Practice Problem 1

The function g, is given by the $g(x) = \log_8 x$. The function h is given by $h(x) = \log_8(x^6)$. Which of the following would correctly describe a transformation for which the graph of h is the image of the graph of g?

(a) A horizontal dilation by a factor of 6

(b) A horizontal dilation by a factor of $\frac{1}{6}$

(c) A vertical dilation by a factor of 6

(d) A vertical dilation by a factor of $\frac{1}{6}$

Practice Problem 2

The function f is given by $f(x) = \log_b\left(\frac{c}{d}\right)$, where b, c, and d are all positive integers. Which of the following is an equivalent representation of $f(x)$?

(a) $\frac{\log_b c}{\log_b d}$

(b) $\log_b c + \log_b d$

(c) $\log_b c - \log_b d$

(d) $\log_b(c - d)$

Practice Problem 1 Solution:

(c) A vertical dilation by a factor of 6.

Using the property: $\log_b x^a = a \cdot \log_b x$, you can rewrite $h(x) = 6 \cdot \log_8 x$. Since $h(x) = 6 \cdot g(x)$, then the image is a **vertical** translation of $g(x)$ by a factor of 6.

Practice Problem 2 Solution:

(c) $\log_b c - \log_b d$

Using the property: $\log_b \left(\frac{c}{d}\right) = \log_b c - \log_b d$, (c) would be the answer.