

**Math 10A with Professor Stankova**

**Quiz 4; Wednesday, 9/20/2017**

**Section #106; Time: 10 AM**

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**Name: \_\_\_\_\_**

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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 maximum 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) Oski is  $1m$  tall and standing  $100m$  away from the base of a  $100m$  pole. On top of this pole is a set of floodlights which are shining down on him.
  - (a) (6 points) Write a formula that expresses the height of Oski's shadow  $x$  as a function of how high the floodlights are  $h$ . (Write a formula only involving  $x$ ,  $h$ , and constants).
  - (b) (2 points) The floodlight suddenly falls and is falling at a constant rate of  $1m/s$ . How fast is the length of Oski's shadow changing when the floodlight is  $51m$  from the ground? Interpret your answer (lengthening vs. shortening).
  - (c) (2 points) The floodlight is now falling at a constant rate of  $2m/s$ . How fast is the length of Oski's shadow changing when the floodlight is  $51m$  from the ground? Interpret your answer (lengthening vs. shortening).