1. Consider a map given by the function

\[ f(x) = 3x - x^3 \]

Find all the fixed points and classify their stability. Use Maple to iterate graphically starting at the points \( x_0 = 1.9 \) and \( x_0 = 2.1 \). Try to explain the dramatic difference between the two orbits.

2. Find examples of a saddle-node bifurcation and a period-doubling bifurcation in a family of one-dimensional maps which are NOT covered in the textbook. Give a brief description of your example, and illustrate its properties with a Maple worksheet (Caution: identical answers may be considered cheating).

Bonus question – plus 3 points to the final mark. Write a program which computes a first few approximations to the Feigenbaum universal constant \( \delta \) in the family \( f_\mu(x) = \mu \pi \sin(x) \) on the interval \([0, \pi]\).