Name: _____

Task Master: _____ **Cynic:** _____ **Recorder:** _____

MTH 254 $\qquad\qquad$ **THE PUDDLE** $\qquad\qquad$ Spring 2015

Working in small groups (3 or 4 people), solve as many of the problems below as possible. Try to resolve questions within the group before asking for help. Each group member should then write up the solutions in their own words; Show your work! Full credit will only be given if your answer is supported by calculations and/or explanations as appropriate.

1. You are walking through a puddle whose depth in millimeters is given by

$$h = 50 - 2x^2 - 2y^2$$

   with x and y in feet (and where "50" and "2" have appropriate units). Your path through the puddle is given by

$$x = 3t \qquad y = 4t$$

   with t in seconds (and where "3" and "4" have appropriate units). Your current position is given by $x = 3$, $y = 4$.

   (a) At your current position, how fast is the depth of water through which you are walking changing per second?

   (b) At your current position, how fast is the depth of water through which you are walking changing per foot?

   (c) How fast are you walking?

   (d) Answer these same questions again using a different method.

   (e) How fast would the depth be changing if you walked "East"?

   (f) How fast would the depth be changing if you walked "Northeast"?