**Warm-up:**
**Identify the *B*-Value and describe the transformation of the graph.**

1) $f(t)=1000(1.02)^{2t}$

2) $f(t)=1000(1.02)^{\frac{1}{2}t}$

An exponential function can be rewritten to show an expression with no *B*-value transformations.

## Worked Example

Given the function $h(x) = 2^x$, consider the function $t(x) = h(3x)$.

$t(x) = h(3x)$

$t(x) = 2^{3x}$

You can rewrite $t(x)$ with no *B*-value transformation.

$t(x) = 2^{3x}$

$= (2^3)^x$

$= 8^x$

7. **Explain the steps to rewrite a function with no *B*-value transformation. What effect does rewriting have on the *b*-value of the original function?**

8. **Given the function $f(x) = 2^x$:**

   a. **Rewrite $c(x) = f(2x)$ as an exponential function with no *B*-value transformation.**

   b. **Rewrite $b(x) = f(-2x)$ as an exponential function with no *B*-value transformation.**

# How Will It Change?

Consider each situation, which can be modeled by an exponential function. What effect would increasing or decreasing the *B*-value have in each situation?

**1. Carla's savings account opens with a balance of $500 and earns 4% interest every year.**

$$f(t) = 500(1.04)^t$$

**2. A community art club started with a membership of 1000 people and has been decreasing at a rate of 5% every week.**

$$f(t) = 1000(0.95)^t$$

**3. Scientists monitoring cell growth observed that a starting population of 2 million cells doubled every minute.**

$$f(t) = 2{,}000{,}000(2)^t$$

**4. The frequency of the sound produced by notes on a keyboard doubles every 12 notes you move to the right.**

$$f(t)=1(2)^{t}$$