**Simplifying Exponential Expressions**

**Example 1**

A microorganism’s ability to survive is proportional to its surface area to volume ratio. The shape of many microorganisms can be approximated by a sphere. Determine the ratio of the surface area of a sphere to its volume. Which microorganisms have a greater chance of survival? Large or small?

**Example 2**

Evaluate the expression when and .

Method 1 Method 2

**Example 3**

Simplify the expression

**Example 4**

Simplify the expression

**Example 5**

Simplify the expression