

**Practice Problem 1**

The function  $g$  is given by  $g(x) = 2^{3x} + 4$ . Which of the following is an equivalent form for  $g(x)$ ?

- (a)  $g(x) = 8 \cdot 2^x + 4$
- (b)  $g(x) = 8^x + 4$
- (c)  $g(x) = 2^x + 12$
- (d)  $g(x) = 8^x + 6$

**Practice Problem 2**

The function  $f$ , is given by  $f(x) = 5^{(3x)}$ . Which of the following statements describes characteristics of the function  $f$  in the  $xy$ -plane?

- (a) The graph of  $f$  is a vertical dilation of  $y = 5^x$ , and  $f(x)$  is equivalent to  $125^x$ .
- (b) The graph of  $f$  is a vertical dilation of  $y = 5^x$ , and  $f(x)$  is equivalent to  $125 \cdot 5^x$ .
- (c) The graph of  $f$  is a horizontal dilation of  $y = 5^x$ , and  $f(x)$  is equivalent to  $125^x$ .
- (d) The graph of  $f$  is a horizontal dilation of  $y = 5^x$ , and  $f(x)$  is equivalent to  $125 \cdot 5^x$ .



### Practice Problem 1 Solution:

(b)  $g(x) = 8^x + 4$

Using the property:  $a^{xy} = (a^x)^y$ , you can rewrite  $2^{3x} = (2^3)^x = 8^x$ . The function also has a vertical translation of 4 units which does not affect the change of base of the exponential expression.

### Practice Problem 2 Solution:

(c) The graph of  $f$  is a horizontal dilation of  $y = 5^x$ , and  $f(x)$  is equivalent to  $125^x$ .

Using the property:  $a^{xy} = (a^x)^y$ , you can rewrite  $5^{3x} = (5^3)^x = 125^x$ . The function  $f(x) = 5^{(3x)}$  represents a horizontal dilation of the function  $y = 5^x$  by a factor of  $\frac{1}{3}$ .

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