First Name _____ Last Name _____ Date ___ – ___ – ___ Period ____ Score ____

**Learning Objectives.**

- Verify a pair of inverse functions via composition

**Skill Builder.** *Work on the Skill Builder problems on the screen while the teacher is taking attendance and returning work.*

**Discussion.**

Find the operation that undoes the given operation.

1. Adding 2.

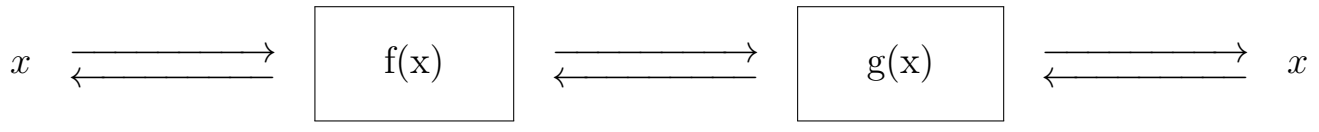
2. Multiplying by 10.

3. Squaring a negative number.

**Concepts.** The *inverse function* undoes the original function. Formally, $g(x)$ is called the **inverse function** of $f(x)$ if both of the following are true:

1. $(f \circ g)(x) = x$
2. $(g \circ f)(x) = x$

See the diagram below.




The inverse function of $f(x)$ is denoted by $f^{-1}(x)$. It is worthwhile to note that

- $\text{domain}(f(x)) = \text{range}(f^{-1}(x))$
- $\text{domain}(f^{-1}(x)) = \text{range}(f(x))$

Moreover, the graph of $f(x)$ and the graph of $f^{-1}(x)$ are symmetric about the line $y = x$.

**Examples.**

Verify the pair of functions below are the inverse functions of each other.

1. $f(x) = x + 2$, $g(x) = x - 2$.

2. $f(x) = x \times 10$, $g(x) = x \div 10$.

**Challenge.** Is $g(x) = \sqrt{x}$ the inverse function of $f(x) = x$? Why or why not?