Consider the functions $f(x) = x^2$ and $g(x) = \sqrt{x}$.

1. Use linear approximation to approximate the value of $f(3.01)$.
2. Use a calculator to find the actual value of $f(3.01)$. Is this value larger or smaller than your approximated value?
3. Use linear approximation to approximate the value of $g(4.01)$?
4. Use a calculator to find the actual value of $g(4.01)$. Is this value larger or smaller than your approximated value?
5. Now, we'll try to explain what's happening here. Compute the functions $f''(x)$ and $g''(x)$. What do you notice about these functions? Are they positive or negative?
6. Using the fact that the second derivative is the rate of change of the first derivative, explain why your approximated answers were larger or smaller than the actual functions values for the functions f and g above.