Practice Problem 1

The function g is given by $g(x) = 5^x$. Which of the following statements about the inverse of g is true?

(A) The inverse of g is given by $g^{-1}(x) = x^5$ and is defined for all real values of x.

(B) The inverse of g is given by $g^{-1}(x) = \log_5 x$ and is defined for all real values of x.

(C) The inverse of g is given by $g^{-1}(x) = \log_5 x$ and is defined only for $x > 0$.

(D) The function g does not have an inverse because the function is not invertible.

Practice Problem 2

The points $\left(-2, \frac{1}{9}\right)$ and $(4, 81)$ are on the graph of the exponential function h given by $h(x) = b^x$, where $b > 1$. Which of the following statements about the graph of $k(x) = \log_b x$ is true?

(A) The points $\left(-2, \frac{1}{9}\right)$ and $(4, 81)$ are both on the graph of k because $k = h^{-1}$.

(B) The points $\left(\frac{1}{9}, -2\right)$ and $(81, 4)$ are both on the graph of k because $k = h^{-1}$.

(C) The points $\left(-\frac{1}{2}, 9\right)$ and $\left(\frac{1}{4}, \frac{1}{81}\right)$ are both on the graph of k because $k = h^{-1}$.

(D) The point $(81, 4)$ is on the graph of k but the point $\left(\frac{1}{9}, -2\right)$ is not on the graph of k because the domain of h is restricted to $x > 0$, thus the range of k is restricted to $y > 0$.

Practice Problem 1 Solution:

(C) The inverse of g is given by $g^{-1}(x) = \log_5 x$ and is defined only for $x > 0$.

The inverse of a general exponential function $f(x) = b^x$ is a logarithmic function of the form $g(x) = log_b x$. Since the range of the exponential function is $y > 0$, the domain of the logarithmic function is $x > 0$.

Practice Problem 2 Solution:

(B) The points $\left(\frac{1}{9}, -2\right)$ and $(81, 4)$ are both on the graph of k because $k = h^{-1}$.

If the function $f(x) = b^x$ consists of input-output pairs of $\left(-2, \frac{1}{9}\right)$ and $(4, 81)$ then the inverse function consists of input-output pairs $\left(\frac{1}{9}, -2\right)$ and $(81, 4)$.