

**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.

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