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 \([-0.5, 0.5] \times [-0.01, 0.01]\).

d) Use Taylor's inequality (the Error Bound) to find an overestimate for \( |f(x) - T_4(x)| \) on the interval \([-0.5, 0.5]\). 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 \( A'(t) = k\sqrt{A(t)}(9 - A(t)) \) 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 \( y' = \frac{y}{1 - x^2} \) 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?

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.