

Math 10A with Professor Stankova

Quiz 4; Wednesday, 9/20/2017

Section #107; Time: 11 AM

GSI name: Roy Zhao

Name: _____

Circle True or False or leave blank. (1 point for correct answer, -1 for incorrect answer, 0 if left blank)

1. True False If a function f has a local minimum at $x = c$, then $f''(c) > 0$.
2. True False For a function $f : [a, b] \rightarrow \mathbb{R}$, the set of critical points of f is $\{x \in [a, b] : f'(x) = 0\}$.

Show your work and justify your answers. Please include all units in the final answer.

3. (10 points) Susie is filling up an upside down conical container with paint (so the point faces down). The container measures with a total height of $2m$ and total width of $2m$.
 - (a) (6 points) Write a formula that expresses the total volume V of paint in container as a function of the height h of the smaller cone that the paint forms. (Write a formula involving only V , h , and constants).
 - (b) (2 points) Assuming that Susie is filling up the cone at a rate of $10^{-3}\pi m^3/s$, how fast is the height of the paint increasing when it is at a height of $1m$?
 - (c) (2 points) Assuming that Susie is still filling up the cone at a rate of $10^{-3}\pi m^3/s$, how fast is the height of the paint increasing when she has already poured in $\pi/12m^3$ of paint?