

1 The puddle

The depth of a puddle in millimeters is given by

$$h = \frac{1}{10}(1 + \sin(\pi xy))$$

Your path through the puddle is given by

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

and your current position is $x = 3$, $y = 4$, with x and y also in millimeters, and t in seconds.

- (a) At your current position, how fast is the depth of water through which you are walking changing per unit time?
- (b) At your current position, 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 $x = 10$. At your current position, how fast is the depth of water through which you are walking changing per unit distance *towards the walkway*.