Math 2415
Homework on 14.4

1. Find an equation for the tangent plane to the surface $z = \sqrt{y - x}$ at the point $(x, y, z) = (1, 2, 1)$.

2. Let $f(x, y) = x^2y^2 - x$.

   (a) Find the equation for the tangent plane to the graph of f at $(2, 1, 2)$.

   (b) Use a linear approximation to find the approximate value of $f(1.9, 1.1)$.

3. Calculate the linearization of the function f at the point P and use it to estimate $f(Q)$ for

   (a) $z = f(x, y) = (x - y)\cos(2\pi xy)$ where $P = (1, \frac{1}{2})$ and $Q = (1.1, 0.4)$

4. Problem 2 from http://mathquest.carroll.edu/libraries/MVC.student.14.03.pdf

5. Problem 10 from http://mathquest.carroll.edu/libraries/MVC.student.14.03.pdf

6. The period of oscillation of a pendulum of length L is given by the formula $T = 2\pi\sqrt{L/g}$, where g is the acceleration due to gravity. Estimate the change in the period of the pendulum if its length is increased from $L = 30$ cm to $L = 31$ cm and it is simultaneously moved from a location where $g = 9.8$ m/s^2 to one where $g = 9.85$ m/s^2.