

Worksheet 7

SI with Ian

Week of March 31th

Feel free to use notes and other resources, however, please do not use online calculators. Also if you are printing this worksheet out before hand (thank you) please wait to complete the worksheet until the SI session.

1 Session Problems and Agenda

- 1 A tank of water in the shape of a cone is being filled with water at a rate of $12 \frac{m^3}{sec}$. The base radius of the tank is 26 meters and the height of the tank is 8 meters. At what rate is the depth of the water in the tank changing when the radius of the top of the water is 10 meters?
- 2 A man starts walking north at 4 ft/s from a point P. Five minutes later a women starts walking south at 5 ft.s from a point 500 ft due east of P. At what rate are the people moving apart 15min after the woman starts walking?
- 3 Find the critical numbers of the function: $f(\theta) = 2 \cos(\theta) + \sin^2(\theta)$.
- 4 Verify that $f(x) = \ln(x)$ satisfies the MVT. Then find all numbers c that satisfy the MVT on $[1,4]$.
- 5 Find all of the numbers c which satisfy Rolle's Theorem for the function $f(x) = x^2 - 2x - 8$ on $[-1, 3]$.
- 6 Using the Mean Value Theorem show that $f(x) = x^3 - 7x^2 + 25x + 8$ has exactly one root.
- 7 Let x and y be two positive numbers such that $x + 2y = 50$ and $(x + 1)(y + 2)$ is a maximum.