

1. What is a good approximation for the value of $\sqrt{102}$?
2. What is a good approximation for the value of \sqrt{x} when x is not 100, but close to 100?
3. Can you turn your approximation into a *function* that would approximate \sqrt{x} near 100? That is, can you find a function $g(x)$ (it might be a really boring function...) such that $g(x) \approx \sqrt{x}$, at least when x is close to 100? And can you use your function to approximate $\sqrt{99}$?
4. How could we do a better job of approximating \sqrt{x} near 102?

5. Thinking of your function $h(x)$ as a polynomial, what degree is it? What about $g(x)$? What about \sqrt{x} ?

6. Can we do an *even* better job of approximating \sqrt{x} near 100? What is a fundamental difference between the graphs of $h(x)$ and \sqrt{x} , that maybe we could use?

7. Can you find an approximation of $\ln 0.9$ using a degree 3 Taylor polynomial?

(a) What center will you use? Why (two reasons)?

(b) Find a degree three polynomial $P_3(x)$ that approximates $\ln x$ close to the center you picked.

(c) Use $P_3(x)$ to give an approximate value of $\ln 0.9$.