4.6 Bernie's Bikes

A Solidify Understanding Task

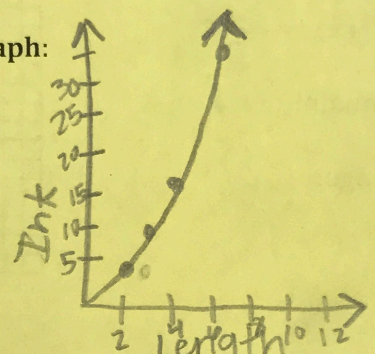
Bernie owns *Bernie's Bike Shop* and is advertising his company by taking his logo and placing it around town on different sized signs. After creating a few signs, he noticed a relationship between the amount of ink he needs for his logo and the size of the sign.

1. The table below represents some of the signs Bernie has created and the relationship between the amount of ink needed versus the size of the sign. Complete the information below to help Bernie see this relationship (don't forget to label your graph).

Length of sign (in feet)	Ink needed (in ounces)
3	9
4	16
2	4
15	225
x	x^2

Function: $f(x) = x^2$ **Domain:** $(0, \infty)$ **Range:** $(0, \infty)$

Graph:

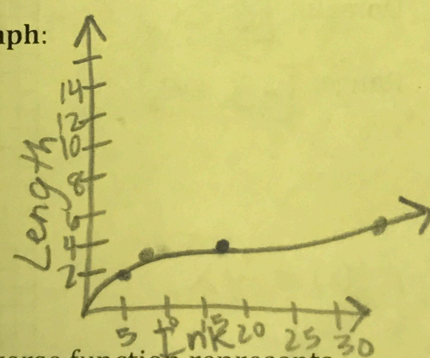


2. Using question 1, complete the information below for the *inverse* of this function (don't forget to label your graph).

ink	Length
9	3
16	4
4	2
225	15
x^2	x

Function: $f(x) = \sqrt{x}$ **Domain:** $(0, \infty)$ **Range:** $(0, \infty)$

Graph:



3. Explain in words what the inverse function represents.

Look at equation, graph, and table and give observations.

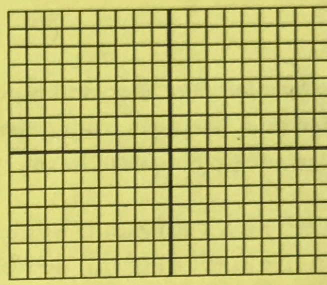
Part II

Determine the inverse for each function, then sketch the graphs and state the domain and range for both the original function and it's inverse.

4. $f(x) = x^2 - 1$; $f^{-1}(x) = \sqrt{x+1}$

Domain: $(-\infty, \infty)$ Domain: $[-1, \infty)$

Range: $[-1, \infty)$ Range: $[0, \infty)$



both graphs should be on the same coordinate plane

$x = 3y + 2$

$x = 3y + 2$
$-2 \quad\quad -2$

$\frac{x-2}{3} = \frac{3y}{3}$

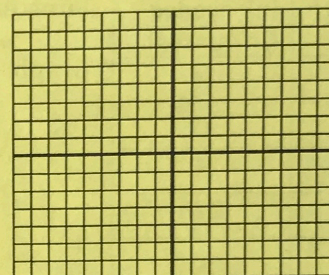
$\frac{x-2}{3} = y$

5. $g(x) = 3x + 2$; $g^{-1}(x) = \frac{x-2}{3}$

y

Domain: $(-\infty, \infty)$ Domain: $(-\infty, \infty)$

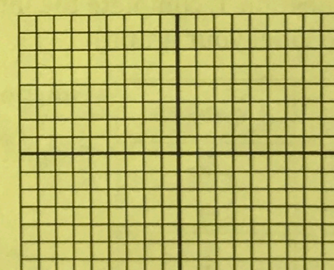
Range: $(-\infty, \infty)$ Range: $(-\infty, \infty)$



6. $f(x) = (x + 3)^2$; $f^{-1}(x) = \sqrt{x} - 3$

Domain: $(-\infty, \infty)$ Domain: $[0, \infty)$

Range: $[0, \infty)$ Range: $[-3, \infty)$



7. $f(x) = x^3$; $f^{-1}(x) = \sqrt[3]{x}$

Domain: $(-\infty, \infty)$ Domain: $(-\infty, \infty)$

Range: $(-\infty, \infty)$ Range: $(-\infty, \infty)$