Math 1110: Linearization Pre-class for Oct 15 (Mon)

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The goal of this activity is to see how we can *compute* (as opposed to only look at) an approximation of a given function around some points.

1. Using Desmos or Geogebra, draw the graph of the function $\sqrt{x}$.

2. Use 3 line segments to approximate the function from 0 to 9.

3. Compute the equation of the tangent line y_1 at $x = 1$. Then draw this line y_1 on the graph.

4. When you zoom in around $(1, 1)$, what do you notice about the function and the tangent line?
   A specific feature becomes more prominent as you zoom in.

5. Compute now the equation of the tangent line y_9 at $x = 9$ and draw it on the graph.

6. When you zoom in around $(9, 3)$, what do you notice about the function and its tangent line? What is similar and what is different from zooming in around $(1, 1)$?

7. Can you compute the exact value of the point on the tangent line y_1 for the $x = 2$. What is it? Same question for y_9 at $x = 10$.

8. What about computing the exact values of $\sqrt{2}$ and $\sqrt{10}$?

9. How can these tangent lines be useful for approximating the values of $\sqrt{2}$ and $\sqrt{10}$?

10. Finally, how can we compute the equation of the tangent line that touches the function $x = 6$. What works and what doesn't work? What do you conclude from that?