponding $y$-value.
2. Recall that the domain is the set of allowable input values to the function. The square root can handle anything greater than or equal to zero, so we need

$$\begin{aligned} x + 4 &\geq 0 \\ x &\geq -4. \end{aligned}$$

   In other words,

$$\text{dom}(f) = \{x \in \mathbb{R} \mid x \geq 4\} = [-4, \infty).$$

   [Note that $-4$ is an allowable input, so we have the square bracket on the $-4$ side.]
3. Recall that the range is the set of output values. The graph of $g$ is a line (not horizontal), so it follows that the range is all real numbers. In other words, the range is $(-\infty, \infty)$.
4. To check if the point $(3, 6)$ is on the graph of $f$, we plug in to the equation $y = f(x)$ and see if we get a true statement. In other words, we compute $f(3)$ and check if it is 6.

$$\begin{aligned} f(3) &= \frac{2 \cdot 3}{3 - 2} \\ &= \frac{6}{1} \\ &= 6. \end{aligned}$$

   It follows that the point $(3, 6)$ is on the graph if $f$.
5. The graph shown below is not the graph of a function because it fails the Vertical Line Test. In other words, there are certain values for $x$ for which there is more than one corresponding height for the curve. In the example I have drawn below, when $x = 1$, we have $y = 1$ and $y = -1$.