1. **Body Mass Index.** The body mass index is defined by \( B(x, y) = \frac{703x}{y^2} \), where \( x \) is weight in pounds and \( y \) is height in inches.
   
   a) A child weighs 65 lb and is 42.7 in tall. Find the child’s body mass index.
   
   b) Over the next 6 month, the child grows to 77 lb and 49.5 in. Use linearization to estimate the child’s new body mass index.

2. Compute the Jacobian of \( f \) and \( g \).

\[
f(x, y) = x + 3y, \quad g(x, y) = x - 2y
\]