

1. If f is a function with domain $[-2, 3]$ and range $[0, 4]$, find the domain and range of $g(x) = -f(x + 5) - 1$

2. Consider the equation $y = \begin{cases} 1 & \text{if } x \text{ is rational} \\ 0 & \text{if } x \text{ is irrational} \end{cases}$

- Is this equation a function?
- What is its domain?
- What is its range?
- What is its y-intercept, if any?
- What are its x-intercepts, if any?
- How would you describe its graph?

For problems 3-6, assume $x < y$, where x and y are both positive numbers.

3. If $f(x) = -x$, is $f(x) < f(y)$?

4. If $f(x) = \sqrt{x}$, is $f(x) < f(y)$?

5. If $f(x) = \frac{1}{x}$, is $f(x) < f(y)$?

6. If $f(x) = x^2$, is $f(x) < f(y)$?

7. For which types of functions do we have to reverse the inequality sign when applying that function to both sides of an inequality?