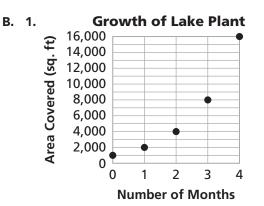## Answers to Problem 2.1

A. **1.** $a = 1{,}000(2^n)$ (Variable names may vary.)

2. a is the surface area of the lake covered after n months. 1,000 is the area in ft^2 covered now (at time 0). The growth factor is 2; it represents the doubling of the area each month.

3. Possible answer: All of the equations in Investigation 1 were of the form $y =$ some number raised to an exponent, such as $y = 2^n$ or $y = 3^{n-1}$, and there was no number in front of the 2 or 3. In this equation, $a = 1{,}000(2^n)$, there is a number in front of the 2. Some students will observe that this situation is more like the ballots than like the ruba situations, with a starting point at $x = 0$ instead of at $x = 1$.

B. **1.**

Growth of Lake Plant

2. This graph has a y-intercept of (0, 1,000), while the ballot situation has a y-intercept of (0, 1). The ruba situations' graphs all started at (1, 1). In the ruba situations, the y-intercept had no meaning in the story because there is no such thing as square 0.

3. Yes; On the graph, two points are never plotted at different y-values for one x-value. Intuitively, this means that the area is a specific size at a single point in time. Since growth continues as time passes, this relationship is a function. **Note:** Even if growth stopped, time still passes and the relationship would be a function.

C. **1.** After 12 months, $1{,}000(2^{12}) = 4{,}096{,}000$ ft^2 will be covered.

2. It will take between 14 and 15 months for the plant to cover all 25,000,000 ft^2 because $1{,}000(2^{14}) = 16{,}384{,}000$ and $1{,}000(2^{15}) = 32{,}768{,}000$.