1. The depth of a puddle in millimeters is given by

\[ h = \frac{1}{10} \left( 1 + \sin(\pi xy) \right) \]

Your path through the puddle is given by

\[ x = 3t \quad y = 4t \]

and your current position is \( x = 3, y = 4 \).

(a) How fast is the depth of water through which you are walking changing per unit time?

(b) How fast is the depth of water through which you are walking changing per unit distance?

(c) **FOOD FOR THOUGHT** (optional)

   There is a walkway over the puddle at \( x = 10 \). How fast is the depth of water through which you are walking changing per unit distance *towards the walkway*. 