1. Suppose $f(x) = (1-x)^{-1/2} = \frac{1}{\sqrt{1-x}}$.

a) Find the fourth Taylor polynomial, $T_4(x)$, centered at $a = 0$ for $f$.

b) Sketch the graphs of $y = f(x)$ and $y = T_4(x)$ in the window $[-1, 1] \times [0, 3]$.

c) Sketch the graph of $f(x) - T_4(x)$ in the window $[-.5, .5] \times [-.01, .01]$.

d) Use Taylor's inequality (the **Error Bound**) to find an overestimate for $|f(x) - T_4(x)|$ on the interval $[-.5, .5]$. Your answer should be an explicit number valid for every $x$ on this interval.

2. A tissue culture grows until it has an area of 9 cm$^2$. Let $A(t)$ be the area of the tissue at time $t$. One model for the growth rate is $A'(t) = k\sqrt{A(t)}\Big(9 - A(t)\Big)$ for some constant $k$. This is reasonable because the number of cells on the edge is proportional to $\sqrt{A(t)}$ and most of the growth occurs on the edge.

a) Without solving the equation, show that the maximum rate of growth occurs at any time when $A(t) = 3$ cm$^2$.

b) Assume that $k = 6$. Find the solution corresponding to $A(0) = 1$ and sketch its graph.

c) Do the same for $A(0) = 4$.

3. Find a solution of $y' = \dfrac{y}{1-x^2}$ which passes through $(0, 1)$. Write the solution explicitly as $y = f(x)$. Graph the solution curve. What is the domain of the function describing the solution curve?

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One problem will be selected for a writeup to be handed in at the next recitation meeting. Please see Professor Greenfield's Math 152 webpage for this semester to learn which problem to hand in.