Homework for Week 5
April 26-30, 2010

Written Homework

Your carefully written solutions to the following questions will be due at the beginning of class on Monday, May 3.

1. The lengths of some fish are modeled by a von Bertalanffy function. For Pacific halibut, this function has the form

\[ L(t) = 200(1 - 0.956e^{-0.18t}) \]

where \( L(t) \) is the length (in centimeters) of a fish \( t \) years old.

(a) Find the rate of change of the length of the fish as a function of time.

(b) At what rate is the fish’s length growing when it is exactly 2 years old? Include units in your answer.

(c) How old will the fish be when it is growing at a rate of 6 centimeters per year?

2. Let \( f(x) = A \sin(\frac{2\pi}{B}x) \). The graph of this function has a tangent line with a slope of 4 at the point \( \left( \frac{B}{2}, 1 \right) \). Find the exact values of \( A \) and \( B \).

3. The derivative of \( \sec(x) \) is \( \sec(x) \tan(x) \). Verify this by calculating the derivative, using the fact that \( \frac{d}{dx}[\cos(x)] = -\sin(x) \). Show all work, and explain each step in your calculation.