

Exponential and Log Inequalities (2.13) Homework

1. Let $f(x) = 2 + \log_3\left(\frac{x}{2} - 4\right)$. Find all x -values for which $f(x) \leq 3$.

2. Let $g(x) = 20 - 4e^x$. Find all values of x for which $g(x) < 12$.

3. Let $f(x) = \log_2(x + 2)$ and $g(x) = 5 - \log_2(10 - x)$. For what input values is the output of $f(x)$ less than the output of $g(x)$?

4. Let $f(x) = \log_4(-x + 8) + \log_4(x + 2)$ and $g(x) = \log_4(4x + 1)$.
 - a. Find all values of x for which $f(x) \geq g(x)$.

 - b. Find all values of x for which $f(x) < g(x)$

5. Let $f(x) = 5^{x-1} - 4$. Find all input values for which the output of f is negative.

6. Let $f(x) = \log_2(x + 2)$ and $g(x) = \log_2(x - 3) + 1$. Find all x -values for which $f(x) \leq g(x)$.
7. Let $f(x) = \log_3(11 - x) - \log_3(x + 1)$. Find all values of x for which $f(x) \leq 1$.
8. Let $f(x) = 10 - \log_5\left(\frac{x}{7}\right)$. Find $f^{-1}(x)$.
9. Let $g(x) = -2 + 5 \log_3(4x)$. Find a function h that satisfies $(g \circ h)(x) = (h \circ g)(x) = x$ for all x -values.
10. Let $f(x) = 3 \log_2\left(\frac{x-8}{4}\right)$.
- Find the domain and range of f .
 - Find the domain and range of f^{-1} .
 - Find $f(12)$.
 - Find $f^{-1}(12)$.
 - Find $f^{-1}(x)$.

Exponential and Log Inequalities (2.13) HW Answers

1. $(8, 14]$
2. $(\ln 2, \infty)$
3. $(-2, 2) \cup (6, 10)$
4. a. $\left(-\frac{1}{4}, 5\right]$
b. $(5, 8)$
5. $(-\infty, 1 + \log_5 4)$
6. $[8, \infty)$
7. $[2, 11)$
8. $f^{-1}(x) = 7(5)^{10-x}$
9. $h(x) = g^{-1}(x) = \frac{1}{4}(3)^{\frac{1}{5}x + \frac{2}{5}}$
10.
 - a. Domain of f : $(8, \infty)$ Range of f : $(-\infty, \infty)$
 - b. Domain of f^{-1} : $(-\infty, \infty)$ Range of f^{-1} : $(8, \infty)$
 - c. $f(12) = 0$
 - d. $f^{-1}(12) = 72$
 - e. $f^{-1}(x) = 4(2)^{\frac{x}{3}} + 8$