The goal here is to approximate $\sqrt{x}$ for values near $x = 4$.

Let $f(x) = \sqrt{x}$.

1. Pick a point x_0 near $x = 4$ where you know $\sqrt{x_0}$.
   (*Hint:* Square a number close to 2)
2. Use the points $(4, 2)$ and $(x_0, \sqrt{x_0})$ to approximate $f'(4)$.
3. Find an equation for the line tangent to the graph of $f(x)$ at $x = 4$.
4. Plot $f(x)$ and the tangent line on the same set of axes. Do they look close to each other near $x = 4$?
5. Use your equation of the tangent line to approximate $\sqrt{4.01}$. How close is your answer to the "real" value?
6. Use the same process to approximate $\sqrt{8.95}$.
   (*Hint*: Look at the tangent line near $x = 9$.)